

Nuclear powered submarines 'do-able' for Australia

August 14 2013

Developing a nuclear-powered submarine may present no greater challenge for Australia than developing its own uniquely modified conventional submarine, according to a green paper published today by University College London.

Developed by UCL's International Energy Policy Institute in Adelaide, the discussion paper considers in detail for the first time the question: 'What would it take for Australia to develop a nuclear-powered submarine capability?'

The Director of the IEPI, Professor Stefaan Simons, says the Australia-first research finds a civil nuclear industry does not need to be developed first in order for a nuclear-powered submarine option to become feasible. Indeed, in most cases around the world, defence needs have preceded civil ones. Perhaps more importantly, nuclear-powered submarines have proven operational capabilities – modifying a conventional submarine to deliver Australia's operational requirements is fraught with risk, he says.

Professor Simons, whose own research includes a focus on nuclear fuel reprocessing, [nuclear waste disposal](#) and low carbon energy technologies, says it is possible that Australia would only need to manage short-lived (radioactive) wastes produced during operations and maintenance of such submarines; which could be done within the facilities already planned for development in Australia.

"With the exception of the nuclear fuel in the reactor, all of the radioactive waste produced in the decommissioning of a nuclear submarine should be lower-level and manageable within the planned facilities," he says.

"It is virtually certain that the fuel would be provided with the reactor. With the modern design trade-offs, indicating that fuelling for life is preferable, issues around refuelling (i.e. the management of spent fuel) would probably not apply and any spent fuel could possibly be the responsibility of the country of origin, depending on negotiations."

The green paper was developed to kick start an informed debate about what would be the necessary requirements if Australia wished to develop a nuclear-powered submarine capability in Australia.

Professor Simons says the green paper creates a broad non-classified understanding of the requirements for nuclear naval (submarine) propulsion. It identifies the necessary infrastructure, workforce, legislative and regulatory (both national and international) requirements.

The green paper highlights eight key issues and outlines a further 15 points for policy consideration. The key findings are:

1. Developing a nuclear-powered submarine capability may present no greater challenge than Australia developing its own uniquely modified conventional submarine design and construction capability.
2. A nuclear industry per se does not need to be developed first in order for a nuclear-powered submarine option to become feasible. Indeed, in most cases around the world, defence needs have preceded civil ones.
3. There appears to be little evidence supporting the argument that Australia would be more dependent on its allies if it leased or acquired

nuclear-powered submarines.

4. There is a significant global shortage of nuclear regulatory personnel and there are significant challenges in developing this capability, although some already exists in Australia. In practice, the primary training ground for many potential recruits into nuclear safety inspectorates is a nuclear submarine engineering force. The existing nuclear regulatory bodies in Australia would benefit in the long run from the use of [nuclear-powered submarines] by the Royal Australian Navy.

5. It is virtually certain that the fuel would be provided with the reactor. With the modern design trade-offs indicating that fuelling for life is preferable, issues around refueling (e.g. the management of spent fuel) would probably not apply and any [spent fuel](#) could possibly be the responsibility of the country of origin, depending on negotiations.

6. It is possible that Australia would only need to manage short-lived wastes produced during operations and maintenance [of nuclear-powered submarines], which could be done within the facilities already planned for development in Australia.

7. It is unlikely that any major maintenance of the reactor would take place in Australia, unless a phased approach to procurement took place where, for instance, the first boat would be leased (to provide capability quickly), with more of the final assembly carried out locally for subsequent vessels.

8. With the exception of the [nuclear fuel](#) in the reactor, all of the [radioactive waste](#) produced in the decommissioning of a nuclear [submarine](#) should be lower-level and manageable within the planned facilities.

Download the [Could Australia's future submarines be nuclear-powered?](#)

green paper.

Provided by UCL Australia

Citation: Nuclear powered submarines 'do-able' for Australia (2013, August 14) retrieved 26 April 2024 from

<https://phys.org/news/2013-08-nuclear-powered-submarines-do-able-australia.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.