DOE Office of SCIENCE
FY 2017 Request

For Department of Energy expenses including the purchase, construction, and acquisition of plant and capital equipment, and other expenses necessary for science activities in carrying out the purposes of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or facility or for plant or facility acquisition, construction, or expansion, and purchase of not more than 17 passenger motor vehicles for replacement only, including one ambulance and one bus, [$5,350,200,000] $5,572,069,000, to remain available until expended: Provided, That of such amount, [$185,000,000] $204,481,000 shall be available until September 30, [2017] 2018, for program direction[: Provided further, That of such amount, not more than $115,000,000 shall be made available for the in-kind contributions and related support activities of ITER: Provided further, That not later than May 2, 2016, the Secretary of Energy shall submit to the Committees on Appropriations of both Houses of Congress a report recommending either that the United States remain a partner in the ITER project after October 2017 or terminate participation, which shall include, as applicable, an estimate of either the full cost, by fiscal year, of all future Federal funding requirements for construction, operation, and maintenance of ITER or the cost of termination] . (Energy and Water Development and Related Agencies Appropriations Act, 2016.)

Program and Financing (in millions of dollars)

Identification code 089–0222–0–1–251		2015 actual	2016 est.	2017 est.
	Obligations by program activity:			
0001	Basic Energy Sciences	1,685	1,849	1,937
0002	Advanced Scientific Computing Research	525	621	663
0003	Biological and Environmental Research	575	609	662
0004	High Energy Physics	746	795	818
0005	Nuclear Physics	581	617	636
0006	Fusion Energy Sciences	458	438	398
0007	Science Laboratories Infrastructure	54	114	130
0008	Science Program Direction	184	185	204
0009	Workforce Development for Teachers and Scientists	20	20	21
0010	Safeguards and Security	95	103	103
0011	Small Business Innovation Research	182	.....	.....
0012	Small Business Technology Transfer	25	.....	.....
0799	Total direct obligations	5,130	5,351	5,572
0801	Science (Reimbursable)	520	520	520
0900	Total new obligations	5,650	5,871	6,092

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Fusion Energy Sciences.—The Fusion Energy Sciences (FES) program mission is to expand the fundamental understanding of matter at very high temperatures and densities and to build the scientific foundation needed to develop a fusion energy source. This is accomplished through the study of plasma, the fourth state of matter, and how it interacts with its surroundings.

The next frontier for the major international fusion programs is the study of the burning plasma state, in which the fusion process itself provides the dominant heat source for sustaining the plasma temperature. Production of strongly self-heated fusion plasma will allow the discovery and study of a number of new scientific phenomena relevant to fusion energy. These include the effects of highly energetic fusion -produced alpha particles on plasma stability and confinement; the strongly non-linear coupling that will occur among fusion alpha particles, pressure-driven self-generated current, turbulent transport, and boundary-plasma behavior; the properties of materials in the presence of high heat and particle fluxes and neutron irradiation; and the self-organized nature of plasma profiles over long time scales. To support the program mission and its major focus, the U.S. fusion program has four elements: Burning Plasma Science: Foundations; Long Pulse; High Power; and Discovery Plasma Science. To achieve these research goals, FES invests in experimental facilities of various scales, international partnerships leveraging U.S. expertise, large-scale numerical simulations based on experimentally validated theoretical models, development of advanced fusion-relevant materials, and invention of new measurement techniques. The knowledge base being established through FES research supports U.S. goals for future scientific exploration on ITER.

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