



Center for Strategic and Budgetary Assessments

ARE U.S. NUCLEAR FORCES UNAFFORDABLE?

The background of the cover is a photograph of a night sky with several bright, parallel streaks of light ascending from the bottom left towards the top right, suggesting the launch of nuclear missiles. The sky is a deep blue with some lighter, wispy clouds.

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The following is a preview of a more detailed study by Todd Harrison and Evan Braden Montgomery to be released next month.

Since the Budget Control Act (BCA) was enacted in 2011, every area of the defense budget has come under increased scrutiny. The cost of nuclear forces in particular has received considerable attention because nearly every component of the triad is due for modernization. To execute these programs as currently planned, the Department of Defense (DoD) will need to increase funding for U.S. nuclear forces well above recent levels, creating additional pressure on an already-strained defense budget. This has led some to conclude that nuclear forces are “unaffordable.”¹ With nuclear costs in the spotlight, a number of estimates have been published that project how much the U.S. government plans to spend on nuclear forces in the years ahead. As shown in the table below, four of the most commonly cited estimates differ significantly, with projections ranging from \$73 billion over five years to more than a trillion dollars over 30 years.

TABLE 1: COMPARISON OF NUCLEAR FORCES COST PROJECTIONS

SOURCE	TOTAL COST (IN THEN-YEAR DOLLARS)	TIME PERIOD	YEARS INCLUDED
DoD’s Major Force Program 1: Strategic Forces (April 2014) ²	\$73B	5 years	FY 2016 to 2020
CBO’s Projected Costs of Nuclear Forces (January 2015) ³	\$348B	10 years	FY 2015 to 2024
Stimson Center’s Resolving Ambiguity: Costing Nuclear Weapons (June 2012) ⁴	\$352–392B	10 years	FY 2013 to 2022
CNS’s The Trillion Dollar Nuclear Triad (January 2014) ⁵	\$872–1,082B	30 years	FY 2014 to 2043

¹ See Angela Canterbury and Kingston Reif, “It’s Time to Rein in Nuclear Spending,” *Defense One*, September 25, 2014 and Tom Z. Collina and the Arms Control Association Research Staff, *The Unaffordable Arsenal: Reducing the Costs of the Bloated U.S. Nuclear Stockpile* (Washington, DC: Arms Control Association, October 2014).

² See Office of the Under Secretary of Defense (Comptroller), *National Defense Budget Estimates for FY 2016, Green Book* (Washington, DC: DoD, April 2014), Table 6-4, available at http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2016/FY16_Green_Book.pdf.

³ See Congressional Budget Office, *Projected Costs of U.S. Nuclear Forces, 2015 to 2024* (Washington, DC: GPO, January 2015), available at <https://www.cbo.gov/sites/default/files/cbofiles/attachments/49870-NuclearForces.pdf>.

⁴ See Russell Rumbaugh and Nathan Cohn, *Resolving Ambiguity: Costing Nuclear Weapons* (Washington, DC: Stimson Center, June 2012), available at http://www.stimson.org/images/uploads/research-pdfs/RESOLVING_FP_4_no_crop_marks.pdf.

⁵ See Jon Wolfsthal, Jeffrey Lewis, and Marc Quint, *The Trillion Dollar Nuclear Triad* (Monterey, CA: Center for Nonproliferation Studies, January 2014), available at http://cns.mii.edu/opapers/pdfs/140107_trillion_dollar_nuclear_triad.pdf.

Each of these estimates vary in terms of the timeframe they cover, the capabilities they include, and how they account for dual-use systems (i.e. systems with both conventional and nuclear missions). For instance, DoD's Major Force Program 1 (MFP-1) does not accurately represent the cost of U.S. nuclear forces because it includes some programs and platforms that do not contribute to nuclear missions, such as the B-1 bomber, and omits others that do, such as nuclear weapons modernization programs. Both the Congressional Budget Office (CBO) and Stimson Center studies limit their assessments to ten years and therefore miss many nuclear modernization costs. Moreover, the Stimson study employs a methodology that estimates the cost of an all-nuclear force (i.e. what costs would remain if all conventional forces were eliminated) rather than the additional cost of maintaining nuclear forces alongside conventional forces. Finally, while the Center for Nonproliferation Studies (CNS) report does capture long-term modernization costs given its much longer timeframe, it does not provide a sufficient level of granularity to determine when costs will peak and at what level.

