

# WebMemo



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## The Advantages of Expanding the Nuclear Navy

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Congress is debating whether future naval ships should include nuclear propulsion. The House version of the Defense Authorization Act of 2008 calls for all future major combatant vessels to be powered by an integrated nuclear power and propulsion system; the Senate version does not. While Congress must be careful in dictating how America's armed forces are resourced, it also has a constitutional mandate "to provide and maintain a Navy." Although nuclear-powered ships have higher upfront costs, their many advantages make a larger nuclear navy critical for protecting national security interests in the 21st century.

**Nuclear Propulsion's Unique Benefits.** As the defense authorization bill is debated, Members of the House and Senate should consider the following features of nuclear propulsion:

- *Unparalleled Flexibility.* A nuclear surface ship brings optimum capability to bear. A recent study by the Navy found the nuclear option to be superior to conventional fuels in terms of surge ability, moving from one theater to another, and staying on station. Admiral Kirkland Donald, director of the Navy Nuclear Propulsion Program, said in recent congressional testimony, "Without the encumbrances of fuel supply logistics, our nuclear-powered warships can get to areas of interest quicker, ready to enter the fight, and stay on station longer than their fossil-fueled counterparts."
- *High-Power Density.* The high density of nuclear power, i.e., the amount of volume required to store a given amount of energy, frees storage

capacity for high value/high impact assets such as jet fuel, small craft, remote-operated and autonomous vehicles, and weapons. When compared to its conventional counterpart, a nuclear aircraft carrier can carry twice the amount of aircraft fuel, 30 percent more weapons, and 300,000 cubic feet of additional space (which would be taken up by air intakes and exhaust trunks in gas turbine-powered carriers). This means that ships can get to station faster and deliver more impact, which will be critical to future missions. This energy supply is also necessary for new, power-intensive weapons systems like rail-guns and directed-energy weapons as well as for the powerful radar that the Navy envisions.

- *Real-Time Response.* Only a nuclear ship can change its mission and respond to a crisis in real-time. On September 11, 2001, the USS Enterprise—then on its way home from deployment—responded to news of the terrorist attacks by rerouting and entering the Afghan theater.
- *Energy Independence.* The armed forces have acknowledged the vulnerability that comes from being too dependent on foreign oil. Delores Etter, Assistant Secretary of the Navy for Re-

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search, Development, and Acquisition, said in recent congressional testimony, “[We] take seriously the strategic implications of increased fossil fuel independence.” The Navy’s use of nuclear propulsion for submarines and aircraft carriers already saves 11 million barrels of oil annually. Using nuclear propulsion for all future major surface combatants will make the Navy more energy independent.

- **Survivability.** U.S. forces are becoming more vulnerable as other nations become more technologically and tactically sophisticated. Expanding America’s nuclear navy is critical to staying a step ahead of the enemy. A nuclear ship has no exhaust stack, decreasing its visibility to enemy detection; it requires no fuel supply line, assuring its ability to maneuver over long distances; and it produces large amounts of electricity, allowing it to power massive radars and new hi-tech weaponry.
- **Force Enhancement.** Though effective, modern aircraft carriers still depend on less capable fossil-fueled counterparts in the battle group. Increasing the number of nuclear surface ships would increase the capability of U.S. naval forces to operate both independently and as part of a battle-group.
- **Superiority on the Seas.** Policymakers have taken for granted the United States’ superiority on the seas for many years. This has led to a decline in America’s overall naval force structure and opened the door for foreign navies to potentially control critical blue-water regions. Expanding the nuclear navy will allow the United States to maintain its maritime superiority well into the 21st century.
- **Environmentally Clean Source of Energy.** Congress is considering placing CO2 restrictions on all federal government activities, including the Pentagon’s. This mandate would be highly detrimental to the armed forces. More people are starting to realize the often-overlooked environmental benefits of a nuclear navy. Expanding nuclear power would help to achieve many of the objectives of a CO2 mandate in addition to increasing America’s military capability. Unlike a

conventionally powered ship, which emits carbon dioxide and other pollutants into the atmosphere, a nuclear ship is largely emissions-free.

**America’s Nuclear Shipbuilding Industrial Base.** Some have erroneously argued that America’s industrial base is inadequate to support a nuclear cruiser. Additional nuclear shipbuilding can not only be absorbed by the current industrial base but also will allow it to work more efficiently. That said, Congress could consider the option of expanding the infrastructure at a later date by licensing additional nuclear production facilities and shipyards should further expansion be necessary.

