

# Canada's Submarines are Sunk Costs

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Credit: Jacek Szymanski, Navy Public Affairs, RCN

HMCS *Victoria* transits in the vicinity of Esquimalt, BC, during sea training trials and exercises, 20 February 2012.

Imagine spending \$50 on a concert ticket, then learning that your friends are organizing a party for the very same evening. If you are like most people, you will go to the concert, even if you would probably enjoy the party more. An economist, however, would advise you to attend the party – because the \$50 is gone regardless of what you do. Decisions about maximizing benefits should be taken within the context of present conditions, not past ones.

The human tendency to allow current decisions to be influenced by past expenses is called the ‘sunk cost fallacy.’ It is one reason – perhaps the main reason – why successive Canadian governments have spent billions of dollars trying to refit and repair four second-hand submarines built for the British Royal Navy three decades ago, instead of purchasing new ones.

It is time to reject the sunk cost fallacy, and either buy new submarines or shut the program down altogether.

## **Warning Signs and Digging Deeper**

There were numerous warning signs when Canada bought the submarines in 1998, including a suspiciously low price of \$750 million – less than one-quarter of the estimated cost of \$3-5 billion to purchase four new vessels.<sup>1</sup> Another warning sign was that the submarines were also offered to Chile, Greece, Pakistan, Portugal, Saudi Arabia, South Africa and Turkey, none of which decided to buy them.<sup>2</sup>

The British government had built the diesel-electric submarines between 1986 and 1993 and named them the *Upholder*-class. It was a difficult procurement, with a litany of problems pushing up costs and ultimately prompting a

review by the Defence Committee of the British House of Commons. For example, shortly after the construction of the first vessel, HMS *Unseen* (now HMCS *Victoria*), it was discovered that the torpedo tube slide-valve, which controls the torpedo tube doors, could malfunction and allow the inner door to be opened while the outer door was ajar, thereby allowing water to flood into the submarine.<sup>3</sup> HMS *Unseen* first went to sea unable to fire its main weapons, with the outer torpedo tube doors having been welded shut for safety reasons.<sup>4</sup>

The second submarine, HMS *Upholder* suffered a loss of power during an emergency reversal test due to malfunctioning main-motor control circuitry. The Paxman Valenta diesel generators, which are still used in the vessels, were intended for railroad locomotives and not for the abrupt stops and starts required of submarines during manoeuvres or combat.<sup>5</sup>

After the submarines were decommissioned by the Royal Navy in 1994, they languished in a Scottish loch for four years awaiting a buyer, and another two to six years before Canada actually took possession of them. HMS *Upholder* (now HMCS *Chicoutimi*) spent a total of nine years in saltwater storage, while the other vessels spent between four and six years. In 2005, the Canadian House of Commons Standing Committee on National Defence reported that, “except for the electrical power fed from shore to demonstrate the electronic systems to prospective customers, the vessels were just soaking up the sun and the salt water.”<sup>6</sup> The vessels suffered serious corrosion, necessitating repairs and refits that contributed to later

delays. One of the submarines, HMCS *Windsor*, remains subject to diving depth restrictions to this day.<sup>7</sup>

Other problems emerged after Canada took possession. Some of the problems were due to the shortage of preventative maintenance, others to the old technologies used in the submarines, and others due to poor construction. In 2004, a fire broke out on HMCS *Chicoutimi*, causing one death. The fire was caused by sea water infiltrating through an open hatch, leading to an electrical short, but the water was only able to cause the short because the wiring system had just one layer of waterproof sealant, instead of the three layers the construction specifications required.<sup>8</sup>

That same year, the electrical systems on HMCS *Victoria* suffered “catastrophic damage,” according to an article by Chris Lambie in the *Halifax Chronicle Herald*.<sup>9</sup> As Lambie explained, “[t]he navy had a new \$1-million piece of equipment that was supposed to supply the sub with direct-current power while it was at dockside,” instead, it destroyed many of the submarine’s electrical components.<sup>10</sup> After the accident, the navy spent “about \$200,000 to buy old technology that mirrors what the sub’s British builders used,” equipment one of the navy’s own “electrical technologists” said “probably goes back to the ’60s.”<sup>11</sup> The submarine spent the next six years undergoing repairs.<sup>12</sup>

In 2012, HMCS *Windsor* completed a five-year refit that was initially scheduled to take two years. Numerous problems were discovered during the course of the refit. According to documents obtained by the CBC, “[i]t appears that every system ... has major problems ... including bad welds in the hull, broken torpedo tubes, a faulty rudder and tiles on the side of the sub that continually

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fall off.”<sup>13</sup> Not surprising, the refit ran far over budget – in 2010 alone the navy spent \$28 million more on the vessel than the \$17 million allocated.<sup>14</sup> Then, in 2012, a defect was found in one of the vessel’s two diesel generators, which resulted in the submarine having to operate on just one generator.<sup>15</sup>

A shortage or lack of spare parts has posed an ongoing challenge. As Commander R.E. Bush, the project director for the *Victoria*-class program, explained in 2005, “many of the original equipment manufacturers either no longer manufacture the equipment, or have moved on to other designs.”<sup>16</sup>

As a result of these and other problems, Canada’s four submarines have spent most of their lives being refitted and repaired, leaving little time for training and operations. In the decade between 2003-2013, they accumulated a total of just 1,277 days at sea.<sup>17</sup>

In the mid-1990s, the government of Prime Minister Jean Chrétien “considered getting out of the submarine business altogether.”<sup>18</sup> In 2007, the Stephen Harper government also considered scrapping the *Victoria*-class submarines.<sup>19</sup> On both occasions, proponents of the submarine program would have pointed to the large amounts of money that had already been spent; money that would be wasted if the program was closed down.

