



# Congressional Budget Office

November 20, 2017

## **Approaches for Managing the Costs of U.S. Nuclear Forces, 2017 to 2046**

Carnegie Endowment for International Peace

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This presentation summarizes information available in Congressional Budget Office, *Approaches for Managing the Costs of U.S. Nuclear Forces, 2017 to 2046* (October 2017), [www.cbo.gov/publication/53211](http://www.cbo.gov/publication/53211)

# Task and Approach

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- CBO was asked to
  - Estimate the costs of plans to develop, sustain, and field existing and future nuclear forces
  - Analyze approaches to manage costs by adjusting modernization plans
- Estimates for the report are based on 2017 budget plans
  - Used the same methodology that CBO used for biannual 10-year cost estimates (with several important exceptions)
  - Projected DoD's and DOE's existing plans out to 2046, including average cost growth experienced historically for similar programs
  - Performed independent estimates of major modernization programs using parametric models based on historical data or actual costs of similar programs

# Projected Costs of U.S. Nuclear Forces, 2017 to 2046

Billions of 2017 Dollars

	<b>30-Year Costs</b>
Strategic Nuclear Delivery Systems and Weapons	
Ballistic missile submarines	313
Intercontinental ballistic missiles	149
Bombers	266
Other nuclear activities	44
Subtotal	<u>772</u>
Tactical Nuclear Delivery Systems and Weapons	25
Nuclear Weapons Laboratories and Supporting Activities	261
Command, Control, Communications, and Early-Warning Systems	184
<b>Total Estimated Costs of Nuclear Forces</b>	<b><u>1,242</u></b>

Source: Congressional Budget Office, using information from the Department of Defense and the Department of Energy.

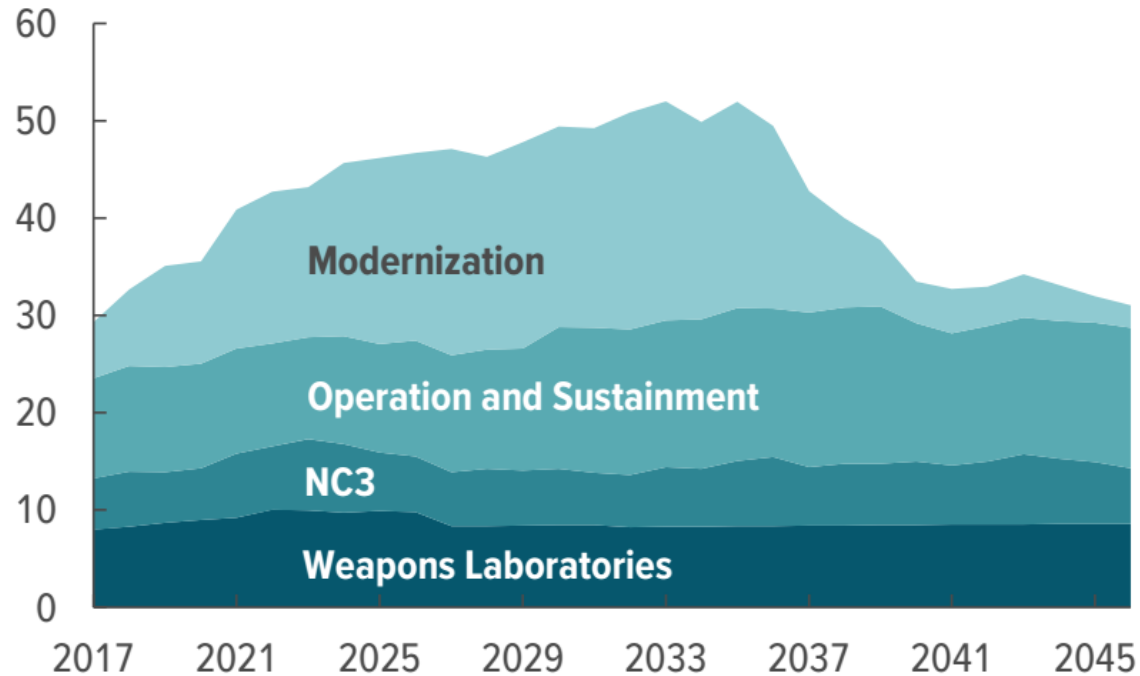
# Differences Between CBO's 30-year and 10-year Cost Estimates

