ASSESSING VALUE FOR MONEY

An Updated Guide to Infrastructure Ontario's Methodology - March 2015

This is a technical document. Definitions for many concepts and terms may be found in the glossary at the end.

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February 20, 2015

Infrastructure Ontario
777 Bay Street, Suite 900
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To: Infrastructure Ontario

Dear Sir / Madam

ASSESSING VALUE FOR MONEY: A GUIDE TO INFRASTRUCTURE ONTARIO'S METHODOLOGY

We are pleased to have been given the opportunity to review "*Assessing Value for Money: An Updated Guide to Infrastructure Ontario's Methodology*" (the "Guide").

A value for money assessment consists of a comparison of the estimated, total risk-adjusted cost of delivering a public infrastructure project using alternative financing and procurement relative to the traditional public sector project delivery method.

We confirm that the value for money methodology described in the Guide will, when properly applied using valid assumptions, yield fair and reasonable results.

We also confirm that the methodology is consistent with a number of best practices observed in other Canadian and international jurisdictions.

Yours very truly,

Deloitte LLP

Deloitte LLP

IO's VFM Methodology

1. Introduction

Infrastructure Ontario (IO), a Crown Corporation wholly owned by the Province of Ontario, delivers public infrastructure projects using a project delivery model called Alternative Financing and Procurement (AFP). The AFP model brings together private and public sector expertise in a unique structure that transfers, to the private sector partner, the risk of project cost increases and scheduling delays typically associated with traditional project delivery. IO uses several AFP models to deliver projects. These are the Build-Finance (BF), Design-Build-Finance (DBF), and Design-Build-Finance-Maintain (DBFM) models. The current list of projects assigned to IO fall under a variety of asset classes including transit, transportation, hospitals, courthouses, post-secondary institutions, detention centres etc. The methodology set out in this guide therefore relates to BF, DBF and DBFM projects, across all asset classes.

Historically, all projects with a cost greater than $50M were screened for their suitability in being delivered as an AFP project. Recently, and following a recommendation from the Auditor General's report, the screening threshold has been increased to $100M, consistent with practices in other jurisdictions. The decision to proceed with an AFP delivery model is ultimately based on both qualitative considerations (e.g. size and complexity of the project) and a quantitative assessment. The quantitative assessment (called Value for Money or VFM) is used to assess whether the AFP delivery model will achieve greater value for money to the public as compared to a traditional delivery model.

The VFM assessment is a common practice globally – a recent study by the Organisation for Economic Co-operation and Development (OECD) found that 19 out of 20 countries surveyed adopt a VFM assessment for proposed P3 projects. Leading P3 jurisdictions around the world have been successful in establishing standard methodologies to guide the application of VFM assessments in support of their P3 programs.

IO's standard VFM methodology was developed in 2007 and recently underwent a refresh to reflect IO's significant history of project experience. The due diligence conducted during the refresh was also informed by the recommendations from the report of the Office of the Auditor General.

The updated VFM Guide is intended to provide greater information and insight about IO's use of best practices, as well as to provide further transparency about VFM and the AFP model for our clients and stakeholders. The process to refresh our VFM methodology involved:
- A review and assessment of IO's historical AFP project experience to ensure the methodology reflected actual project data;

- Consultations with key stakeholders and Ministry client groups, incorporating feedback and lessons learned;
- Engagement of external experts who brought their latest knowledge and expertise to bear; and
- A review of research and published reports on both traditional and P3 projects from comparable markets (e.g. UK, Australia).

The refinements reflected in this updated VFM Guide include:
- Simplified risk matrices;
- Introduction of an innovation factor;
- Lifecycle cost adjustment for traditional delivery;
- Removal of insurance premium from 'Competitive Neutrality'; and
- Enhancements to the risk assessment process.

2. When is VFM used?

Value for money in AFP projects is demonstrated when the benefits of transferring risks are greater than the costs of doing so. The VFM assessment is used by the government, IO clients and the IO Board of Directors to ensure that the choice of proceeding via AFP remains the best value proposition for the public sector.

The VFM assessment compares the total risk-adjusted cost borne by the public sector of delivering a project via AFP to a traditional design, bid, and build (DBB) process. At its core, VFM compares the higher financing and transaction costs inherent in the AFP model to the benefits of transferring risks to the private sector combined with the innovation that comes from an integrated, performance based approach to the project.

IO engages an external advisory firm to develop a project specific financial model to support the VFM assessment. The VFM is assessed at three stages in the procurement process, as follows:

STAGE #1 - Authorization to release the Request for Proposal (RFP)
The release of all RFPs by IO must be approved by its Board of Directors. The IO Board does not approve release of an RFP unless, among other factors, positive VFM is demonstrated.

STAGE #2 - Authorization to enter into the Project Agreement
Upon close of the RFP process, bids are evaluated by an evaluation committee. The preferred bid is identified and the VFM is updated to reflect the actual bid costs. The updated VFM is presented to the IO Board of Directors. The IO Board of Directors will not approve proceeding with the AFP procurement unless positive VFM is demonstrated.

STAGE #3 - Publication of the value for money analysis post Financial Close

After the project agreement has been finalized and financial close achieved, IO prepares and releases a final VFM analysis in a public report. The objective of the report is to provide the public and others with an understanding of the project and the basis for the decision to deliver the project via AFP.

3. How is VFM Calculated?

The VFM compares the total project costs, expressed in dollars measured at the same point in time, related to the following:

1. **Traditional DBB Project Delivery:** Estimated costs to the public sector of delivering an infrastructure project using traditional procurement processes for that sector (under which total estimated costs are known as the *public sector comparator, or PSC*), and
2. **Alternative Financing and Procurement (AFP)**: Estimated costs to the public sector of delivering the same project to the identical specifications using AFP.

The difference between the **PSC** and the **AFP** is referred to as **value for money**. If the cost of delivery under AFP is less than the PSC, value for money is considered positive.

In the illustrative DBF VFM analysis (figure #1), the PSC is shown as the stacked bar on the left of the graph and the AFP is shown as the right hand bar. Both are expressed in terms of dollars measured at the same point in time.

Figure #1 - Illustrative DBF VFM ($'s millions):
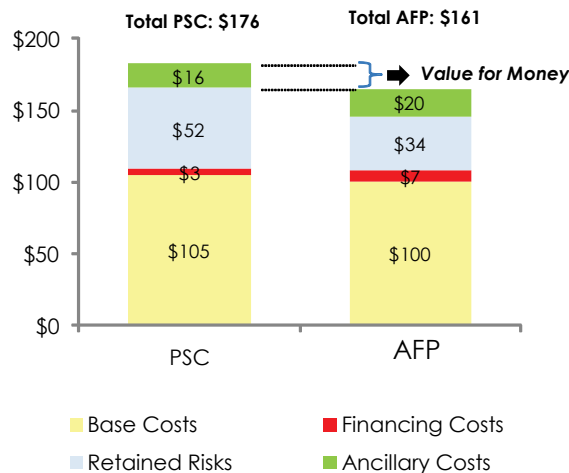
The comparative cost components will vary slightly in magnitude between the two procurement methods (as shown by the coloured segments in the figure). The difference between the estimated total project costs is the VFM and is calculated as:

$$\frac{(\text{Total Traditional Project Costs} - \text{Total AFP Project Costs})}{\text{Total Traditional Project Costs}}$$

$$= \frac{(\$176 - \$161)}{\$176}$$

⟹ **VFM = $15 or 9%**

Stated in percentage terms, the VFM for the hypothetical project is an estimated 9%.

