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The 2020 Outlook for Navy Shipbuilding

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CONGRESS OF THE UNITED STATES
CONGRESSIONAL BUDGET OFFICE

CBO

An Analysis of
the Navy's
Fiscal Year 2020
Shipbuilding Plan



OCTOBER 2019

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Outline

- The Navy's Forthcoming Force Structure Assessment
- The Navy's 2020 Shipbuilding Plan
- Risks to the Navy's Shipbuilding Plan
- The Marine Commandant's New Planning Guidance
- Illustrations of Alternative Force Structure Elements

The Navy's Forthcoming Force Structure Assessment

A 355-Ship Fleet Would Mainly Represent an Increase in the Number of Attack Submarines and Large Surface Combatants

Ship Type	2014 Force Structure Assessment	2016 Force Structure Assessment	2019 (or 2020?) Force Structure Assessment
Aircraft Carriers	11	12	The Navy's new force structure assessment with updated numbers is expected by January 15, 2020
Ballistic Missile Submarines	12	12	
Attack Submarines	48	66	
Large Surface Combatants	88	104	
Small Surface Combatants	52	52	
Amphibious Warfare Ships	34	38	
Logistics and Support Ships	63	71	
Unmanned Surface Vehicles	n.a.	n.a.	
Unmanned Underwater Vehicles	n.a.	n.a.	
Total	308	355	

The Navy's 2020 Shipbuilding Plan

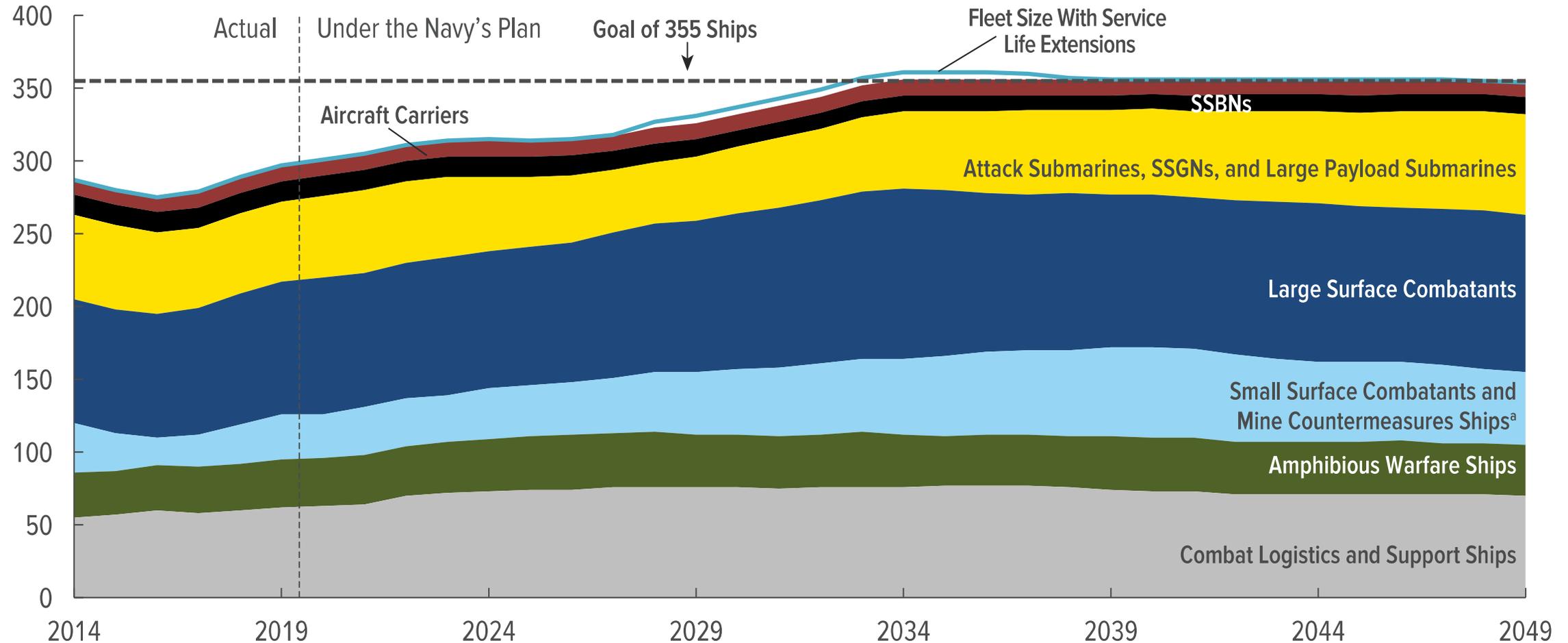
Ship Purchases Under the Navy's 30-Year 2019 and 2020 Shipbuilding Plans

Ship Type	2019 Shipbuilding Plan	2020 Shipbuilding Plan	Difference
Aircraft Carriers	7	7	0
Ballistic Missile Submarines	12	12	0
Large Payload Submarines or SSGN(X)	5	5	0
Attack Submarines	60	61	1
Large Surface Combatants (CGs/DDGs)	76	76	0
Small Surface Combatants (LCSs/FFGs)	57	58	1
Amphibious Warfare Ships	28	28	0
Logistics and Support Ships	56	57	1
Total	301	304	3