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- Different time scale
  - 30-year time scale to capture full modernization cycle
- Constant dollars instead of nominal dollars
  - Inflation can distort analysis over longer periods
- Different allocation of bomber costs
  - Current study used 100 percent of B-2, B-52, and B-21 costs because some options delayed or reduced the size of the B-21 fleet
  - Current study noted costs (and savings) if one used 25 percent of B-52 and B-21 costs, as in the 10-year estimates

# Annual Costs of Nuclear Forces, 2017 to 2046

Billions of 2017 Dollars

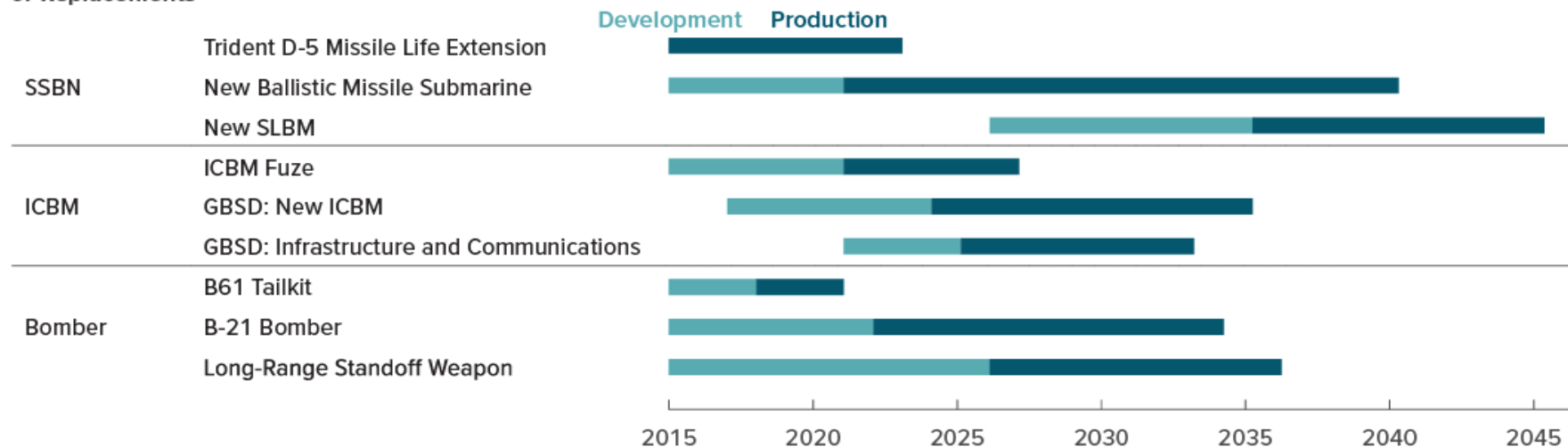


Source: Congressional Budget Office, using data from the Department of Defense and the Department of Energy.

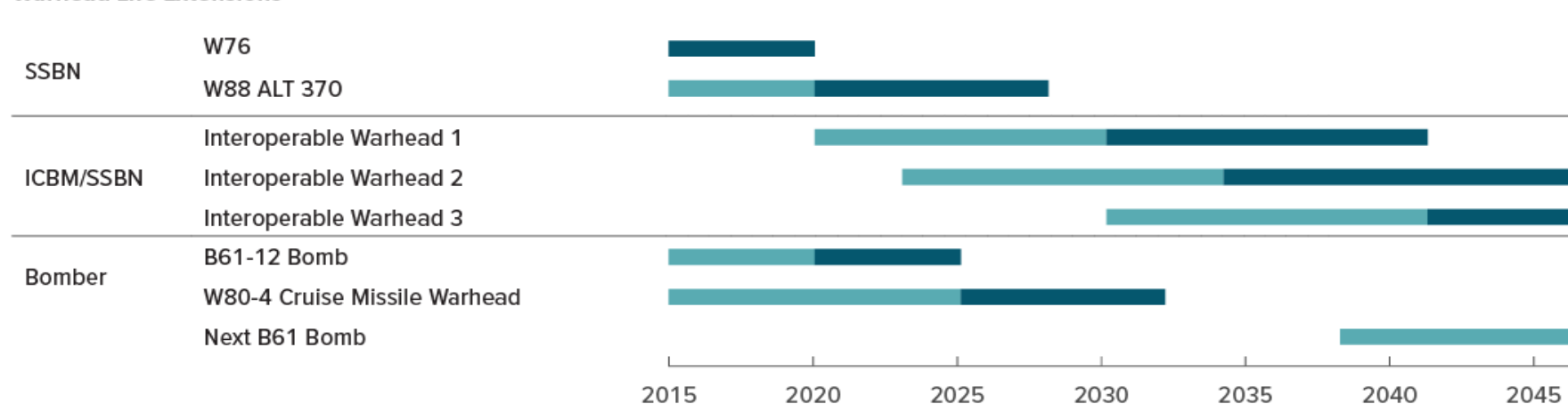
NC3 = Nuclear command, control, communications, and early-warning systems.