4. Inputs and Assumptions

The VFM assessment relies on a number of inputs and assumptions[1], including:
- Base Costs (Construction, maintenance and lifecycle costs as applicable);
- Financing costs;
- Ancillary Costs; and
- Retained Risk.

Each of these categories are discussed in further detail below.

Base cost of the project

In the estimation of base costs, IO relies on external cost consultants to estimate the cost of the project if delivered under an AFP model. This becomes the starting point for both the PSC and AFP models. These costs are then adjusted for:

- ***An innovation factor***

The new methodology now includes an Innovation Factor[2] which recognizes that the base cost of the PSC will be higher than the AFP model as a result of:
- The use of performance based specifications in AFP projects allow contractors to consider innovative and alternative ways to deliver a project such that the hard costs of a project are lower as compared to a traditional delivery which uses more prescriptive specifications (for

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[1] The cost components in the VFM analysis include only the AFP portions of the project costs. Non AFP related project costs, such as land acquisition costs, that would be the same irrespective of the delivery method are excluded from the VFM calculation.

[2] Note: the innovation factor is applied to DBF and DBFM delivery models only.

example, innovation with regards to construction means and methods, design innovation, schedule, etc.); and

- Increased competitive environment on AFP projects which have resulted in cost reductions.

The AFP approach requires the creation of unified teams bringing together all of the skills required to deliver the project, including project management, finance, planning, architecture, engineering, contracting, and a range of specialized services. This, combined with output based specifications and a highly competitive procurement process, has successfully driven innovation in the process resulting in cost reduction. MMM Group has stated that the benefits of having all project stakeholders (including the owner) working together from the start, include:

- The absence of conflict in an open-book, transparent project definition and costing process;
- The opportunity to create the best possible product through a collaborative effort involving all parties applying innovation to reduce project costs;
- The addition of constructability to the process of design and development;
- The provision of a high level of date certainty by shortening time frames from what would be the case in conventional design/tender/construct delivery;
- The allocation of project risks to those best suited to manage them; and
- The maintenance of a competitive, transparent bidding process.

MMM Group undertook two studies concerning budgeting capital costs in the highway and transit sectors. These studies reviewed project data and obtained professional advice regarding the difference in capital costs for major components of civil works (both highways and transit) and transit vehicle acquisition that could be expected under different methods of procurement. A key part of the studies involved interviews conducted with leading Canadian and international construction and concession companies in the AFP/PPP sector. Companies such as PCL, SNC Lavalin, Dragados, ACS, Ellis Don, AECON and Hochtief were interviewed.

The study findings confirm that AFP projects deliver significant savings in both hard and soft costs through:

- Synergies and avoidance of duplication;
- The application of value engineering and innovation; and
- The avoidance of 'scope creep'.

The main advantages of AFP projects identified in the survey of major contractors and developers are:

- Enhanced project innovation;
- Better life cycle costing;
- Condensed schedules;
- The transfer of specific risks to the party best able to manage them; and
- The opportunity to select the best team to develop and deliver the project.

In order to gather additional data in support of the assumptions and findings of this report, a questionnaire was developed for the purpose of interviewing leaders in the AFP/PPP industry. The contractors/developers all agreed that civil works provide the greatest opportunity for innovation and cost savings with the margin of savings of 10% to 15%, and in some cases as high as 20%-30%. The contractors and developers all confirmed that contractors continually look for opportunities to add value and reduce the costs of their bid. By undertaking value engineering investigations and considering innovative and alternative ways to deliver a project where savings can be realized, they are able to reduce the 'hard' costs of a project. Major contractors are more familiar with new and different civil construction methods than most owners are and they are more willing to assume risk to achieve savings in both cost and schedule. Under traditional delivery, owners tend to do the opposite - they rely on reliable past means and methods, avoid risk to the extent possible and continue to rely on past experiences. [3]

IO has conducted its own analysis of the impact of innovation, based on the projects that had reached substantial completion as at March 31, 2014. We looked at both the average difference between the AFP project budget and the average price of the bids received at the RFP stage and at the dispersion between the winning bid price compared to the average price of all bids received. While neither are perfect measures of innovation, both provide insight into how the bidding consortia may be working to win AFP projects. The result of this analysis shows a potential range of innovation from 7% to 12% for DBFM projects. Taking both the third party review and IO's own data together, some level of innovation, in the range of 10-15% for DBFM projects, can be implied to exist through the use of the AFP approach. Going forward, IO will continue to work with its own data and independent third parties including impartial academics to validate and further refine our estimate of the innovation factor.

- ***A lifecycle cost adjustment factor***

Over the operational life of an asset, the primary risk to the owner is called the asset residual risk. Altus defines this risk as 'the risk that, on expiry of the contract, the asset's value or condition does not achieve the quality standard originally prescribed'. In a DBFM model, the asset is held to specific quality standards that are required to be maintained through 30 years concession. These standards, along with rigourous hand back requirements, incent the private partner to maintain the asset such that it is in good condition 30 years after it is built. Under a traditional delivery approach, the asset is more susceptible to neglect or inadequate funding, diminishing asset quality and expected service life[4]. Failure to consistently invest in maintenance and lifecycle repairs over the life of an asset can lead to significant reductions in its useful life. Many asset owners, including governments, have historically

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[3] MMM Group, Budgeting and capital costs in the transit and highway sector: Difference between Design-Bid-Build & Alternative Financing and Procurement, January 2011.

[4] Altus Group Limited, Value for Money Risk Analysis Review, Hospital Projects: Design, Build, Finance, Maintain, March, 2015.

under-invested in lifecycle spend in this way. For instance, over the past several decades, the province spent about 60% of its estimated required capital investment, with the other 40% deferred to future years. This approach to asset management is not uncommon in government as the public sector tends to rationalize short term decisions to defer spend on maintenance without considering the impact in the long term. It is widely recognized that the cost to replace an asset that has not been maintained far exceeds the cost of the maintenance itself.

