

# A Life-Cycle Costing Case Study

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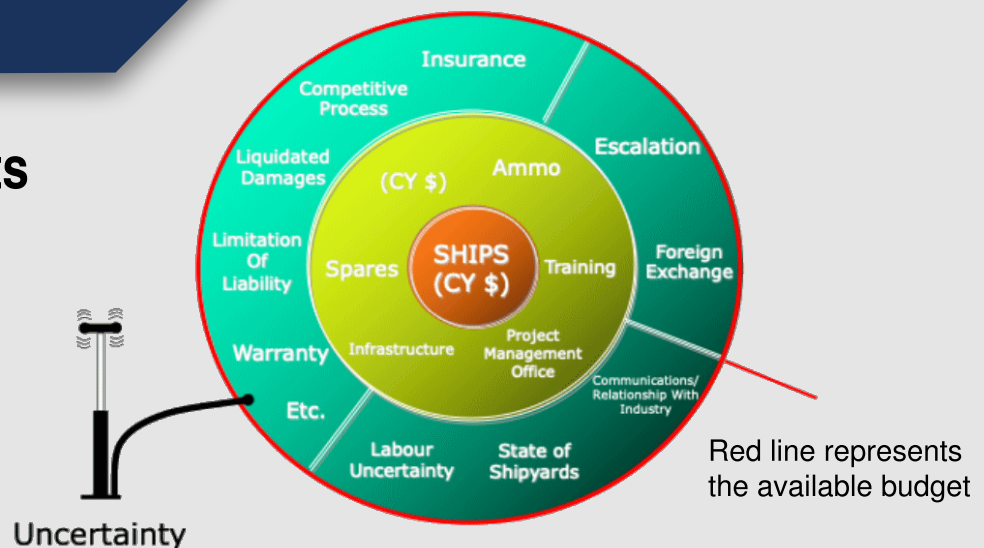
In recent years, one of the major debates surrounding the National Shipbuilding Strategy has been the cost of the vessels being delivered to the Royal Canadian Navy, relative to comparable warships to allied and partner navies around the world. In many instances, RCN vessels appear several times more expensive than comparable ships, despite similar capabilities. Building costs for advanced warships are complex but one of the most obvious differentiators is the methodology which a government or shipyard uses to cost a vessel.

This note breaks down the Life-Cycle Costing (LCC) methodology, which the Government of Canada uses to cost major capital purchases, like naval vessels. The LCC system is the process of compiling all the costs of a procurement program as well as the cost, actual and estimated of operating the vessel over its intended life and finally disposal. This includes actual and estimated costs which will be

incurred over the full lifespan of the project. These costs go well beyond the acquisition or sail-away costs for vessels, which represent the price of the individual vessel alone. Rather, LCC costs include everything from the initial investment in options analysis and studies; all stages of the design; the requirements definition and validations phases; the tests and trials; and then finally the actual purchase of the asset(s) – including the costs of product data, intellectual property rights, operating licenses and additional charges for recovery of non-recurring engineering (NRE). On top of all of these costs, the LCC includes the running costs incurred to maintain the platform(s) for the full lifespan. This means future investments; annual recurring costs including personnel, operations and maintenance costs; and salvage or disposal expenses.

In Canadian naval acquisitions, it is necessary to perform a detailed risk analysis for each potential purchase. This requires completion of