# Approximate Modernization Timelines

## Delivery System Life Extensions or Replacements



## Warhead Life Extensions



Source: Congressional Budget Office, using data from the Department of Defense and the Department of Energy.

\* = program continues beyond 2046

# Options That Would Reduce the Costs of Nuclear Forces

- CBO developed nine options based on three general approaches
  - Delay some modernization programs (one option)
  - Reduce force structure but keep warheads at New START levels (five options)
  - Reduce force structure and the number of warheads (three options)
  
- For each option, CBO
  - Estimated savings relative to costs of planned forces
    - If implemented for the next generation of systems
    - If implemented for the current generation of systems
  - Assessed the impact on capability relative to that of planned forces
    - Number of warheads in three categories
    - Characteristics under three scenarios (crisis management, limited nuclear strike, large-scale nuclear exchange)

# One Option that would Delay Some Modernization Programs



Source: Congressional Budget Office.

Option 1 would delay development of the new intercontinental ballistic missile, the B-21 bomber, and interoperable warheads.



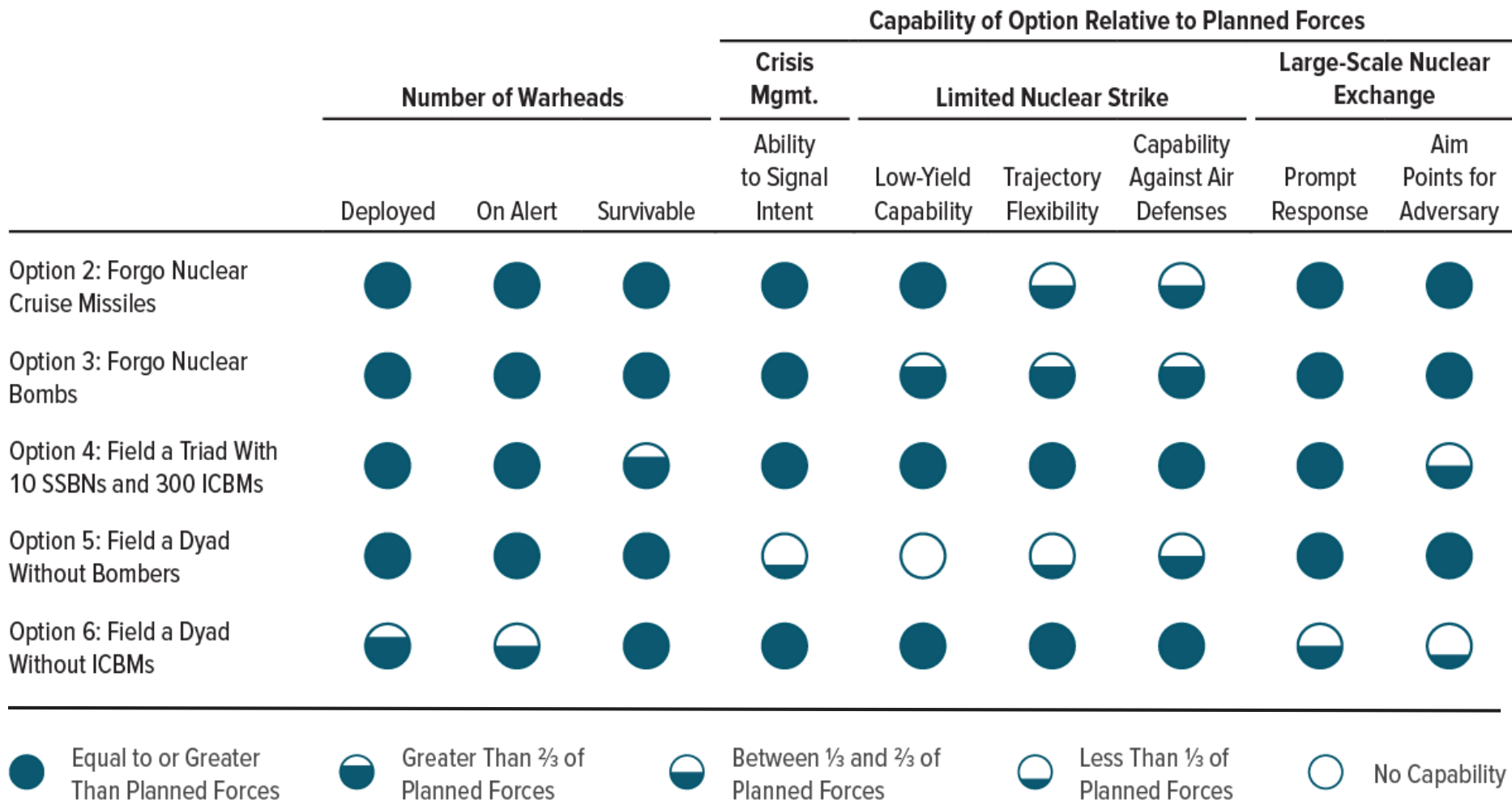
# Five Options that Would Reduce Force Structure but Keep 1,550 Warheads