One way to measure the health of a building portfolio is through the Facility Condition Index (FCI), which compares the estimated cost to complete deferred maintenance to the value of the asset. An asset with an FCI over 10% is considered in 'poor' condition; 50% is deemed a 'critical' state of disrepair and by 60%, the standard is to demolish and rebuild the asset rather than to repair. In the province's traditionally owned portfolio, 7% of buildings are past the critical FCI point; in the next 10 years, given the aging of the asset base, this will rise to over 75% of all buildings[5]. By incenting asset quality through the 30 year contract period, the AFP model should result in an asset that is handed back in a condition that avoids this critical risk and future cost.

IO's VFM methodology captures this risk by a) reducing the actual spend on lifecycle under a traditional model over the 30 year operating term, reflecting our historically observed under spending and b) quantifying the expected impact and cost of this deferred maintenance in the risk assessment (ultimately adding to the owner's overall project costs).

- **Competitive Neutrality, as applicable**

For DBFM projects, the base costs under AFP delivery will also include a provision for certain taxes payable by the private sector (depending on the structure of the project company). The equivalent costs will not appear under the PSC, as the public sector may be exempt from paying certain taxes. These perceived cost advantages could be misleading. As a result, an adjustment called the "competitive neutrality adjustment" is required to negate this potentially misleading cost of AFP delivery. The adjustment consists of adding such costs to the PSC.

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[5] Information taken from IO's internal data on the Government Real Estate Portfolio as at March 31, 2014

Financing Costs

One of the common elements of all the AFP models used by IO is the use of private finance for some period of the project.

Traditional Model	AFP Model
The public sector makes progress payments throughout construction. The public sector incurs an opportunity cost for having paid earlier (payments through the construction period) as compared to the AFP delivery.	Government pays a portion of the capital cost either during construction and/or at the end of construction and makes a series of regular service payments, starting at substantial completion and stretching over the term of the operating agreement. This requires that the private party borrow at private financing rates to pay for the project costs during construction and carry that financing until fully repaid by the public sector.

Under a traditional delivery model, there is a notional cost of financing to the province inherent in the 'opportunity cost' of having to pay for a traditionally build projects earlier than it would have under an AFP model.   This notional public sector financing cost is calculated at the current Provincial cost of borrowing or weighted average cost of capital and is reflected in the discount rate used to assess and compare the project costs.

At the initial VFM stage, IO often engages independent, external financial advisors who provide assumptions on the financing costs and fees that a private party is likely to be charged under an AFP model (and will pass through to the public sector as a cost). In addition, IO studies the financing costs and fees observed in the bids received on earlier projects to develop private financing assumptions. When VFM is reassessed (stage #2), the actual private financing cost in the preferred bid is used to replace the estimated private financing costs in the AFP model.

Ancillary project costs (e.g. transaction costs, etc.)

There are significant costs associated with the planning and delivery of a large complex project that could vary depending on the project delivery method. For example, there are costs related to each of the following:

- Project management: internal and/or external project management fees, whether direct or indirect, including the incremental cost of Infrastructure Ontario providing its services under alternative financing and procurement.

- Transaction costs: additional transaction costs are typically incurred under alternative procurement and financing, including legal, capital markets, fairness, transaction, architectural and engineering advisory fees.

Ancillary costs are quantified and added to each model as applicable. While, the overall ancillary costs, including transaction costs, are likely to be higher under AFP given the greater degree of up-front due diligence, the project management costs may be lower under the AFP Model due to efficiencies experienced in the AFP Model.

Retained Risks

The delivery of large complex public projects includes significant risks for owners, designers, and builders. Accounting for these risks is a fundamental part of project planning and budgeting; it is not meaningful or accurate to evaluate projects without accounting for risk. Most risks can – if proper time and attention are devoted to the task – be identified and the range of potential costs quantified. A comprehensive review (termed "risk analysis") of these types of risks and the resulting additional costs needs to be factored into the VFM analysis in advance of the project. Note that the VFM analysis quantifies the risks that continue to be retained by the Province under each delivery model.

In the absence of a single comprehensive database that reliably tracks the occurrence and impact of project risks, IO relies on the professional experience and judgement of external advisors to quantify the risks under each delivery model. IO has engaged Altus Group and MMM Group to develop sector specific risk matrices that are used as a starting point for assessing project risk. These firms have a significant amount of experience delivering projects under both the traditional and AFP approaches. The generic risk matrices represent the typical risks that are present in an infrastructure project and generally, indicate a higher level of owner retained risk for traditional delivery projects in comparison to the AFP delivery models.

IO's methodology requires that a project specific risk workshop be conducted with key stakeholders and industry experts to review and assess the specific attributes of the project that would warrant an adjustment to the generic risk matrix estimation accordingly. This approach ensures that the project specific risks are carefully considered and reflected in the estimation of risk.

There is a growing body of empirical data that supports the notion that traditionally delivered projects have a tendency to run over budget at a rate that is higher than an AFP delivery model. IO has considered this relevant external data, where available, to assess the quantification of risks using a 'top down' approach. We have noted that the vast majority of information available indicates that P3 projects globally have achieved strong performance in terms of on-time and on-budget delivery.

Findings from the Conference Board of Canada published in their 2010 report titled *"Dispelling the Myths: A Pan-Canadian Assessment of Public-Private Partnerships for Infrastructure Investments"* show that out of 55 P3 projects examined in Canada, none exceeded budget and of the 19 that had achieved substantial completion, 17 of these were completed either on-time or ahead of schedule.

Altus Group published a report dated October 16, 2014 on IO's track record in delivering AFP projects; it found that of the 37 AFP projects delivered that had reached substantial completion 36 projects were completed within budget and about 73% were completed on time or within one month of their scheduled completion date.

Similar findings are evidenced in global publications:

- Research conducted by the University of Melbourne[6] compared the performance of 25 P3 projects to 42 traditionally-delivered projects. The research found that P3 projects were 31.5 percent better than traditional projects in terms of on-budget performance[7] and that P3 projects had an average cost escalation post-contract award of 4.3 percent compared to 18 percent for traditionally-delivered projects.

- In 2002, Mott MacDonald completed a study for Her Majesty's (HM) Treasury in the United Kingdom[8] that examined the performance of 50 large infrastructure projects each with values exceeding £40m in 2001 dollars. 11 of the 50 projects used the P3 model and the remainder used the traditional procurement method. The study found that the traditional procurement was on average 17% late relative to the planned schedule and 47% over budget. This is compared to an average of 1% of P3 projects being delivered early with virtually zero cost overruns.

- In the UK, the National Audit Office (NAO) issued a report in 2009 titled *Performance of PFI Construction* that it is similar in scope to the review undertaken by Altus Group for IO's AFP Program. The NAO report indicates that 69 percent of PFI projects were delivered on time[9] and 65 percent of projects were delivered within budget (that number increases significantly to 94 percent when projects that were less than 5 percent over budget are included).[10]

- Infrastructure Partnerships Australia produced a study called "Performance of PPPs and Traditional Procurement in Australia" which compared the performance of 21 PPP projects against 33 traditionally delivered projects. The findings indicated that from the time of original approval to substantial completion, the average cost overrun of traditional projects was 35.3% compared to 11.6% for AFP projects.[11]

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[6] http://www.cefoppp.org/upload/pdf/Report_on_the_performance_of_PPP_projects_inAustralia_when_compared_with_a_representative_sample_of_traditionally_procured_infrastructureprojects_20120524154505.pdf

[7] Based on the inter-quartile for the period from initial project announcement to the actual final costs.