America’s shipyards are not operating at full capacity. Depending on the vendor, product, and service, the industrial base is currently operating at an average capacity of approximately 65 percent. Additionally, Navy leaders have testified that without further investments, their training infrastructure is adequate to handle the influx of additional personnel necessary to support an expansion of nuclear power.

Construction of additional ships would not be limited to the nuclear shipbuilding yards. Modules could be produced throughout the country and assembled at nuclear-certified yards. Another alternative might be to build the ship in a non-nuclear yard and then transport it to a nuclear yard where the reactor can be installed. The work would be spread throughout the aircraft carrier and submarine industrial bases. Today, the aircraft carrier industrial base consists of more than 2,000 companies in 47 states. Likewise, the submarine industrial base consists of more than 4,000 companies in 47 states

**Economic Viability.** The Navy recently did a cost analysis of nuclear ships versus conventionally powered ships. Delores Etter on March 1 said:

[M]edium surface combatants [like cruisers], with their anticipated high-combat system energy demands, th[e] break-even point is between \$70 and \$225 per barrel [of oil]. This indicates that nuclear power should be considered for near-term applications for those ships.

At the time of that statement, the price of a barrel of crude oil was about \$65; oil is currently trading at

nearly \$100 per barrel. The Navy pegged the cost premium for a nuclear cruiser at between zero to 10 percent with the oil price at \$74.15. That premium would obviously be much lower with today's prices. Given that every \$10 hike in the price of oil costs the Department of Defense \$1.3 billion, policymakers must consider nuclear propulsion for future ships.

Furthermore, the Navy's cost comparisons do not even consider the savings that would result from additional volume going through under-utilized shipbuilding infrastructure.

**Economies of Scale Savings.** Increasing construction of nuclear ships and submarines yields significant cost reductions. For example, increased workloads could save the Navy 5 percent to 9 percent on propulsion plant component costs. Building two Virginia-class submarines annually would result in approximately \$200 million in savings per submarine. Adding a nuclear cruiser every two years to the workload would reduce the price of other nuclear ship power plants by about 7 percent. This equates to savings of approximately \$115 million for each aircraft carrier and \$35 million for each submarine.

Furthermore, the cost of a nuclear ship includes its life-cycle costs. While nuclear ships can cost more up front, policymakers should consider lifetime costs, which include operations and maintenance, fuel, and decommissioning. Cost-comparison studies have not considered many of the costs unique to fossil-fueled ships, such as the cost of protecting fuel supply lines, which the Navy will protect as primary combat ships or the environmental costs of emissions.

**Correcting Misperceptions About Nuclear Propulsion.** Despite multiple official studies and numerous hours of congressional testimony, specific misunderstandings continue to persist about nuclear propulsion. The following facts address these misperceptions:

- *Nuclear propulsion is not an indication of nuclear weapons.* According to Ron O'Rourke, an analyst for the Congressional Research Service, "A military ship's use of nuclear power is not an indication of whether it carries nuclear weapons—a nuclear-powered military ship can lack nuclear weapons,

and a conventionally powered military ship can be armed with nuclear weapons."

- *A shipyard does not have to be nuclear-certified to contribute to nuclear ship construction.* According to Vice Admiral Sullivan, "[You could] build modules of this ship in different yards and put it together in a nuclear-certified yard..., and we do that today with the Virginia Class." Today, approximately 6,000 companies in 47 states contribute to nuclear shipbuilding.
- *The United States has ample experience in nuclear shipbuilding.* The United States has built and operated nine nuclear-powered cruisers, 10 nuclear-powered aircraft carriers, and nearly 200 nuclear-powered submarines. The Navy's Naval Nuclear Propulsion Program has trained more than 100,000 officers and technicians.
- *Nuclear power is safe.* The Navy operates 103 reactor plants in 81 nuclear-powered ships, the NR-1 submarine, and four training and test reactors. Over more than half a century, the Navy has operated for over 5,800 reactor years and steamed over 136 million miles without accident or radioactive release.
- *Foreign countries welcome America's nuclear ships into their ports.* U.S. nuclear-powered ships are welcomed into more than 150 ports in more than 50 countries.
- *Other countries have nuclear navies.* Russia, China, the United Kingdom, and France all maintain nuclear ships. Other countries, such as India, are seeking the capability.

**Conclusion.** With the defense authorization bill, Congress is on the threshold of making a generational decision on the future of the Navy. Nuclear-powered ships have a proven record of safety, cost-effectiveness, and strategic value. With the industrial capacity already in place, Congress must seriously consider the unique benefits of providing and maintaining a larger nuclear navy.

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