CSBA's forthcoming study is intended to help rationalize the apparent discrepancies among these cost estimates in three ways. First, it provides a bottom-up estimate for the cost of U.S. nuclear forces over the next 25 years (FY 2015 to FY 2039), which is sufficient to capture the near-term costs that will be incurred while the BCA budget caps remain in effect, the mid-term costs that are expected to crest in the 2020s, and the long-term costs that will not be incurred until the 2030s. Second, the study uses explicit criteria for determining what costs should be attributed to nuclear missions based on the capabilities and capacity needed for nuclear forces above and beyond the needs of conventional forces. And third, it allocates partial costs for dual-use systems based on how costs would change if the nuclear mission is reduced or eliminated.⁶

FIGURE 1: TOTAL ESTIMATED COST OF NUCLEAR FORCES IN FY 2015 DOLLARS

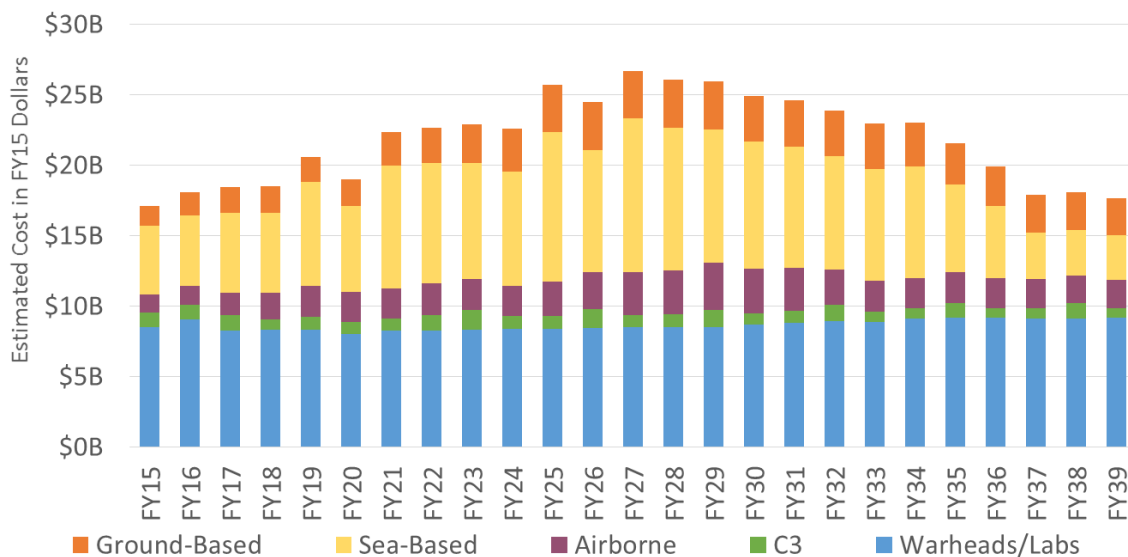


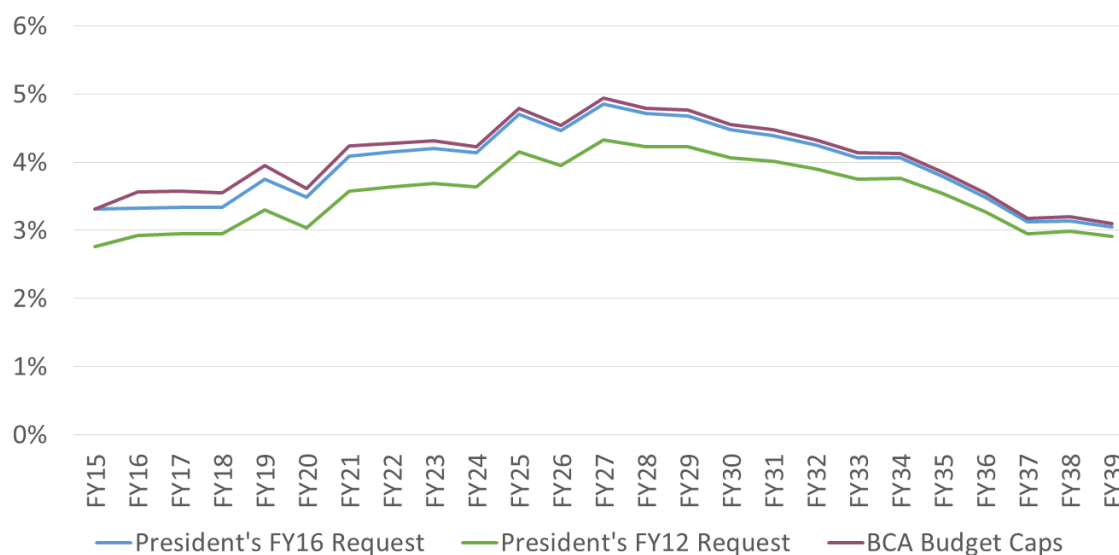
Figure 1 summarizes the CSBA cost estimate for U.S. nuclear forces over the next 25 years. According to our projection, annual costs should grow by 56 percent (adjusting for inflation) and peak around FY 2027 before declining to near current levels in the late 2030s. This increase is similar to recent statements by Frank Kendall, the Undersecretary of Defense for Acquisition, Technology, and Logistics, that the Pentagon would require an additional \$10–12 billion per year

⁶ Like the other studies, the CSBA estimate does not include costs associated with cleanup and disposal of nuclear waste, threat reduction and arms control, and missile defense.

beginning in FY 2021 to support its planned nuclear modernization efforts.⁷ Much of the projected increase in costs is due to modernization programs, such as the Navy's Ohio Replacement program and the various warhead modernization programs funded primarily by the Department of Energy.