[8] As referenced in a report from Fraser Institute; Using Public-Private Partnerships to Improve Transportation Infrastructure in Canada, May 2013.

[9] In the context of the NAO report, "on-time" delivery refers to projects completed within one month of the date set out in the contract.

[10] http://www2.vlaanderen.be/pps/documenten/2009_performance_pfi_construction%5B1%5D.pdf

[11] http://www.infrastructure.org.au/content/ppp.aspx

- A recognized leader in the study of infrastructure projects, Bent Flyvbjerg produced a report called "Cost Underestimation in Public Works Projects: Error or Lie?" The report looked at cost estimation in traditionally delivered public sector projects and found that on average; actual project costs were 28% higher than estimated. In 9 out of 10 transportation infrastructure projects, costs were underestimated.[12]
- A study from the US Government Accountability Office (1997) called 'Managing the costs of large-dollar highway projects' stated that 23 of 30 highway projects with a value in excess of $100M had costs that increased beyond initial estimates. The increases ranged from 2 to 211% with approximately half of the projects increasing by more than 25%.[13]

The above noted studies and reports support the notion that traditional projects are more likely to result in project cost overruns (as a result of risks materializing) relative to the AFP approach.   This is a common understanding that results from the underlying differences in approach and contractual arrangements between the two models.   IO's risk estimation process quantifies the anticipated cost overrun that would result for the owner under the traditional and AFP deliver models.   By way of example, in a typical hospital project, Altus' base risk matrix would suggest that on average, risks associated with the Policy/Approval phase through to end of Completion and Commissioning would result in an approximate 38%-42% construction cost overrun (if the risks materialized) compared to 7%-9% for an AFP project.   This would appear reasonable given the sample of studies conducted above would suggest a range of 18%-47% expected cost overrun for traditionally delivered projects and up to 12% for AFP (with Ontario's experience suggesting closer to 5%).

As the VFM assessment moves through the various stages of the procurement process, our inputs and assumptions are refined to reflect the most current information and data available. Refer to table 1 for a summary of the sources of information used at various stages in the procurement.

Table 1: Information Sources

Input	Stage 1 VFM - Authorization to release the RFP	Stage 2 VFM - Authorization to enter into the Project Agreement	Stage 3 VFM – Publication of the value for money analysis post Financial Close
Base Cost	Estimated by external cost consultants	Based on the Preferred Proponent's bid data	Based on the Winning Bid as at financial close
Adjustments to Base Cost	The innovation factor and lifecycle cost adjustment are IO estimates pulled from relevant data sources where available – refer to next section for further details on these recent changes to the methodology. These factors remain constant throughout		

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[12] http://flyvbjerg.plan.aau.dk/JAPAASPUBLISHED.pdf
[13] http://www.gao.gov/assets/160/155775.pdf

	the various stages of analysis, unless there is data to support a change.		
Financing Cost	Private sector – financial advisors Public sector – simple average of the Provincial debt	Private sector – based on the Preferred Proponent's bid data Public sector – simple average of the Provincial debt	Private sector – based on the structure/rates as at Financial Close Public sector – simple average of the Provincial debt
Ancillary Costs	Estimate based on IO's experience; consistent throughout analysis.		
Risk Retained by Public Sector	Professional judgement of external advisors with input from key stakeholders on project specific risk adjustments; consistent throughout analysis unless there are changes to risk profile during procurement process and/or base costs.		

5. Summary

IO's VFM methodology is an approach to quantifying and comparing on a risk adjusted basis, the cost of delivering a project using an AFP approach relative to the traditional public sector delivery model.   In the development of this methodology, we have engaged a number of advisors and stakeholders to ensure that:

- We continue to use a methodology that reflects best practice in project assessment;
- We have incorporated lessons learned and relevant project delivery experience; and
- We leveraged data to support our assumptions where available and in the absence of hard data, consulted extensively with professionals in the industry.

In 2014/2015, IO undertook a refresh to its VFM methodology and this document has described a number of the key changes which are summarized below:

1. **Simplified risk matrices:** IO's external consultants[14] have simplified the base risk matrices[15] to provide clarity in the definition of individual risks and to eliminate the potential for redundancy across categories.   In addition, they have updated the assessment of risks to better reflect project experience (both traditional and AFP) and project risk allocation.

2. **Introduction of an innovation factor**: The innovation factor has the effect of increasing the base cost of the PSC relative to the AFP model in recognition of the cost differential that exists

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[14] IO engaged MMM Group Limited and Altus Group Limited to conduct the refresh of the risk matrices.

[15] The Base Risk Matrix is the template developed by asset class and delivery model and is used as a starting point for the risk assessment process. The Base Risk Matrix is then adjusted to reflect project specific risks.

between the two models. The application of this type of factor is a common practice and can be found in methodologies used in other jurisdictions.   A survey conducted by MMM Group in 2011[16] suggested that contractors estimated performance based specifications would result in capital cost savings of 10-15%.[17]

3. **Lifecycle cost adjustment for traditional delivery:** One of the issues highlighted by the Auditor General was the potential for redundancy in the treatment of lifecycle costs and asset residual risk, one of the biggest risks in the delivery of traditional projects. Our experience suggests that typically, government will under-spend on lifecycle maintenance for projects delivered under traditional approaches. In contrast, the AFP model requires the private sector partner to meet specifications which ensures the asset is well maintained over the project term. To reflect this difference in practice, IO will adjust the estimate of required lifecycle spend by a factor representing our observation on historical under-spending. The risk borne by the owner under a traditional delivery model associated with the condition of the asset at the end of 30 years is reflected in our risk assessment.

4. **Removal of insurance premium from Competitive Neutrality:** In a review of the application of Competitive Neutrality, we recognized that the cost of insurance premiums were included within the definition of base Facilities Maintenance Costs and therefore did not need to be explicitly accounted for. This has been removed going forward.

5. **Enhancements to the risk assessment process:** IO obtains a letter from our external cost consultants confirming the results of the project specific risk workshop. This letter summarizes the discussion held at the risk workshop on project specific considerations and provides a rationale for adjustments made to the base risk matrix. Ultimately, the letter affirms the estimation of project risks – a key input to our VFM assessment.

IO is committed to continuous improvement and will review its methodology, inputs and assumptions on a regular basis. We expect that our methodology and approach to VFM will continue to evolve as new and better information becomes available. Ultimately, the methodology and all underlying assumptions will be based on what is the most conservative, accurate and transparent approach to estimating VFM. This ensures that public interest remains paramount.