The Harper government, persuaded that it should stick with the program, awarded the *Victoria*-class in-service



HMCS *Chicoutimi* arrives at Esquimalt, British Columbia, for refit work following a fire on the submarine’s initial voyage to Canada in 2004.

Credit: Cpl Chris Ward, Imaging Services, CFB Esquimalt



Credit: Penki kontinental, UAB/Reuters Scand/ScanPix

HMCS *Windsor* is lowered into the water from dry dock after undergoing a five year refit at CFB Halifax, Nova Scotia, 11 April 2012.

support contract to the British-based company Babcock International in 2008. The contract was worth up to \$1.5 billion over 15 years.<sup>20</sup> Several years later, the government added \$200 million to the contract, bringing it to \$1.7 billion.<sup>21</sup>

By 2012, however, the Department of National Defence was concerned that the Harper government might terminate the submarine program for cost-savings reasons.<sup>22</sup> The sunk costs argument may have been invoked again, and the program continued. Then, after the October 2015 election, defence officials persuaded the government of Justin Trudeau to add another \$900 million to the contract with Babcock International, bringing the total – for 2008 to 2023 – to \$2.6 billion.<sup>23</sup> Now, according to an article by Lee Berthiaume in the *Ottawa Citizen*, the navy “is waiting to hear whether the government wants to extend the submarines’ lives so they can operate until the 2030s.”<sup>24</sup> This decision, which needs to be made soon, would require an additional \$1.5 to \$3 billion.

### **It would not be fair to blame the Royal Canadian Navy for the ongoing problems with the *Victoria*-class submarines.**

The whole situation is quite remarkable, especially when you consider that the four submarines are now 24-27 years old, and only one is currently available for immediate deployment. That submarine happens to be HMCS *Windsor*, with its restricted diving depth and other ongoing mechanical problems. Most recently, the crew of HMCS *Windsor* was forced to abort a voyage to an exercise near Norway in August 2016, returning to Halifax for a week of repairs.<sup>25</sup>

The situation is even more remarkable when you consider that, for less money than has been spent refitting and repairing the *Victoria*-class submarines in an effort to

make them fully operational, the Chrétien or Harper governments could have procured at least three brand new submarines from proven manufacturers in Germany or France. The new submarines would have been cheaper to maintain, and been much more reliable, and they could have included useful new technologies such as air independent propulsion for operations under Arctic sea ice.

It would not be fair to blame the Royal Canadian Navy (RCN) for the ongoing problems with the *Victoria*-class submarines. In a recent article in the *Naval War College Review*, Jan Joel Andersson explains that “it is very difficult and costly to operate submarines safely and even more difficult to create and sustain a submarine force capable of conducting effective combat patrols.”<sup>26</sup> As a result, “[m]any of the world’s navies are finding it hard to maintain and service their submarines properly or even to recruit and retain qualified personnel, and these services have little opportunity to conduct enough patrols to give their crews the operational experience necessary to deploy effectively.”<sup>27</sup> Andersson provides a long list of developing countries with old, difficult to maintain and, for the most part, non-operational submarines. He also notes that even Canada’s peers have troubles with their submarine fleets. For example, he notes:

The Royal Australian Navy (RAN) currently operates six Swedish-designed *Collins*-class submarines that were coproduced in Australia and commissioned between 1996 and 2003. These boats, among the largest and most advanced conventional submarines in the world, have suffered from persistent maintenance problems that have resulted in reduced availability and opportunities for crew training. The RAN’s stated goal is always to have two submarines deployed or available for immediate deployment, two in training, and two in maintenance. However, this goal has reportedly never been achieved; the navy has at times been left with only one operational submarine, sometimes none at all.<sup>28</sup>

However, the challenges facing the RCN have been exacerbated by the political decision, made nearly two decades ago, to provide them with these particular cut-price, second-hand, poorly built and maintained submarines.

### ***Options for the Future***

Elsewhere, I have acted as devil’s advocate by challenging the arguments in favour of retaining Canada’s submarine capability.<sup>29</sup> Good decision-making is facilitated by a rigorous contestation of ideas and analysis, something which is often lacking in the hierarchical worlds of national defence



Royal Australian Navy Collins-class submarine HMAS *Dechaineux* leads HMAS *Waller* and HMAS *Sheean* in formation from Fleet Base West HMAS *Stirling*, 22 March 2013.

and Westminster-style government. How many Canadian politicians know, for instance, that Denmark decommissioned its submarines in 2006, choosing to strengthen its surface fleet instead? Like Canada, Denmark is a NATO member with a very long coastline, due to its responsibilities to control and defend Greenland's coasts as well.