Ship Purchases Under the Navy's 2019 and 2020 Shipbuilding Plans, 2020 to 2024

Ship Type	2019 Shipbuilding Plan	2020 Shipbuilding Plan	Difference
Aircraft Carriers	1	1	0
Ballistic Missile Submarines	2	2	0
Large Payload Submarines or SSGN(X)	0	0	0
Attack Submarines	10	11	1
Large Surface Combatants (CGs/DDGs)	13	13	0
Small Surface Combatants (LCSs/FFGs)	8	9	1
Amphibious Warfare Ships	5	3	-2
Logistics and Support Ships	16	16	0
Total	55	55	0

Fleet Inventory Under the Navy's 2020 Plan



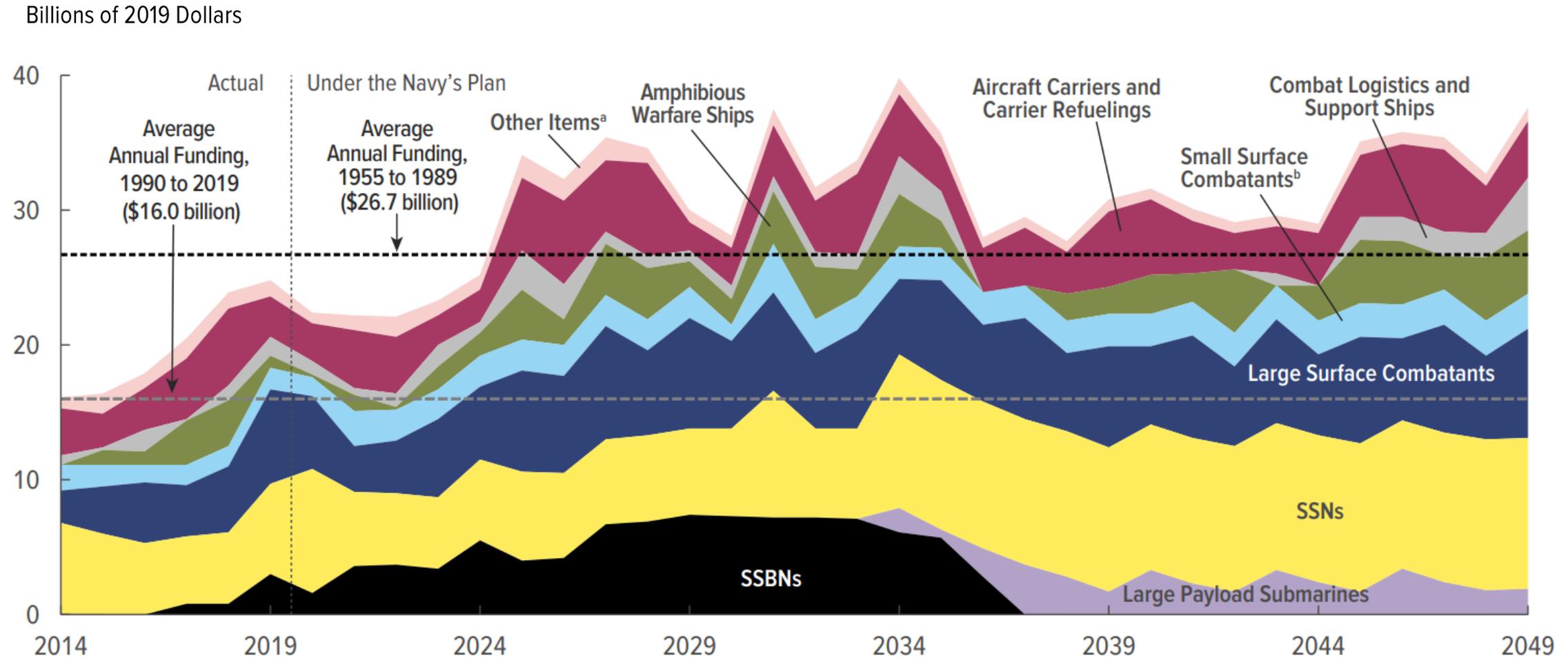
SSBNs = ballistic missile submarines; SSGNs = guided missile submarines.

a. Includes littoral combat ships, Oliver Hazard Perry FFG-7 guided missile frigates, new frigates, new small surface combatants, and Avenger class mine countermeasures ships.

Costs of the Navy's 2019 and 2020 Shipbuilding Plans

Billions of 2019 Dollars	2019 Shipbuilding Plan	2020 Shipbuilding Plan	Difference
Total Costs Over 30 Years			
Navy's estimates	643	660	17
CBO's estimates	817	865	48
Average Annual Costs for New Ships Only			
Navy's estimates	21.4	22.0	0.6
CBO's estimates	27.2	28.8	1.6
Average Annual Costs for All Shipbuilding Activities			
Navy's estimates	23.4	24.1	0.7
CBO's estimates	29.4	31.0	1.6
Average Cost per Ship			
Navy's estimates	2.1	2.2	0.1
CBO's estimates	2.7	2.8	0.1