To help put these costs in perspective, Figure 2 compares the total cost of nuclear forces as a percentage of the overall national defense base discretionary budget under three different scenarios: the BCA budget caps currently in effect, the President's FY 2016 budget request, and the President's FY 2012 budget request (often referred to as the "Gates Budget"). In each case, the top-line budget scenarios use a straight-line extrapolation to extend through FY 2039. The cost of nuclear forces remains below five percent in all years under all three scenarios. In comparison, the U.S. military spends more than twice as much on healthcare each year—roughly 10 percent of the budget—than it does on nuclear forces.

FIGURE 2: NUCLEAR FORCES AS A PERCENTAGE OF TOTAL NATIONAL DEFENSE UNDER THREE BUDGET SCENARIOS



Much of the recent debate over nuclear forces has concerned the affordability of nuclear modernization programs and the nuclear triad overall. As the independent National Defense Panel noted in its final report, “the Department of Defense is committed to a recapitalization of the triad, which under current budget constraints is unaffordable, especially considering that the nuclear deterrent’s supporting infrastructure, command and control systems, and other enabling capabilities also require expensive renovations.”⁸ Our analysis concludes that U.S. nuclear forces are affordable because their projected costs account for a small percentage of the overall defense budget (3 to 5 percent), even when supporting systems and infrastructure are included. While

⁷ Marcus Weisgerber, “Pentagon: We Can’t Afford to Replace Aging ICBMs, Bombers, Subs,” *Defense One*, April 14, 2015, available at <http://www.defenseone.com/management/2015/04/pentagon-we-cant-afford-replace-aging-icbms-bombers-subs/110134/>.

⁸ William J. Perry and John P. Abizaid, Co-Chairs, *Ensuring a Strong U.S. Defense for the Future: The National Defense Panel Review of the 2014 Quadrennial Defense Review* (Washington, DC: United States Institute of Peace, 2014), p. 50.

costs are projected to grow over the next decade, they will return to roughly the current level once the “bow wave” of nuclear modernization programs has passed.