However, there are also good arguments in favour of Canada retaining a submarine capability, including the fact that it has the world's longest coastline. My concern is that Canada will lose its submarine capability through negligence rather than design, as successive governments stave off the necessary decision on whether to purchase new submarines.

One should not underestimate the political inertia which exists on this file. In addition to the sunk costs argument, politicians know that refitting old military equipment avoids the public controversies that accompany major new purchases. Why would the Trudeau government want to repeat the travails involved in replacing the Sea King helicopters or the CF-18 fighter jets when it could, instead, quietly put more money into refitting and repairing the *Victoria*-class submarines?

Instead of hiding behind another round of refits, the government should face up to the fact that Canada's submarine capability is running out of time. As Chief of Maritime Staff Paul Maddison told the Senate National Security and Defence Committee in 2012: "I would envision initiating a next-generation submarine discussion within the next three or four years to ensure there is no gap in submarine capability, which is what we faced in the 1990s."<sup>30</sup> In other words, a decision is urgently needed. Does Canada purchase new submarines? Or does it, like Denmark, get out of the submarine business altogether?

A prompt and efficient procurement should be facilitated by the fact that there are only a few options available for

new diesel-electric submarines. The first option is the *Scorpene*-class. This class of submarine was designed by France's DCNS and Spain's Navantia. A proven design, the *Scorpene*-class is currently in service in the French Navy and is being acquired by other countries, including Chile, Malaysia, Brazil and India. It has a top speed of 20 knots submerged and a diving depth of around 350 metres. The *Scorpene*-class has a range of 6,500 nautical miles (12,000 km) and, with its air independent propulsion (AIP) system, can remain submerged for up to three weeks.<sup>31</sup>

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As with any naval ship, the cost of the *Scorpene*-class depends on the equipment and armaments placed on board. Malaysia paid between 390-400 million Euros for each of its *Scorpenes*, Chile paid 400-460 million Euros, and India paid 750 million Euros.<sup>32</sup> At the current exchange rate of 1.39, these figures work out to CAD \$542-556 million, \$556-639 million, and \$1.042 billion.

The second option for Canada is the U-212/214. Germany's U-214 submarine is the export version of the U-212. A product of Thyssen Krupp Marine Systems, it has been purchased by Portugal, Greece, South Korea and Turkey. The U-214 has a maximum speed of 20 knots, a maximum depth of about 400 metres, and a range of 10,420 nautical miles (19,300 km). Its AIP system provides a submerged endurance of two weeks.<sup>33</sup>

The U-214 lacks the non-magnetic steel hull that makes the U-212 (the non-export version) impossible to detect



Malaysia's first *Scorpene*-class diesel-electric submarine docked at its naval base in Port Klang on the outskirts of Kuala Lumpur, 3 September 2009.



Credit: Ulrich Wrede/  
www.primeportal.net

*U-32 is the second Type 212A submarine of the German Navy. The Type 212 features diesel propulsion with an air independent propulsion system using hydrogen fuel cells.*

using a Magnetic Anomaly Detector. If Canada were to purchase the German-designed submarine, it might wish to negotiate for the inclusion of the non-magnetic technology. The cost of a U-212, with the non-magnetic hull, is around \$500 million.<sup>34</sup>

The third option is the *Shortfin Barracuda*. In 2016, Australia decided on this new model which is a diesel-electric version of the *Barracuda*-class nuclear submarine produced by French company DCNS. The *Shortfin Barracuda*, which exists only as a design, will be relatively large and long-ranged for a conventionally-powered submarine, at 97 metres in length and with the ability to sail 18,000 nautical miles without refueling.<sup>35</sup>

However, the *Shortfin Barracuda* will be very expensive, with the Australian government expecting to pay AUS \$50 billion for 12 of the new vessels.<sup>36</sup> As a point of comparison, Thyssen Krupp Marine Systems offered to build the same number of U-216s (a larger version of the U-212) in Australia for AUS \$20 billion.<sup>37</sup> Even a fleet of *Virginia*-class nuclear-powered attack submarines would cost less than the *Shortfin Barracudas*.<sup>38</sup> This cost factor alone probably rules the Australian choice beyond consideration for Canada.

## Conclusion

When it comes to the *Victoria*-class submarines, the sunk cost fallacy has prevented clear-headed decision-making for nearly two decades. Canada bought the submarines, paid billions of dollars to fix them, and cannot allow that money to go to waste. Or so the thinking has gone.

Those decades of clouded thinking have left Canada – a wealthy, developed, G7 country – with a sad little fleet of broken-down submarines. It is time for bold, evidence-based decision-making. It is time to either buy new submarines, or shut the program down. 🍷

## Notes

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