Billions of 2017 Dollars

Option	Number of Platforms in 2046			30-Year Savings Relative to Costs of the 2017 Plan	
	SSBNs	ICBMs	Nuclear Bombers	Savings in Modernization Programs Only	Total Savings
Option 2: Forgo Nuclear Cruise Missiles	12	450	120	23	28 (2%)
Option 3: Forgo Nuclear Bombs	12	450	120	15	27 (2%)
Option 4: Field a Triad With 10 SSBNs and 300 ICBMs	10	300	120	25	30 (2%)
Option 5: Field a Dyad Without Bombers	12	450	None	50	71 (6%)
Option 6: Field a Dyad Without ICBMs	12	None	120	88	120 (10%)

Source: Congressional Budget Office using information from the Department of Defense and the Department of Energy.

# Effects on Capability for Options at 1,550 Warheads



Source: Congressional Budget Office.

# Three Options that Would Reduce Force Structure and Decrease Warheads to 1,000

Billions of 2017 Dollars

Option	Number of Platforms in 2046			30-Year Savings Relative to Costs of the 2017 Plan	
	SSBNs	ICBMs	Nuclear Bombers	Savings in Modernization Programs Only	Total Savings
Option 7: Field a 1,000-Warhead Triad	8	150	120	55	66 (5%)
Option 8: Field a 1,000-Warhead Dyad Without Bombers	10	300	None	81	107 (9%)
Option 9: Field a 1,000-Warhead Dyad Without ICBMs	10	None	120	106	139 (11%)

Source: Congressional Budget Office using information from the Department of Defense and the Department of Energy.

