

Parliamentary Budget Officer of Canada

TRUEPLANNING® AND PRICE® PARAMETRIC ESTIMATING EXPERTISE SUPPORT PBO'S BUDGET FEASIBILITY STUDIES ON MAJOR CAPITAL PROJECTS FOR THE CANADIAN PARLIAMENT

Challenge: Provide an independent budget analysis to the Canadian Parliament on the estimated cost to build six-to-eight Artic/Offshore Patrol Ships (A/OPS). The A/OPS conceptually feature an unprecedented hybrid design between ice breakers and open ocean vessels, negating both estimate by analogy because of insufficient comparable data and bottom-up estimating for lack of detailed information.

Solution: Parametric estimating with PRICE® TruePlanning® cost modeling software and supporting PRICE Systems methodology expertise to determine costs using high-level descriptors (ship size, weight, technology, engineering complexity, etc.) and historical shipbuilding costs.

Results: The PBO's independent analysis found that only four ships could be delivered within the project's budget and schedule at a minimum acceptable confidence level of 50%. Based on the PBO's findings, Parliament would have to consider increasing budget or amending capabilities to ensure project success.

Non-Partisan Study of What the Project Should Cost

Proposed within the Canadian Parliament was a program to design and build six-to-eight ice-capable Artic/Offshore Patrol Ships (A/OPS) for the Royal Canadian Navy. As enabled by the country's Federal Accountability Act of 2006, parliamentarians requested the Parliamentary Budget Officer (PBO) to perform an analysis of the budget proposed for the A/OPS project.

An entity totally independent from parliament, the PBO is supported by a staff of 18 economic analysts, financial analysts, researchers, advisors and administrators. "We exist to give parliamentarians an independent cost estimate — a second opinion of what something should cost and what the budget should be," explained Erin Barkel, a Financial Analyst on the PBO's Expenditure and Revenue Analysis team.

Murky Water of Estimating a New Design Concept

Unlike most parliamentary requests, estimating the cost of new innovative ships that would deliver unique value to the safety and security of Canada's coasts was a once in a generation undertaking. Moreover, the A/OPS conceptually feature an unprecedented hybrid design between ice breakers and open ocean vessels, negating both estimate by analogy because of insufficient comparable data and bottom-up estimating for lack of detailed information. "We were starved for data because this type of project was both an infrequent type of acquisition for Canada and unique to any other vessels in the world," said Erin.

The PBO faced a similar challenge in 2012 when it was tasked to conduct a study on budgeting for support ships to be provided to the Canadian Navy. Then, as for the A/OPS budget analysis, parametric estimating with TruePlanning® software from PRICE® Systems was chosen as the best solution for data-driven,



CASE STUDY

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*Erin Barkel
Financial Analyst
PBO Staff*

high-confidence cost projections. The PBO's choice of TruePlanning® at the time was made after seeing the software at trade events, its track record of use by leading military and non-military organizations, and its highly respected reputation around the world as a robust cost estimating tool.

A/OPS Cost Modeling with TruePlanning®

Using TruePlanning®, the PBO followed the industry-accepted military cost estimating process such as practiced by the U.S. Government Accountability Office (GAO). Since the A/OPS project had a flexible objective (i.e., six-to-eight ships), the PBO began its analysis by constructing a model to estimate the cost of building eight ships. If that scenario was not feasible within the stated budget, the model could then be adjusted to determine the number of ships that could be acquired within budget.

Taking into account costs by ship size, weight, technology, engineering complexity and other factors, estimates were performed from a variety of perspectives, such as:

- The person-year effort to build each ship, since the effort should decrease for each subsequent ship (i.e. learning curve)
- The number of ships that can be built with the stated budget
- The optimal budget schedule
- Cost increases (budget overruns) for project delays

Risk-adjusted point estimates with confidence intervals from 5% to 95% were calculated for scenarios using four, five, six, and eight ships with construction to begin as planned. Results indicated that it was not possible to build any more than four ships with a minimum acceptable confidence level of 50%. With just a one-year delay in the start of the project at the minimum confidence level, the project would be over budget by \$34 million. A two year delay would result in the project being \$85 million over budget.

Based on the PBO's findings, Parliament would have to consider increasing budget or amending objectives to ensure project success.

Unique Benefits of PRICE Support

Virtually every challenge solved with TruePlanning® is unique in its own way — a realization recognized and embraced by the PBO. "Software is only one component of the TruePlanning solution," says Erin. "The expertise behind the software is equally important. PRICE's support for TruePlanning is so much more about cost modeling experience and expert guidance on how best to approach a challenge. We have very intelligent people within the PBO; it's a depth of experience with parametric estimating that we don't have. There is always someone at PRICE who can validate and add context to the data we want to put into TruePlanning — for example, whether or not our methodology and inputs are correct and why one cost driver would be more important than another for accurate results."

Growing Capabilities with the TruePlanning® Framework

As the lead user of TruePlanning® within the PBO, Erin is delighted in seeing the office's ability to build its own expertise in parametric estimating and being able to lean on PRICE according to need. For example, sights are set on gaining better control over historical cost data and doing a better job of leveraging it with PRICE's TrueFindings® integrated knowledge management to help refine the quality of data for TruePlanning® input.

And while the PBO's first needs for using TruePlanning® was high-level estimates so Parliament could accurately budget major shipbuilding initiatives, working with PRICE to master trade space analysis is viewed as the next valuable step for the PBO in order to render independent cost estimates and recommend design tradeoffs based on CAIV studies to help guide Parliament when planning major system acquisitions for Canada.

About Canada's Parliamentary Budget Officer

The Parliamentary Budget Officer (PBO) provides independent analysis to the Canadian Parliament on the state of the nation's finances; estimates and trends in the Canadian economy; and, upon request from a committee or parliamentarian, estimates on the financial cost of any proposal for matters over which Parliament has jurisdiction. The position of Parliamentary Budget Officer, which is supported by 14 employees, was created in December 2006 as part of the Federal Accountability Act to provide transparency and credibility to the government's fiscal forecasting and budgeting.

For more detailed information on the PBO's use of TruePlanning®, see these publicly available PBO reports:

- "Budget Analysis for the Acquisition of a Class of Arctic/Offshore Patrol Ships," October 28, 2014
- "Feasibility of Budget for Acquisition of Two Joint Support Ships," February 28, 2013

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