Shipbuilding Costs Under the Navy's 2020 Plan



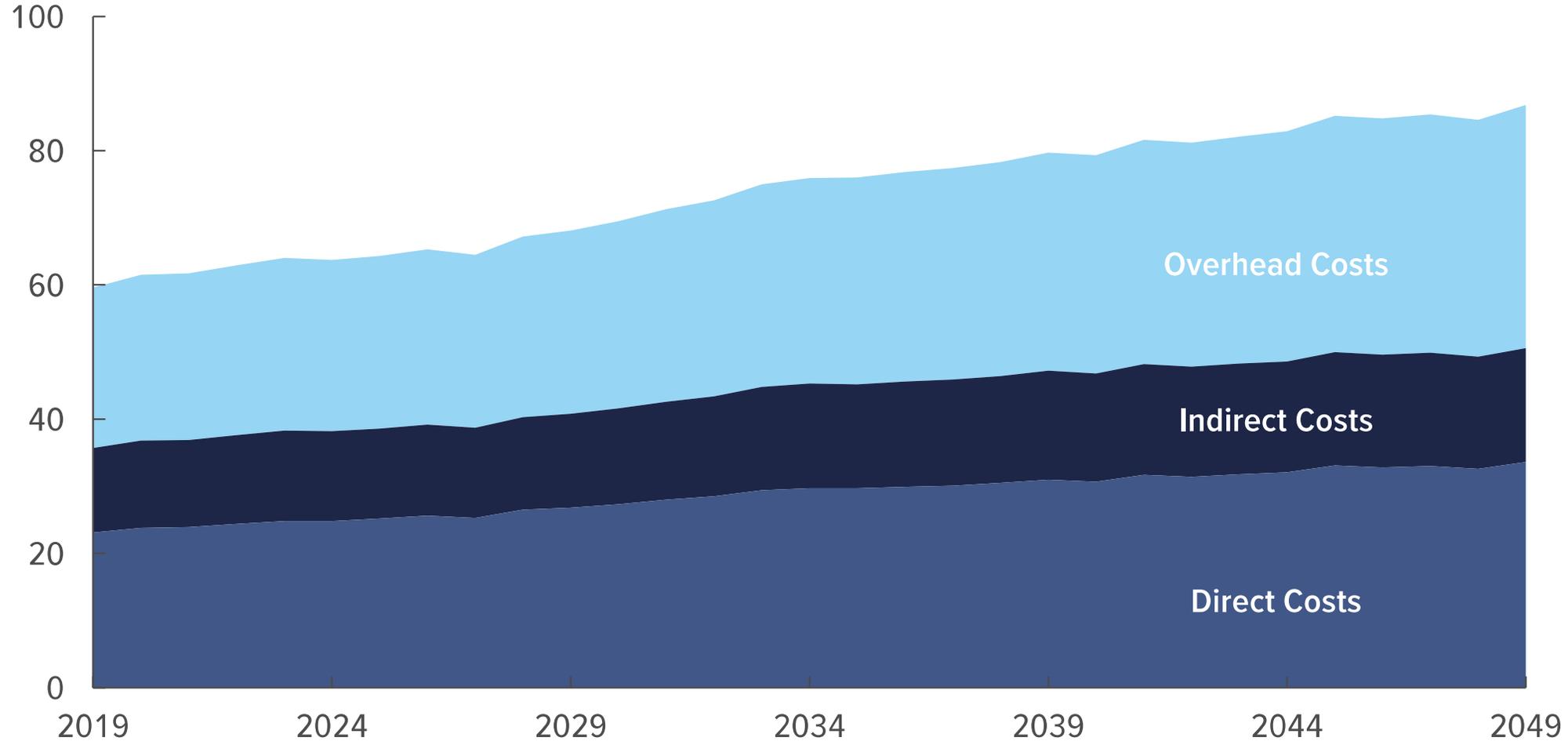
SSBNs = ballistic missile submarines; SSNs = attack submarines.

a. Includes ship conversions, ships that are not part of the Navy's battle force and training ships, outfitting and postdelivery activities, and smaller items.

b. The costs of the mission packages for littoral combat ships, which are not funded in the Navy's shipbuilding accounts, are not included.