# Effects on Capability for Options at 1,000 Warheads

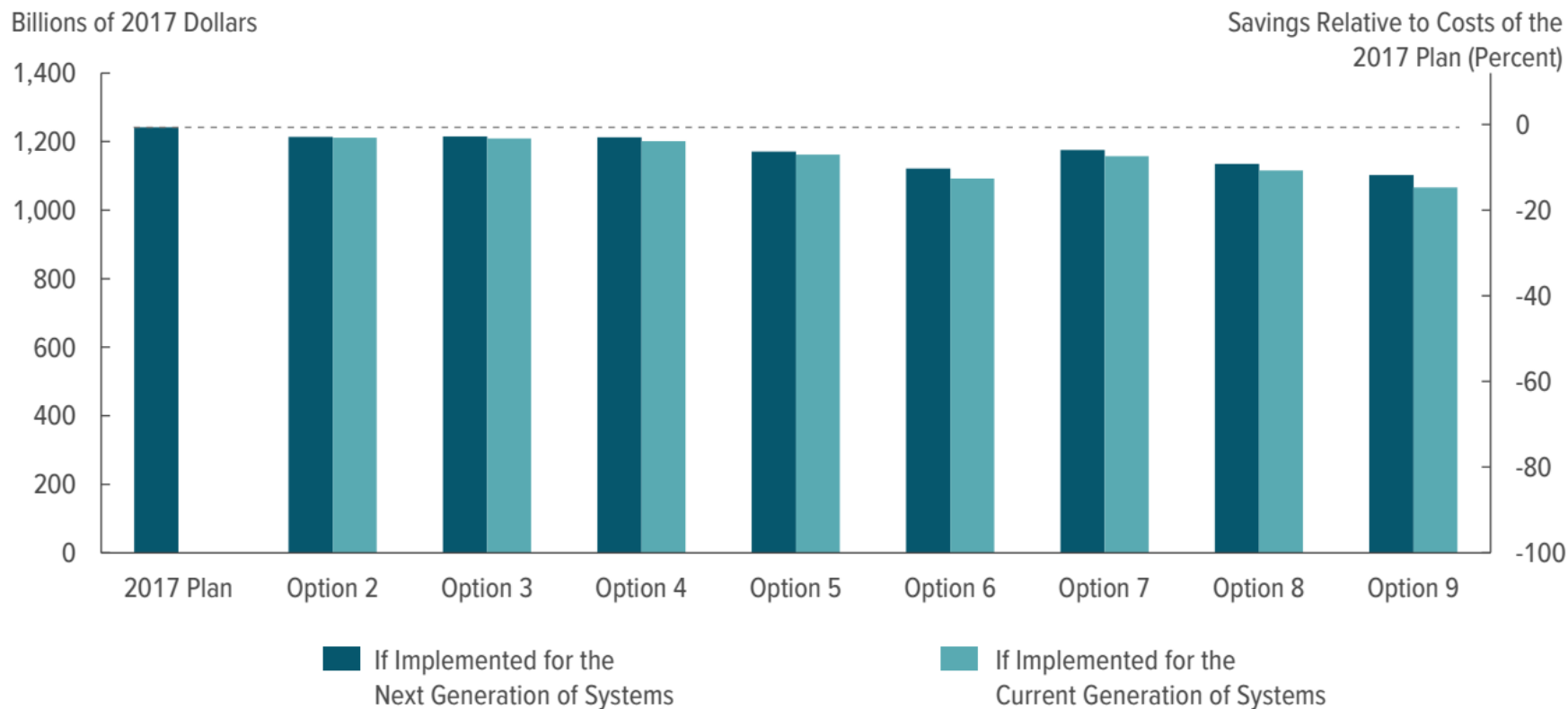
	Capability of Option Relative to Planned Forces								
	Number of Warheads			Crisis Mgmt.	Limited Nuclear Strike			Large-Scale Nuclear Exchange	
	Deployed	On Alert	Survivable	Ability to Signal Intent	Low-Yield Capability	Trajectory Flexibility	Capability Against Air Defenses	Prompt Response	Aim Points for Adversary
Option 7: Field a 1,000-Warhead Triad									
Option 8: Field a 1,000-Warhead Dyad Without Bombers									
Option 9: Field a 1,000-Warhead Dyad Without ICBMs									

	Equal to or Greater Than Planned Forces		Greater Than 2/3 of Planned Forces		Between 1/3 and 2/3 of Planned Forces		Less Than 1/3 of Planned Forces		No Capability
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Source: Congressional Budget Office.

# Total Costs of CBO's Force Structure Options



Source: Congressional Budget Office.

Option 1 is not included in this figure. Although that option would have net savings over the 2017–2046 period, they would be realized largely by delaying costs until after 2046.