



**CONGRESSIONAL BUDGET OFFICE
COST ESTIMATE**

July 20, 2018

**H.R. 6227
National Quantum Initiative Act**

*As ordered reported by the House Committee on Science, Space, and Technology
on June 27, 2018*

SUMMARY

H.R. 6227 would establish an office and a program to advance research in quantum information science and technology applications. The bill would authorize the appropriations for the Department of Energy (DOE), the National Institute of Standards and Technology (NIST), and the National Science Foundation (NSF) to carry out related activities. CBO estimates that implementing H.R. 6227 would cost \$1.1 billion over the 2019-2023 period, assuming appropriation of the authorized and necessary amounts.

Enacting the bill would not affect direct spending or revenues; therefore, pay-as-you-go procedures do not apply.

CBO estimates that enacting H.R. 6227 would not increase net direct spending or on-budget deficits in any of the four consecutive 10-year periods beginning in 2029.

H.R. 6227 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA).

ESTIMATED COST TO THE FEDERAL GOVERNMENT

The estimated budgetary effect of H.R. 6227 is shown in the following table. The costs of the legislation fall within budget functions 250 (science, space, and technology) and 370 (commerce and housing credit).

	By Fiscal Year, in Millions of Dollars						2019- 2023
	2018	2019	2020	2021	2022	2023	
INCREASES IN SPENDING SUBJECT TO APPROPRIATION							
Department of Energy							
Authorization Level	0	125	125	125	125	125	625
Estimated Outlays	0	69	106	125	125	125	550
National Institute of Standards and Technology							
Authorization Level	0	80	80	80	80	80	400
Estimated Outlays	0	62	78	80	80	80	380
National Science Foundation							
Authorization Level	0	50	50	50	50	50	250
Estimated Outlays	0	6	24	37	44	49	160
National Quantum Coordination Office							
Estimated Authorization Level	0	1	1	1	1	1	5
Estimated Outlays	0	1	1	1	1	1	5
Total							
Estimated Authorization Level	0	256	256	256	256	256	1,280
Estimated Outlays	0	138	209	243	250	255	1,095

BASIS OF ESTIMATE

For this estimate, CBO assumes the legislation will be enacted near the end of 2018. Section 403 of the bill states that no additional funds are authorized to be appropriated by H.R. 6227. In CBO’s view, however, the bill effectively authorizes the appropriation of specified amounts by directing agencies to fund certain activities.

H.R. 6227 effectively would authorize appropriations totaling \$1.3 billion over the 2019-2023 period for the following agencies:

- \$125 million annually for DOE to carry out basic research and establish and operate quantum information science research centers;
- \$80 million annually for NIST to expand quantum research and advance commercial development of quantum applications; and
- \$50 million annually for the NSF to carry out a quantum research and education program and to award grants to nonprofit organizations and institutions of higher education.

According to a Congressional Research Service report, in recent years the federal government has spent between \$200 million and \$250 million annually on quantum information science research and development.¹ DOE, NIST, and NSF received appropriations in 2018 for such activities. Under current law, no specific sums are authorized to be appropriated to those agencies for those purposes.

H.R. 6227 also would direct the President to establish a national quantum coordination office to manage interagency activities and conduct public outreach. Under the bill, the office would be staffed by employees detailed from federal agencies such as DOE, NIST, the NSF, the Department of Defense, the Office of Management and Budget, and the National Aeronautics and Space Administration. Based on programs of similar size and scope, CBO estimates that the office would require five full-time employees annually at a cost of about \$150,000 each. The bill also would establish an advisory committee of representatives from industry, academic institutions, and federal laboratories, whose travel expenses could be reimbursed. CBO estimates that such expenses would be insignificant in any year. In total, CBO estimates that implementing the bill's staffing provisions would cost \$1 million annually.

Based on historical spending patterns for similar activities, and assuming appropriation of the authorized and necessary amounts, CBO estimates that enacting H.R. 6227 would cost \$1.1 billion over the 2019-2023 period.

PAY-AS-YOU-GO CONSIDERATIONS: None.

INCREASE IN LONG-TERM DIRECT SPENDING AND DEFICITS

CBO estimates that enacting H.R. 6227 would not increase net direct spending or on-budget deficits in any of the four consecutive 10-year periods beginning in 2029.

MANDATES

H.R. 6227 contains no intergovernmental or private-sector mandates as defined in UMRA.

1. Congressional Research Service, *Federal Quantum Information Science: An Overview* (July 2, 2018).

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