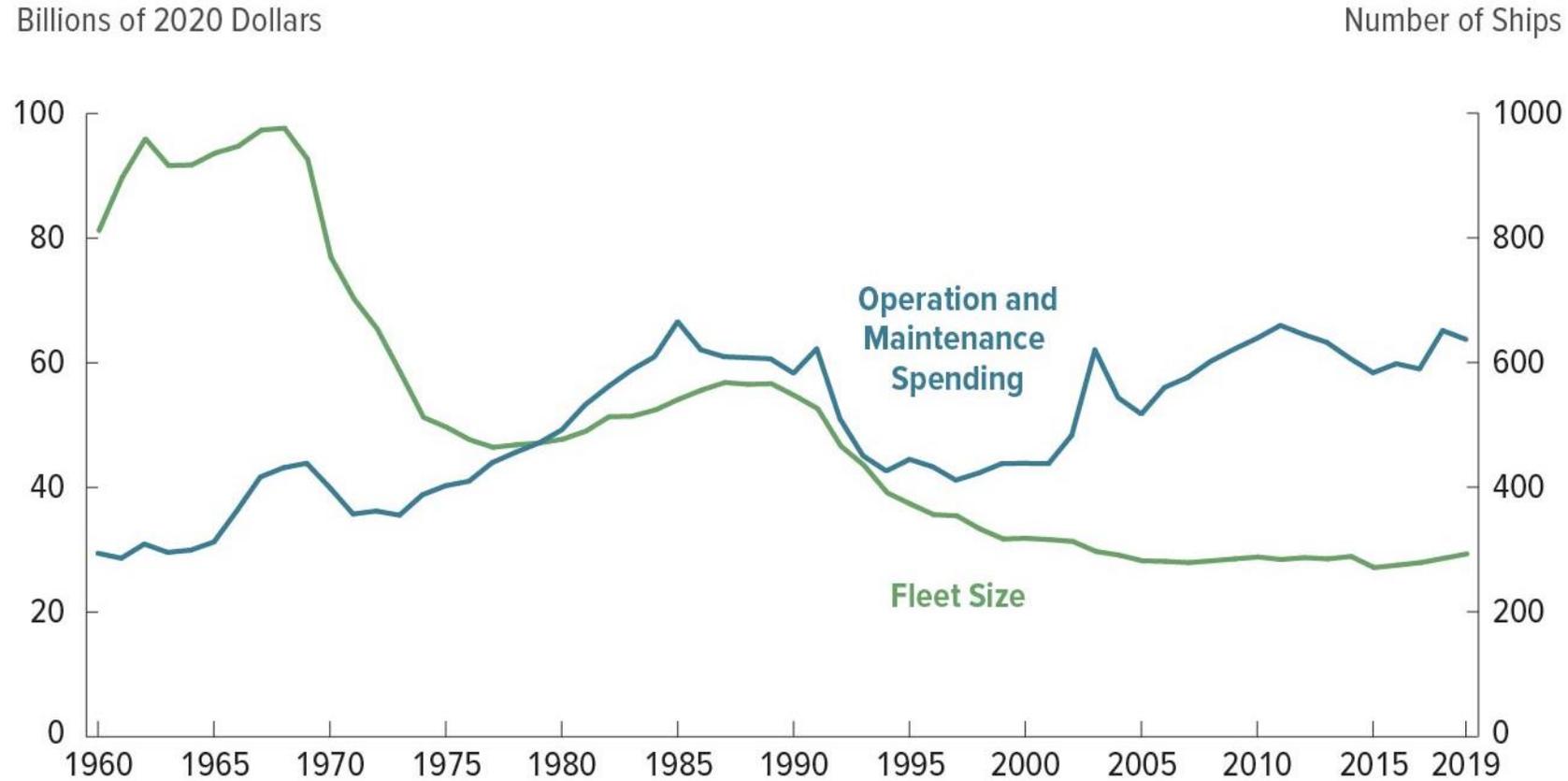
Operation and Support Costs for a 355-Ship Fleet, 2019 to 2049

Billions of 2019 Dollars



With the fleet growing to 355 ships, operating costs would grow significantly in real terms over the next 30 years.

Operation and Maintenance Spending Versus Fleet Size



Risks to the Navy's Shipbuilding Plan

Three Kinds of Risks

- From budgetary pressure
- From growth in the costs of building ships
- From uncertainty about future designs

The Future of the 355-Ship Fleet

“I think with today’s fiscal situation and where the Navy topline is right now, we can keep around 305–310 ships whole, properly manned, properly maintained, properly equipped, and preferably ready.”

—Admiral Robert Burke, Vice Chief of Naval Operations

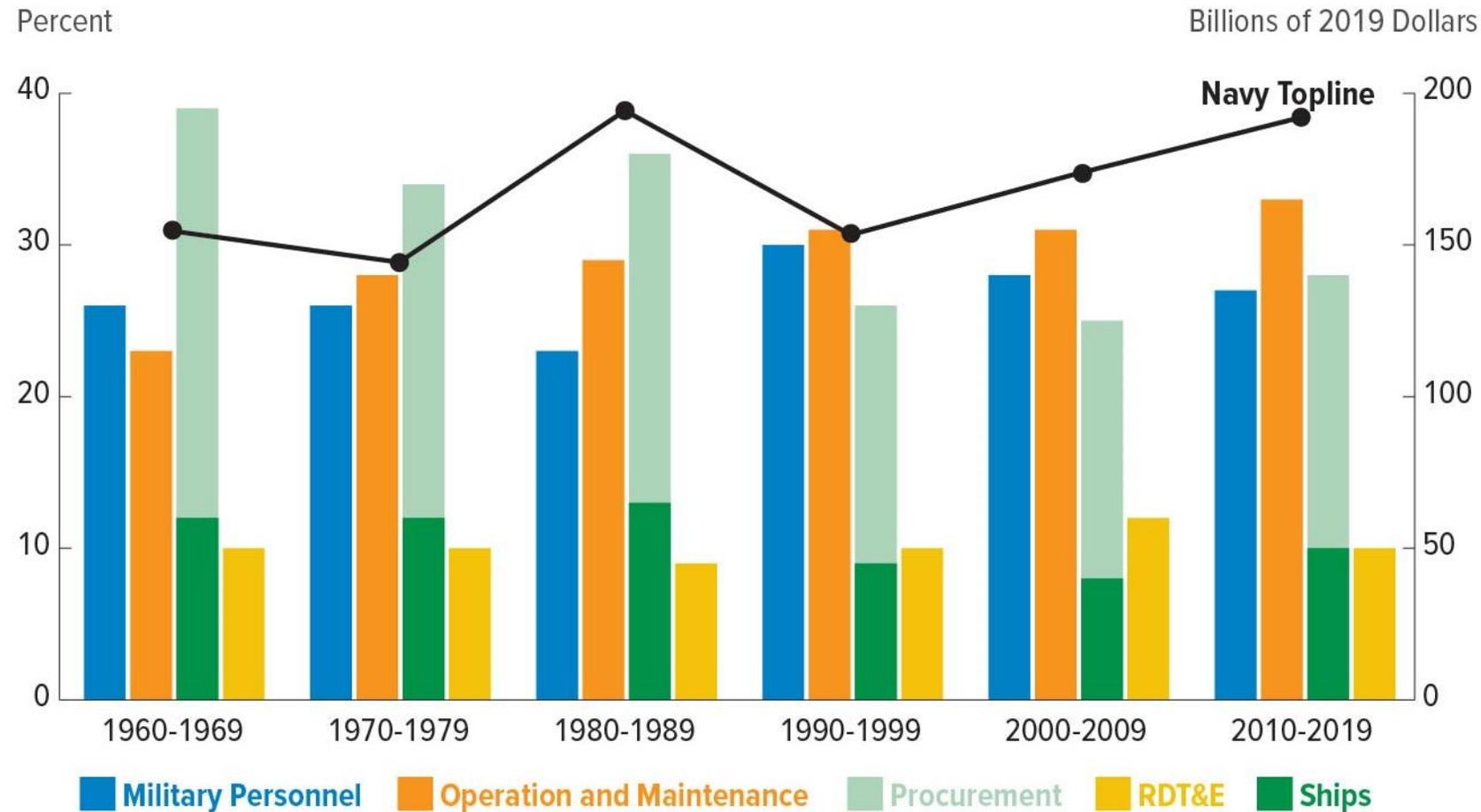
“If you look at our funding in the [Navy] and straight-line that on our current budget projections, we can probably get to about 305 to 308 ships and sustain that over time without a significant increase in our budget.”