## Ship Project Costs & Budget



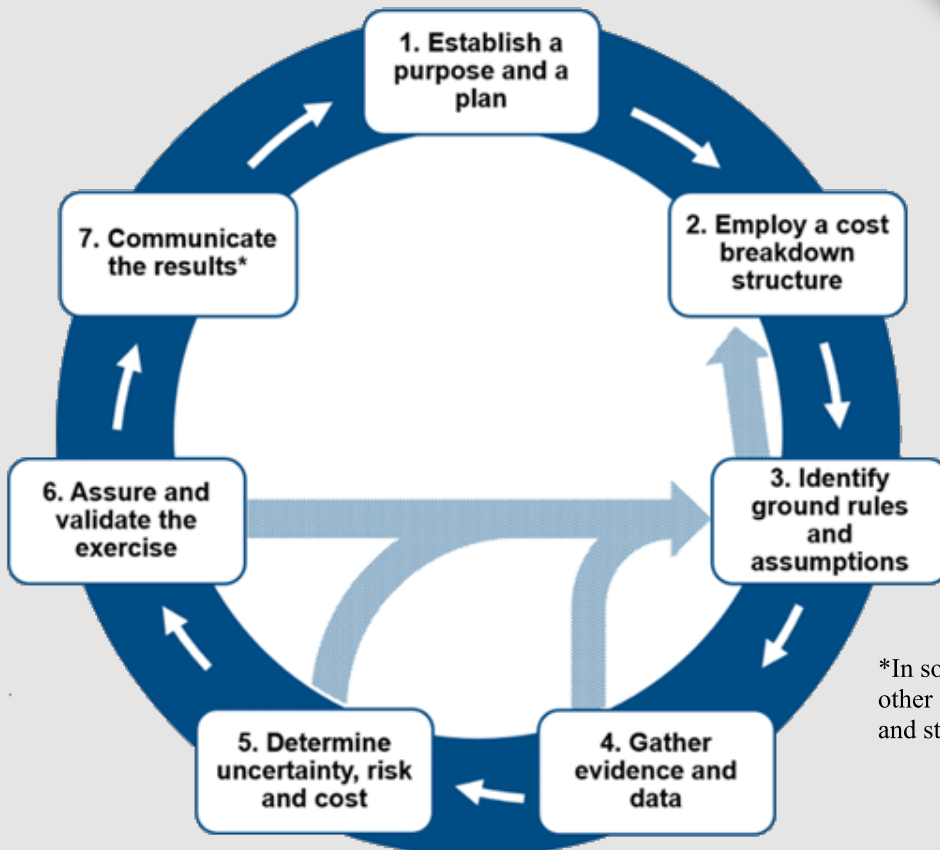
a Project Complexity and Risk Assessment (PCRA) to support the Treasury Board Policy on the Management of Projects and the Standard for Project Complexity and Risk. Each potential new platform, capability, or weapons systems must be evaluated for risks like reliability and maintainability over its lifetime. Additionally, the costs of ancillary or supporting projects must be captured to ensure visibility of the overall costs to decision-makers. In the case of naval projects, these additional activities extend to bases or facilities such as new jetties, cranes, barges, dredging operations, changes to environmental policies, and other associated infrastructure to support the new capability. Over the course of the platform's life, these costs will normally exceed the initial price tag. In Australia for instance, the Auditor General in their reporting spanning the period from 1998 to

2018, assessed that LCC are generally two to three times the capital costs, and clearly account for the majority of the Defence Budget.

The Navy uses the full LCC of any acquisition because the methodology is mandated by the Treasury Board, on behalf of the Government of Canada, and it is well established practice within the Department of National Defence (DND). The policy is supported by several guides and manuals designed to assist Project Sponsors in preparing sound, defensible estimates to support decision-making. Here again, DND continues to refine and strengthen its costing policies and mechanisms.

While bureaucrats and government accountants may be familiar with the system, this expansive definition of 'cost' can cause sticker shock