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[16] MMM Group; Budgeting capital costs in the transit and highway sector: Differences between design-bid-build and alternative financing and procurement, January 2011.
[17] Refer to MMM Group's letter dated February 27, 2015 'Quantifying the Value of Innovation with AFP Project Delivery' which speaks further to the estimation of innovation in AFP projects. This letter can be found on IO's website.

6. Improvements to AFP model

With over 8 years of experience in delivering AFP projects, IO is continually seeking to optimize the AFP model to ensure value for money for taxpayers.   Recently, we have introduced a number of refinements which are described further below:

- *Assessing the optimal balance of private sector finance relative to desired risk transfer*: A key underpinning of our AFP model is the use of private finance.
    - Private finance provides a means of driving Project Co performance to meet the public sector's desired outcomes;
    - Third party lenders create an additional level of diligence and oversight in the execution of the project; and
    - Long term financing also aligns with the overall lifecycle approach of IO's AFP model; matching the private sector's investment in the project with their requirement to manage the asset to specific standards over a 30 year term.

    While this is a critical element of our model, we must always seek to balance the cost of private financing against the desired level of risk transfer to ensure we deliver best value for the Province. In this context, IO has amended its policy to allow for an increase in the amount of Substantial Completion Payments on its social projects (of up to 60%), thereby reducing the amount of long term financing required. We will continue to maintain the flexibility to pay up to 85% of the capital cost through Substantial Completion Payments on civil infrastructure projects. The amount of long term financing is matched to the anticipated risk during the operating period.

    In addition, we are increasingly assessing the use of milestone and progress payments during construction to reduce the short term financing needs while ensuring Project Co has a sufficient investment in the project to ensure appropriate risk transfer.

    The amount of private capital in the project during construction and operations will be proportional to the amount of risk at that time. Risk is assessed based on empirical data and the advice of third party experts relative to the construction and asset repair and renewal phases. The risk assessment process is set out in greater detail in Section 4 of the guide.

- *Direct payment of Design Bid Fees:* Design Bid fees are paid to pre-qualified bidders who submit a compliant bid, but are unsuccessful in the procurement process. Historically, IO has required that the winning bidder to pay the Design Bid fee to the unsuccessful proponents directly. This had the impact of increasing financing costs as the amount of the Design Bid fee was included in the proponent's bid.   Recently, IO has obtained approval to pay these fees directly, thereby avoiding associated financing costs.

- *Standardization of sizing of our Letters of Credit*: Once a Preferred Proponent is identified, IO requests that the bidder provide a Letter of Credit (LC) as a form of security during the Preferred Proponent Negotiation period (from time of identification of PP to Financial Close). The LC is requested to protect IO against failure of Project Co to reach Commercial / Financial Close.   The cost of this LC is directly passed onto the Province through the bid price. Recently, we undertook an assessment of the size of our LC's and have established an upper limit which we believe will still provide protection while balancing market capacity and cost.

As we continue to delivery large, complex infrastructure projects across a variety of sectors, we will seek to make further refinements to the AFP model in the best interest of the Province and taxpayers, as appropriate. These refinements will continue to be founded in our lessons learned and review of best practices in other jurisdictions.

More on the Risk Assessment Process

There are a large number of risks associated with delivering the types of projects assigned to IO. These risks can be grouped into three broad categories:

1. Retained risks: risks that are retained exclusively by the public sector;
2. Transferred risks: risks that are entirely transferred to the private sector consortia[18]; and
3. Shared risks: risks that are shared (and retained) to varying degrees between the public sector and the private sector consortia.

A comprehensive risk assessment assists IO and the public sector sponsors in ensuring that the party best able to manage, mitigate and/or eliminate the project risks is allocated the risks under the project agreement.

The risk assessment process starts with a standard risk template for the relevant sector as developed by industry experts. The risk matrix is a comprehensive chart that identifies risks and quantifies their impact to the public sector under the different delivery models. Specific project risk workshops are held to identify unique characteristics of the particular project as compared to the standard template. These unique project risks are then categorized, allocated and estimated. Participants in the risk workshops may include Infrastructure Ontario staff, public sector project sponsors, and external experts (including VFM advisors, various construction and facilities maintenance cost consultants and financial advisors).

Steps to adjust the standard template to incorporate project specific risk during the risk workshops include:

STEP #1:   Identify the project specific risks

STEP #2:   Allocate these risks to the party best able to manage the risk

STEP #3:   Estimate probability of occurrence of these risks and the resulting cost impact ranges

STEP #4:   Run statistical analysis to quantify the total risks retained by the public sector

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STEP #1: IDENTIFYING THE PROJECT RISKS

The first thing that risk workshop participants do is identify the individual risks that are inherent and unique to the project and group them by category. Generally, these are:

- Planning/strategic;
- Financial/accountability;
- Design and construction;
- Maintenance; and
- Life cycle.

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[18] Risk transfer is achieved through project agreement terms

STEP #2: ALLOCATING THE RISKS

Once the major risks have been identified, the workshop participants allocate each of the risks either to the public sector, or to the private sector or as a risk shared by both public sector and private sector, depending on the nature of the specific risk in question, as well as the delivery approach and related project agreement terms. The following table shows how a risk is allocated to the appropriate stakeholder depending on the procurement model. For instance, the risk "Construction Management Efficiency/ Coordination" which encompasses the risk that construction management team does not effectively coordinate activities to complete construction on schedule is one of several key risks that are transferred to the private sector under AFP (as indicated by the X's).

	Allocation					
	Traditional			AFP		
RISK	**Public**	**Private**	**Shared**	**Public**	**Private**	**Shared**
Construction Management Efficiency/ Coordination	X				X	

A corner stone of the AFP approach is the on-time delivery of the project which includes the transfer of all activities associated with construction schedule to the party best able to manage the risk, in this case being the private sector. The AFP model effectively transfers this risk by placing all financial consequences of the risk materializing squarely on the private sector. If the contractor does not effectively manage its construction program and a delay to the project completion date surfaces, the contractor absorbs all of the associated costs that arise from the delay. The AFP contract enforces this risk through use of a guaranteed price, often without any payment until the asset has been substantially completed.

STEP#3: ESTIMATING PROBABILITY OF RISK OCCURRENCE AND RESULTING COST IMPACT RANGES

The next step will determine the probability under each delivery model that a risk will occur causing additional costs (over and above base costs) to be incurred. For example, if one out of every two projects incurs costs due to a particular risk materializing, the probability of occurrence would be 50%.

Once the probability of each risk occurring has been determined, a range of potential costs is then estimated for each risk that is retained[19] by the public sector under either delivery method. The range is expressed as a percentage of base costs with a range from (i) unlikely, but low additional cost (10th percentile); through (ii) most likely additional cost; to (iii) unlikely, but high additional cost (90th percentile).