—Thomas Modly, Under Secretary of the Navy

“[One of] my top five immediate objectives [is to] establish an Integrated Plan to achieve 355 (or more) ships, Unmanned Underwater Vehicles (UUVs), and Unmanned Surface Vehicles (USVs) for greater global naval power, within 10 years.”

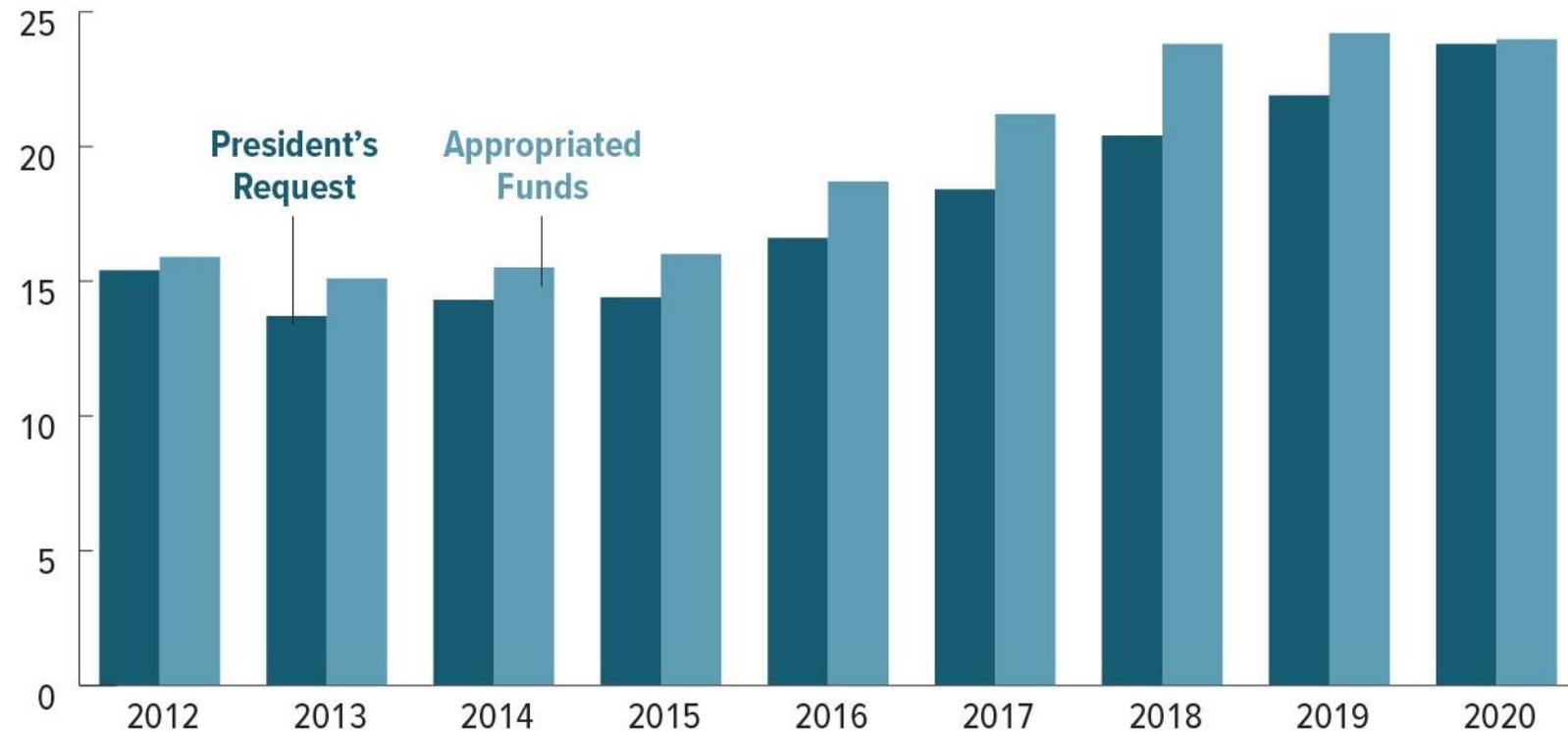
—Thomas Modly, Acting Secretary of the Navy