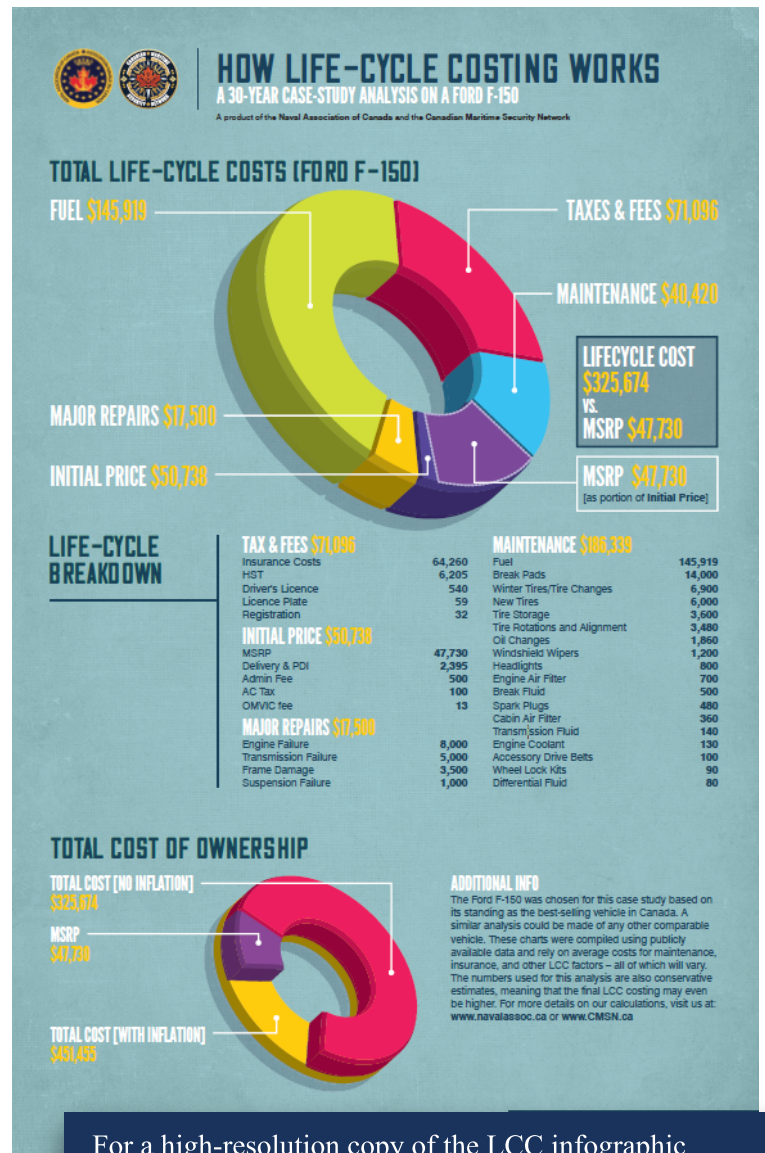
## Critical Steps in the Process



\*In some cases the costing process ends at step 7. in other cases, the process may occur more than once and step 7 may lead back to step 1.

amongst Canadians unfamiliar with this method of tallying expense. Indeed, an LCC cost is always going to be dramatically higher than the pure acquisition costs. That confusion, between acquisition or sail-away costs and life-cycle has therefore led to false comparisons, as ships from different builders, using very different costing methodologies, are compared side to side. On many occasions, this applies to oranges comparison has made Canadian procurements appear wildly overpriced, particularly compared to foreign builds, many of which present only the acquisition cost of a vessel with no visibility of what is included in the cost.

This note is an attempt to visualize the LCC system in an accessible manner: by taking the Ford F-150 and showing its full lifecycle cost. For an easier comparison, this is calculated at 30 years (beyond a truck's normal lifespan) to match the estimated life of a Canadian destroyer. The result is a radical change in the cost of the vehicle to reflect its running cost over those decades. That full life-cycle cost is certainly not how consumers visualize the price but it is how the Government of Canada would look at it. Understanding how this system works is important to placing the RCN's shipbuilding programs in context and understanding how Canadian-build vessels stack up to international equivalents.



For a high-resolution copy of the LCC infographic breakdown click [here](#)



## Why the Ford F-150?

The Ford F-150 was chosen to demonstrate the LCC model because it was the most popular vehicle sold in Canada in 2024 and, therefore, one well known to most Canadians. There is nothing unique about the F-150's LCC costs and a similar analysis of a comparable pickup trucks would yield comparable results.

## Data

When calculating LCC costs, open source data on average maintenance costs were used and some rough calculations were made based on average use. For fuel, which represents one of the largest LCC costs, a truck's mileage was calculated at the Canadian average (15,300 km) with a projected fuel price of \$1.60/liter.