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[19] The public sector may retain risks in full or in part (shared with the private party)

For example, participants would be asked to estimate the probability and impact associated with the risk "Construction Management Efficiency/Coordination". Since this is a risk that is retained by the public sector only under the traditional delivery model, the range of potential cost impacts to the public sector is estimated only under the Traditional delivery model.

The resulting impact estimates may be as follows:

| Risk | Traditional | | | |
| | Probability of Risk Occurring | Impact Range | | |
		10th	Most Likely	90th
Construction Management Efficiency/ Coordination	12%	2.0%	5.0%	10.0%

The table illustrates that if the public sector sponsors were to proceed with the project using the Traditional delivery method, there is a 12% chance that costs for the public sector would exceed the base project costs on account of design coordination and completeness issues, and that the range of cost impact is from 2.0% of base costs at the low end to 10.0% at the high end. Under AFP, this risk is not retained by the public sector and so its monetary impact to the public sector under AFP is zero. If this risk was retained by the public sector under AFP, estimates of the impact of this risk to the public sector would be developed as well.

STEP #4: QUANTIFYING TOTAL RISKS

Once the probability and impact ranges have been established for each risk, the cost of risk retained by the public sector under Traditional and AFP delivery are calculated using the following formulas:

Cost of Risk$_{PSC}$ =
(Base Costs x Probability of Occurrence of Risk #1 under Traditional x Impact of Risk #1 under Traditional) + (Base Costs x Probability of Occurrence of Risk #2 under Traditional x Impact of Risk #2 under Traditional) + …+ (Base Costs x Probability of Occurrence of Risk #N under Traditional x Impact of Risk #N under Traditional); where the risk matrix has N defined risks under Traditional delivery

Cost of Risk$_{AFP}$ =
(Base Costs x Probability of Occurrence of Risk #1 under AFP x Impact of Risk #1 under AFP) + (Base Costs x Probability of Occurrence of Risk #2 under AFP x Impact of Risk #2 under AFP) + …+ (Base Costs x Probability of Occurrence of Risk #N under AFP x Impact of Risk #N under AFP); where the risk matrix has N defined risks under AFP delivery

On any project, the actual impact of any individual risk may fall somewhere along a continuum of impacts that includes the low, most likely and high ranges (the 10th, Most Likely and 90th percentile impacts quantified in the risk workshop). Since the impact will not necessarily be the same for each risk, without knowing in advance the exact combination of risks that might occur in the project being analysed, there are an infinite number of solutions to the above equations depending on the combination of impacts that are plugged into the equations. A well-established mathematical technique for dealing with such problems is the method of statistical simulation. Statistical simulation follows the following steps:

Step 1: Create a parametric model, $y = f(x_1, x_2, ..., x_N)$. In our problem, y is the cost of risk and the x'es are the risk impacts for each of the N risks.

Step 2: Generate a set of random inputs, $x_{i1}, x_{i2}, ..., x_{iN}$. This is done by randomly picking a risk impact number for each of the N risks, from within the defined range for that risk[20].

Step 3: Evaluate the model and store the results as y_i. In other words, plug the randomly chosen set of impacts for each risk into the two equations above and record the resulting cost of risk number for Traditional and AFP delivery.

Step 4: Repeat steps 2 and 3 for $i = 1$ to a minimum of 10,000 times.

Step 5: Analyze the results using summary statistics, confidence intervals, etc. The statistical simulation exercise generates a full distribution of cost of risks under Traditional delivery and under AFP, as we now have 10,000 different possible costs of risks each under Traditional and AFP delivery. This distribution can be statistically analyzed for the mean (i.e. average or 50th percentile) cost of risk retained by the public sector under Traditional delivery and under AFP delivery. This mean cost of risk is used in the VFM analysis.

Most risk impact ranges, such as the Design Coordination and Completeness risk discussed in the section on retained risks, are positively (or rightward) skewed[21] so the mode ("Most Likely" outcome) of the distribution is less than the mean (average or 50th percentile) of the distribution. Using the "Most Likely" impact to calculate the cost of the risk would thus understate the true cost of the risk on average.

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[20] Risks are assumed to be completely uncorrelated and impact ranges are assumed to follow a triangular distribution.

[21] In probability theory and statistics, skewness is a measure of the asymmetry of the probability distribution of a real-valued random variable.

Optimism Bias:

Underestimating the costs associated with project risks is common and is referred to as "optimism bias." In statistical terms, project planners tend to value risks according to their "Most Likely" probability of occurrence, ignoring extreme cases where the incidence of a seemingly remote risk has had a significant impact on a project. For example, if project budgets expanded by exactly 1% over the life of the project eight times out of ten, it would not be unusual to learn that those planning a similar project would budget for only that additional 1%. If the remaining two in every ten projects experienced budget overruns of an extreme 10%, however, the planning and budgeting for a project should take this into consideration (i.e., should recognize that a 1% contingency for budget overruns will not always be sufficient). If the project managers are optimistic and expand the budget by only 1%, two out of every ten projects will experience overruns on average. One should, in fact, expect an average cost expansion of 2.8% (the average of eight projects at 1% and two projects at 10%). IO avoids optimism bias by presenting all risks at their true statistical mean, which takes into account not just the "Most Likely" risk outcome, but also all possible risk outcomes.

The concept of optimism bias can be further illustrated with our example of Design Coordination and Completeness risk. Assume that this was the only risk that appeared in the risk matrix. While we defined the "Most Likely" impact under the Traditional model at 3.0%, the average or mean for this risk is actually 4.3%, owing to the skewed nature of the distribution[22]. This is shown in the chart below.

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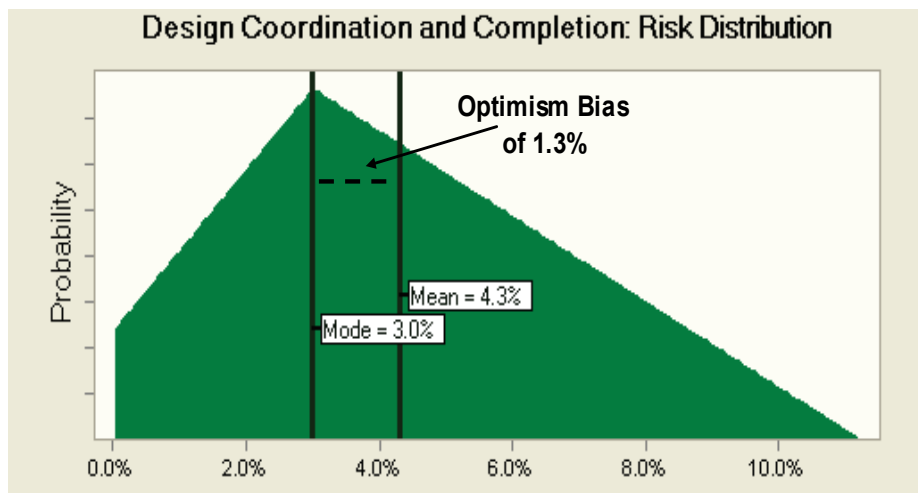
[22] Commercial Statistical programs are readily available that allow a user to select an appropriate impact range distribution (for example a triangular distribution as shown in the example) to calibrate to the 10th, Typical and 90th percentile impacts as established in the risk workshops in order to generate the Mean of the defined distribution.