Major Allocations of the Navy's Budget, 1960 to 2019



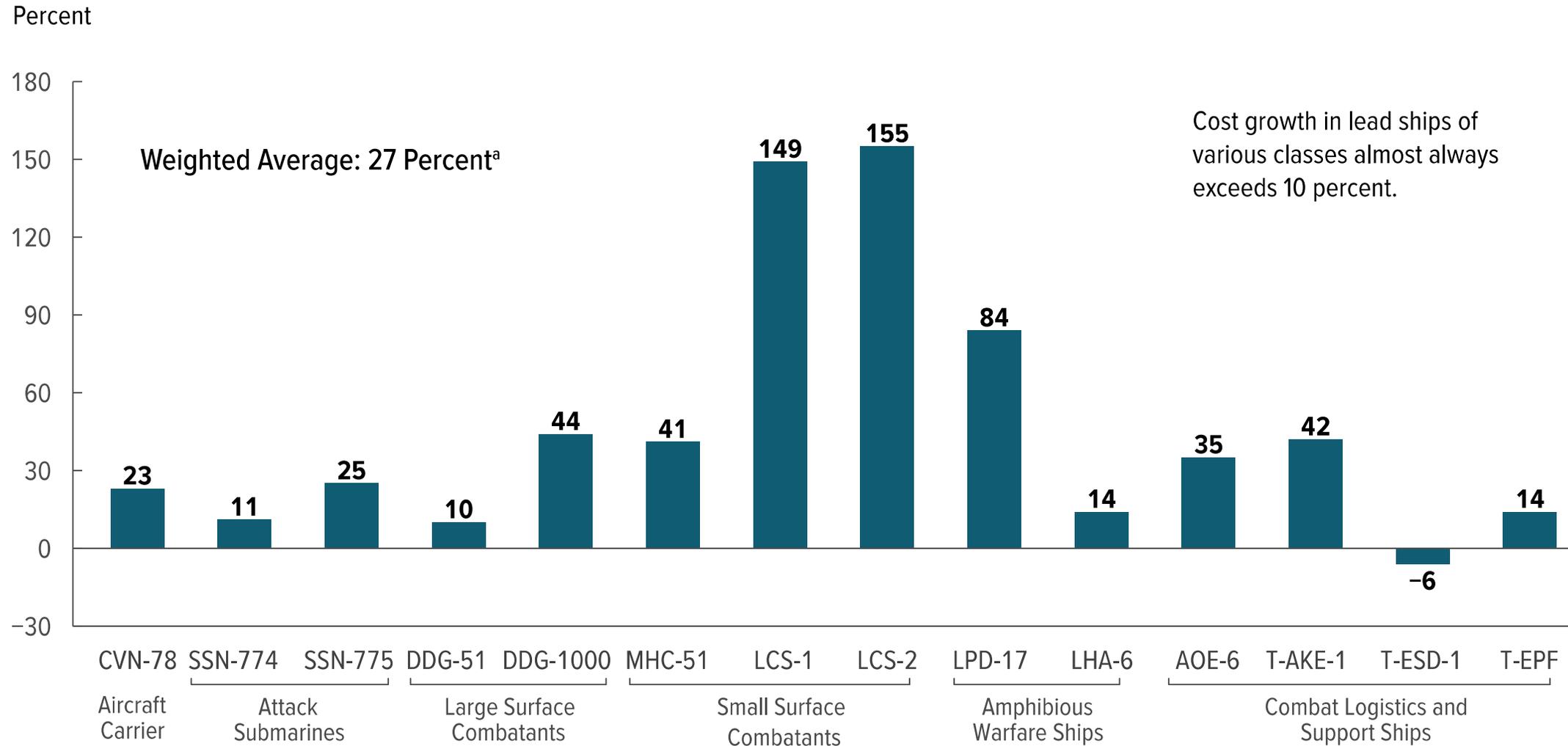
Requested and Appropriated Shipbuilding Budgets, 2012 to 2020

Billions of Dollars



Between 2012 to 2020, the Congress appropriated \$1.7 billion per year more, on average, than the President requested. In 2020, the Congress provided a smaller increase than in any of the prior eight years.

Cost Growth on Lead Ships, 1985 to 2015



a. CBO calculated the weighted average by summing the initial costs for all ships in the data set and comparing that to the sum of all final costs for the ships in the data set. The unweighted average cost growth is 46 percent.

Uncertainty in Columbia Class Cost Estimates

Billions of 2019 Dollars

	Lead Ship	Average Follow-on Ship
Navy	13.4	6.7
CBO	14.0	7.4
CBO (With less learning)	14.0	8.5
CBO (With less cross-class benefit)	14.9	8.2
CBO (With less of both)	14.9	9.4

Ford Class Aircraft Carrier Cost Estimates and the Likelihood of Cost Growth in Recent Budgets

	2019 Budget		2020 Budget ^a	
	Estimate (Billions of dollars)	Probability of Growth (Percent)	Estimate (Billions of dollars)	Probability of Growth (Percent)
CVN-79	11.3	~60	11.4	64
CVN-80	12.9	~60	12.2	78
CVN-81	15.1	~60	12.5	80

All data are provided by the Navy, with the exception of the probability of growth for the CVN-81 carrier in 2019. CBO inferred that number from the Navy's cost estimates.

a. The Navy's estimates reflect the "two-carrier buy"—that is, the Congressional authorization in 2019 to buy the CVN-80 and CVN-81 jointly.