Another important consideration, which is explored in more detail in our study, is that the potential savings from incremental reductions in nuclear forces is considerably less than the costs due to these forces. This is due in part to the fact that some costs do not scale with the size of the nuclear arsenal (i.e. fixed costs) and some variable costs do not scale linearly. In 2001, CBO’s David Mosher wrote that, “As long as the United States continues to be a nuclear power, keep submarine-launched ballistic missiles at sea, maintain a robust early-warning network and command and control system, and pursue a science-based stockpile stewardship program, the price tag for nuclear forces will not fall much below where it is today.” The situation remains largely the same now because of the looming modernization costs for nearly every part of the nuclear enterprise over the next two decades. Absent a major shift in U.S. nuclear strategy that would enable a major reduction, delay, or wholesale cancelation of nuclear modernization programs, the search for savings in nuclear forces continues to be a “hunt for small potatoes.”

Funding the nuclear modernization programs currently planned for the 2020s and beyond would require gradually increasing the overall defense budget by less than two percent above the BCA budget caps over the next decade, offsetting cuts of this amount within the budget, or some combination of the two. Thus, the issue is not affordability—rather, it is a matter of prioritization. Should nuclear forces, and by extension their modernization programs, be given higher priority in the budget than other forces? This question is ultimately a matter of national security strategy and not one that can be answered by cost assessments alone.

ABOUT THE CENTER FOR STRATEGIC AND BUDGETARY ASSESSMENTS (CSBA)

The Center for Strategic and Budgetary Assessments (CSBA) is an independent, nonpartisan policy research institute established to promote innovative thinking and debate about national security strategy and investment options. CSBA's analysis focuses on key questions related to existing and emerging threats to U.S. national security, and its goal is to enable policymakers to make informed decisions on matters of strategy, security policy, and resource allocation.

ABOUT THE AUTHORS

Todd Harrison is the Senior Fellow for Defense Budget Studies at the Center for Strategic and Budgetary Assessments. Since joining CSBA in 2009, Mr. Harrison has authored a number of publications on trends in the overall defense budget, defense acquisitions, military personnel costs, military readiness, and the cost of the wars in Iraq and Afghanistan. He frequently contributes to print and broadcast media and has appeared on CNBC, CNN, NPR, Al Jazeera English, and Fox News. He has been a guest lecturer for a number of organizations and teaches a class on the defense budget at George Washington University's Elliot School of International Affairs and a class on military space systems at Johns Hopkins University's School and Advanced International Studies. Mr. Harrison is a term member of the Council on Foreign Relations and was named one of the Defense News 100 Most Influential People in U.S. Defense. Mr. Harrison joined CSBA from Booz Allen Hamilton, where he supported clients across the Department of Defense, assessing challenges to modernization initiatives and evaluating the performance of acquisition programs. He previously worked in the aerospace industry developing advanced space systems and technologies and served as a captain in the U.S. Air Force Reserves. He is a graduate of the Massachusetts Institute of Technology with both a B.S. and an M.S. in Aeronautics and Astronautics. Mr. Harrison combines his budgetary, technical, and engineering experience with a strong background in systems analysis to lead the Budget Studies program for CSBA.

Evan Braden Montgomery is a Senior Fellow at the Center for Strategic and Budgetary Assessments. At CSBA, his research addresses two broad questions. First, how should the United States adapt its military strategy, capabilities, posture, and alliance relationships in response to changes in the balance of power as well as trends in future warfare? Second, how should we think about the role of nuclear weapons, including the size and shape of the U.S. arsenal as well as the impact of proliferation on regional security competitions? His current academic work focuses on how established powers respond to emerging powers and the relationship between grand strategy and military strategy. Dr. Montgomery is the author of numerous CSBA reports and policy briefs, most recently *The Future of America's Strategic Nuclear Deterrent*. He has also published articles in *Foreign Affairs*, *International Security*, *Security Studies*, and *The Journal of Strategic Studies*, and his commentary has appeared in *Defense News*, *The Diplomat*, *The National Interest*, and *Real Clear Defense*. He is a member of the International Institute for Strategic Studies.