If one were to budget only 3.0% for this risk, one would underestimate the mean (or average) risk impact by 1.3% (= 4.3% - 3.0%).

Continuing with our earlier example of Design Coordination and Completion risk, for a project with estimated base costs of $60.0 million, we can calculate the cost estimates for this risk at the mean of the risk impact range.

Calculating the Average (or Mean) Cost of a Risk

Design Coordination and Completion Risk:

Mean Impact (Traditional): 4.3%

Cost for Risk =
Base Costs x Probability of Occurrence x Mean Impact

Estimated Mean (Traditional):
= $60.00 x 90% x 4.3% = $2.32 million

Under AFP, this risk is not retained by the public sector so the impact to the public sector is $0. This example illustrates a cost savings under AFP for this risk of $2.32 million.

The above example works only because of the assumption that a single risk existed on the project. It was used only to illustrate optimism bias. Since a plethora of risks occur in concert on projects, it is necessary to use a statistical simulation method to establish the true mean impact of the combined risks.

Standardization and benchmarks

It is important to note that, while risk estimations are developed and provided by industry experts who have significant relevant experience and knowledge, IO continues to work to minimize subjectivity to the greatest extent possible. AFP project agreements are highly standardized, and as such, the variation in risk ranges should be minimal across projects. However, every project has its own unique characteristics, and therefore every risk workshop will yield slightly different results. Benchmarks are developed by experts in the relevant field of cost estimation: construction, maintenance and lifecycle, and are used as a starting point for risk workshops. Risk ranges are then modified to reflect project-specific risks.

Intangible Benefits

While considerable time and effort are allocated to quantifying risks in order to more correctly compare the two delivery methods, there are also intangible benefits that are more difficult to quantify. For example, the benefits of having a project delivered on time cannot always be appropriately quantified. It would be difficult to put a dollar value on ensuring that the people of Ontario get access to reduced wait times in a new health facility. These are important qualitative benefits that, while not quantified in the VFM analysis, are important to consider nonetheless.

More on Financing and Discounting

<u>Traditional Model Financing:</u>
When projects are built using a Traditional procurement method, the public sector makes progress payments throughout the construction period equal to the full capital value of the project, and thereafter pays annually for facility maintenance and lifecycle as needed. Depending on which public sector entity procures a project, construction funds are either wholly or in majority provided by the Province. While the Province may not borrow money directly from the market on a project-by-project basis to make these payments, it incurs an "opportunity cost" of having to pay earlier than it would under AFP (under AFP, payment for construction is delayed until substantial completion or later). The government could have used the funds used to make these progress payments for other public purposes. A key alternative use for the funds, one that can be used to measure this opportunity cost, is to pay down existing public debt (thus avoiding interest payments on the paid-down debt) or alternatively, to avoid incurring additional borrowing costs to finance government expenses. It is important to note that since this financing cost is not directly linked to project-specific borrowing, this financing cost is an "allocated" or "notional cost." This notional public financing cost is calculated at the current Provincial cost of borrowing or weighted average cost of capital (the notional public sector financing rate). The Province's cost of borrowing can be estimated through readily available data.

<u>AFP Model Financing:</u>
Though the VFM methodology is consistent across the AFP delivery models described earlier, a key difference is the choice of the point in time (referred to as the base date) at which the PSC and AFP costs are compared. This choice has an important effect on how the public sector financing costs are presented in the VFM analysis, though it does not affect the outcome of the VFM analysis.

Since, in the BF or DBF model, the public sector makes payment at project completion (a future date); this is the date that becomes the base date for comparison of PSC and AFP costs as it more accurately reflect the total amount of payment for the asset. Thus all BF or DBF PSC costs, such as the multiple construction payments made over the construction term, have to be future-valued at the public sector borrowing rate to the base date. The difference between the future value of each construction payment and the construction payment itself represents the notional cost of financing that the public sector incurs as a result of having made the construction payment. For example, assume that the public sector makes a construction payment of $20 million one year into a three-year construction term. Assume further that the public sector borrowing rate is 5% a year. By making the $20 million construction payment, the public sector does not pay down public debt of $20 million. By construction end, this $20 million debt would have grown to $22.05 million (i.e. the future value at 5% compounded annually for two years). Thus the difference of $2.05 million represents the notional cost of financing associated with the construction payment that the public sector made. This calculation is done for each construction

payment made by the public sector to arrive at the total notional public sector financing cost. The financing cost is added to the PSC in a BF or DBF model. The timing of the construction cash flows is estimated and provided by the external cost consultant.

In a DBFM model, the public sector makes a series of service payments to the private sector, starting either during construction or upon construction completion and stretching over the post-construction period (i.e. typically a maintenance term of 30 years). Since there will be not one but many future-dated payments in the DBFM model, the date on which the RFP closes and all the private-party bids are received is used as the base date[23] for comparison of the costs in the PSC and AFP models. Thus all PSC costs (and AFP costs) have to be present-valued back to the base date using the technique of discounting and using public sector borrowing rate as the appropriate discount rate. Discounting the payments made by the public sector in the PSC model explicitly accounts for the implied public sector financing cost. To understand why this is so, consider the previous example where a $20 million payment is to be made a year into the future. To finance an expenditure of $20 million in a year's time, the public sector has two equivalent choices. It can either (A) borrow $20 million in a year's time to finance the expenditure occurring then or (B) it can borrow $19.05 million today, invest the borrowed money in an account bearing 5% interest (e.g. buying its own debt that pays 5% interest), earning $0.95 million in interest (= $19.05 x 5%) over the next year so as to have $20 million available just in time to finance the expenditure.

By borrowing an equivalent smaller amount (i.e. discounted) earlier ($19.05 million today vs. $20 million in a year), the public sector incurs a financing cost reflected in the discount rate (equal to the public sector financing rate). Thus no separate public sector financing cost line item appears in the discounted PSC model for a DBFM VFM analysis (i.e. there would be no financing box on the PSC side in the sample VFM figure, when drawn for a DBFM project). It should be noted that if it were assumed that project-specific debt were to be raised by the public sector to finance a traditionally-delivered project, then the financing costs associated with that specific debt would be calculated and would appear as a separate line item in the PSC model. However, the net present value of total project costs would be identical unless the project specific debt was issued at a rate different from the public sector financing rate.

Discounting
The cash flow streams differ between the PSC (e.g. progress payments through construction) and the AFP (e.g. lump sum payment at substantial completion or through post-construction payments during

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[23] At the VFM publication stage (stage #3), the base date is the date on which financial close of the project is achieved. Costs are contractually locked down at financial close, making it a good point in time for the comparison.

the maintenance period). In order to numerically compare the cash flow streams, the respective cash flows must be expressed in dollars as at a single date in time, known as the base date, by the technique of discounting cash flows.