Uncertainty About Future Designs

- Future new attack submarine or SSN(X)
- Future new large surface combatant
- New frigate

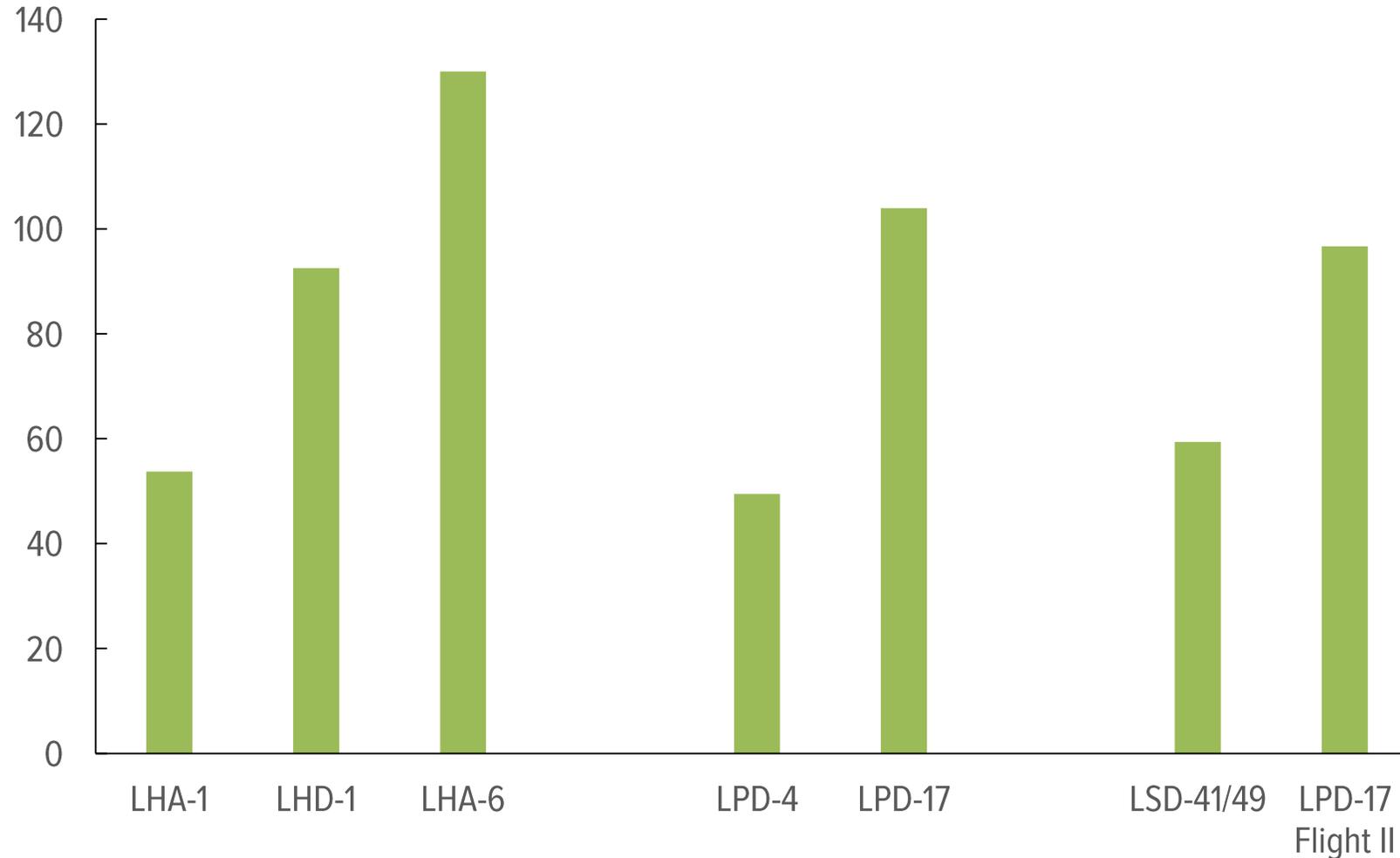
The Marine Commandant's New Planning Guidance

The Guidance

- “Force design is my number one priority.”
- “If provided the opportunity to secure additional modernization dollars in exchange for force structure, I am prepared to do so.”
- “We must continue to seek the affordable and plentiful at the expense of the exquisite and few when conceiving of the future amphibious portion of the fleet.”

Amphibious Warfare Ships, Cost per Thousand Tons by Class Average

Millions of 2019 Dollars



Illustrations of Alternative Force Structure Elements

How Might the Navy Change the Amphibious Warfare and Surface Combatant Forces?

- CBO considered two illustrations of alternative force structure elements:
 - Amphibious forces
 - Surface combatant forces

- The Marine Corps and the surface combatant community within the Navy are studying alternative ship designs and force architectures to move away from a force dominated by large manned ships. They envision a force that would be more distributed and numerous and that would include many smaller ships and unmanned systems.

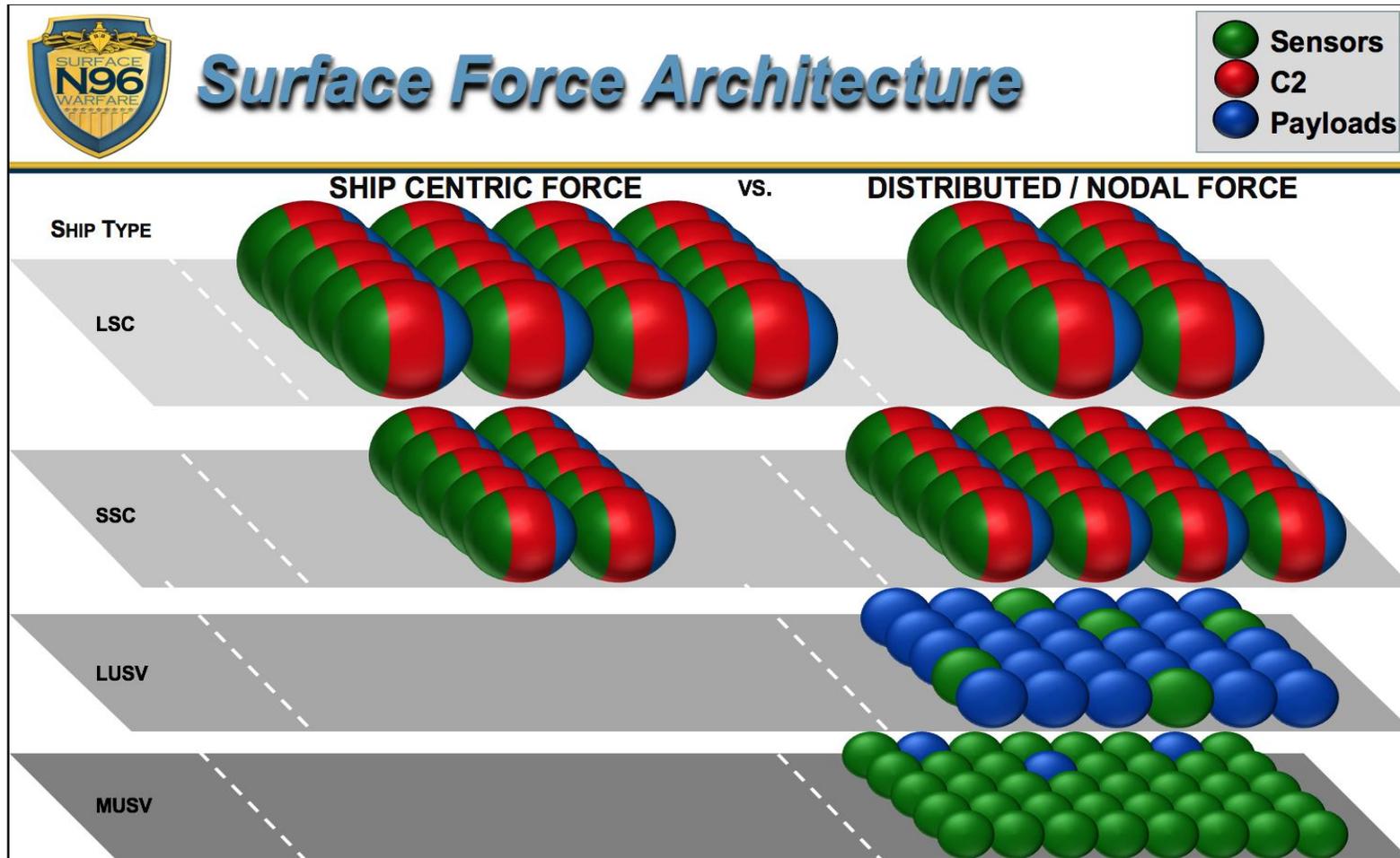
Illustrative Alternative for Amphibious Warfare Ships, 2020 to 2049

2020 Plan, Costs^a	2020 Plan Inventory in 2040	2020 Plan Inventory in 2049
28 ships for \$75 billion	37 amphibious ships	35 amphibious ships
8 America class for \$31 billion	11 LHD/LHAs	10 LHD/LHAs
20 LPDs for \$44 billion	26 LPDs	25 LPDs
No smaller ships or unmanned	No smaller ships or unmanned	No smaller ships or unmanned
Alternative Plan, Costs^a	Alternative Plan Inventory in 2040	Alternative Plan Inventory in 2049
68–78 Ships for \$75 billion	57–61 Amphibious ships	83–93 Amphibious ships
8 America class for \$31 billion	11 LHD/LHAs	10 LHD/LHAs
63–73 less exquisite ships ^b	14 LPDs	13 LPDs
No unmanned	32–38 less exquisite ships	60–70 less exquisite ships

a. Costs are expressed in billions of 2019 dollars.

b. CBO used an illustrative procurement costs of \$600 million to \$700 million for each alternative less exquisite ship.

The Navy's Future Surface Combatant Force?



In the future, the Navy wants to build a more distributed and more numerous surface combatant force.

Source: Department of the Navy.

LSC = large surface combatant; SSC = small surface combatant; LUSV = large unmanned surface vehicle; MUSV = medium unmanned surface vehicle.

Illustrative Alternative for Surface Combatants, 2020 to 2030

	Navy 2020 Shipbuilding Program		Alternative Plan	
	Ship Purchases	Program Costs ^a	Ship Purchases	Program Costs ^a
Destroyers	28	70	11	28
Frigates	20	23	40	46
Large USVs	10	3 ^b	60	17
Total	58	93	111	91

a. Costs are expressed in billions of 2019 dollars.

b. Illustrative procurement costs for large USVs are based on the Navy's estimates in its budget justification documents for the 2020 budget.

USVs = unmanned surface vehicles.