Bringing cash flows forward in time (future valuing) or back in time (present valuing) is known as discounting and follows the concept of time value of money – the premise that a dollar today is worth more than a dollar in the future. This reflects the opportunity cost of capital: funds available earlier can earn a return, or be used for other capital expenditures and therefore reduce the associated cost of borrowing.

Discounting hinges on the rate used to estimate the value of a future dollar in today's terms. Since the project costs are in future dollars, and are estimated costs that may turn out to be different (e.g. higher) than projected, the discount rate chosen should match the uncertainty inherent in these cash flows. Since higher risks require higher returns, one could argue for a higher discount rate (i.e. risk-free rate plus risk premium) to capture the uncertainty in the project costs. However, this leads to the counterintuitive result of future uncertain costs being heavily discounted leading to a project appearing less costly in present-day dollars as a result of this increased risk. An appropriate method to avoid this result is to quantify the embedded uncertainty in costs through a comprehensive risk assessment. The quantified risks (i.e. cost of risk) can be added to the estimated project costs resulting in virtually "risk-free" costs. This "risk-free" cash flow stream can then be discounted back and expressed in dollars as at bid submission date at a "risk-free" rate. As the public sector financing rate reflects the virtually unlimited taxing power of the crown to repay its debts, crown borrowings are viewed as being risk-free.

Since crown borrowings are viewed as risk-free, the appropriate rate to use for discounting project costs is the public sector financing rate.

Infrastructure Ontario has chosen to be **conservative** and **transparent** by accounting for risks exclusively through risk quantification workshops, rather than adding a risk premium to the discount rate.

The public sector financing rate simply reflects the Province's most current weighted average cost of capital (WACC). In consultations with the Ontario Financing Authority (OFA), IO has determined that the best proxy for the Province's most current WACC is the simple average of the Provincial debt (bonds with terms of 1 year and higher). To neutralize the effects of daily fluctuations on the discount rate, a ten-day rolling average of this simple bond yield average is used as the standard discount rate.

The advantages of computing the discount rate this way can be summarized by the following:
* Readily available, as market rates are public and easily accessible when required; and
* Reflects the market cost of funds as opposed to static historical costs.

The choice of the discount rate has a significant impact on results. Generally speaking, the higher the discount rate, the higher is the calculated VFM. IO's choice of the lowest reasonable risk-free discount rate ensures a conservative estimate of VFM.

Glossary

Alternative Financing and Procurement (AFP): A range of infrastructure project delivery methods which use private expertise and financing to strategically rebuild vital infrastructure, on time and on budget, while ensuring appropriate public control and ownership.

Ancillary costs: The soft costs of delivering a project. These costs normally include: project management, legal services, architectural and engineering, advisory and other professional fees, transaction, capital markets and fairness advisors.

Build Finance (BF): Typically considered for smaller projects that involve renovations or significant interconnections to existing infrastructure (e.g., shared HVAC, build-out of existing floors). The private sector is generally responsible for construction and financing during the construction period and the project is paid for by the public sector at the completion of construction.

Competitive neutrality: In certain instances, the base costs under AFP delivery will include a provision for certain taxes applicable to DBFM Project company only. The equivalent costs will not appear under the PSC, as the public sector does not have an equivalent special purpose vehicle for the delivery of the project. These perceived cost advantages could be misleading. As a result, an adjustment called the "competitive neutrality adjustment" is required to negate this potentially misleading cost of AFP delivery. The adjustment consists of adding such costs to the PSC.

Construction costs: Costs incurred in completing the construction of a project, including labour, materials, construction equipment, site preparation, construction management, typical contingencies, etc.

Design Build Finance (DBF): A delivery model in which the private sector is generally responsible for the design, construction and financing during the construction period. The project is paid for by the public sector at the completion of construction.

Design Build Finance Maintain (DBFM): Typically considered for large projects involving new construction on a vacant site (greenfield or brownfield). The private sector is generally responsible for design, construction, long-term financing and maintenance. The project is paid for in instalments over a fixed period, usually 30 years.

Discount rate: The interest rate at which future cash payments are discounted to a base date to determine their value at the base date. Discounting is the process which allows costs to be assessed in current-value dollars.

Facility management: This typically includes the provision of management, maintenance and repair services (including insurance) related to the building and building components to allow the facility to be used for its intended purposes throughout the term of the Project Agreement, in addition to soft facilities management such as grounds maintenance, parking, security, retail services like a food court or cafeteria, and dispatch services (e.g. "one-call" help desk).

Innovation Factor: Adjustment factor that recognizes the difference between Traditional and AFP base costs and reflects the fact that i) AFP projects promote the use of innovative solutions through the use of performance based output specifications (for example, innovation with regards to construction means and methods / design innovation / schedule, etc.) that lower prices; and ii) pipeline of AFP projects combined with consistency of the program as a whole has led to an increasingly competitive bidding environment resulting in cost reduction.

Lifecycle costs: Costs typically associated with planned or scheduled replacement, refreshment and/or refurbishment of building systems, equipment and fixtures that have reached the end of their useful service life during the project term.

Notional public sector financing cost: An estimate of the notional financing costs that the public sector would incur when a project is to be delivered using a Traditional delivery method.

Optimism bias: A tendency of those planning infrastructure projects to fail to take into account the full magnitude of risks retained by the project sponsor.

Private sector financing costs: The financing costs incurred by bidders (and ultimately passed on to the public sector) under a project delivered through alternative financing and procurement.

Project risks: Risks are events that can lead to serious cost increases, construction delays, or both should they occur. Risks can be quantifiable (e.g. construction cost overruns) or qualitative (e.g. social, political or economic risks associated with the delayed delivery of a project).

Public sector comparator (PSC): Estimated total costs (including adjustments for risks retained and ancillary costs) to the public sector of delivering an infrastructure project using Traditional procurement processes.

Risk matrix: A detailed table or chart that lists the conceivable quantifiable risks for each project. These risks range from cost overrun and design risks to planning and regulatory risks. Each risk is described in detail along with the probability of the risk occurring and a range of probable cost impacts as a result of the risk occurring.

Risks retained under traditional delivery: The project risks which are borne by the public sector when a project is delivered using a Traditional delivery method.

Risks retained under alternative financing and procurement delivery: Any project risk retained by the public sector when a project is delivered using alternative financing and procurement.

Traditional delivery: Procurement of a project using a Stipulated Sum Contract (usually the CCDC2 form of contract) for construction and, if applicable, a series of short-term maintenance contracts post-construction.

Value for money: The difference between the Public Sector Comparator and the AFP model is referred to as the Value for Money. There is said to be positive Value for Money by procuring a project using AFP when the cost to deliver an AFP is less than the Public Sector Comparator.