



U.S. DEPARTMENT OF
ENERGY

Advanced Scientific Computing Research

Presented to the
Advanced Scientific Computing Advisory Committee

by

Steve Binkley

November 18, 2013

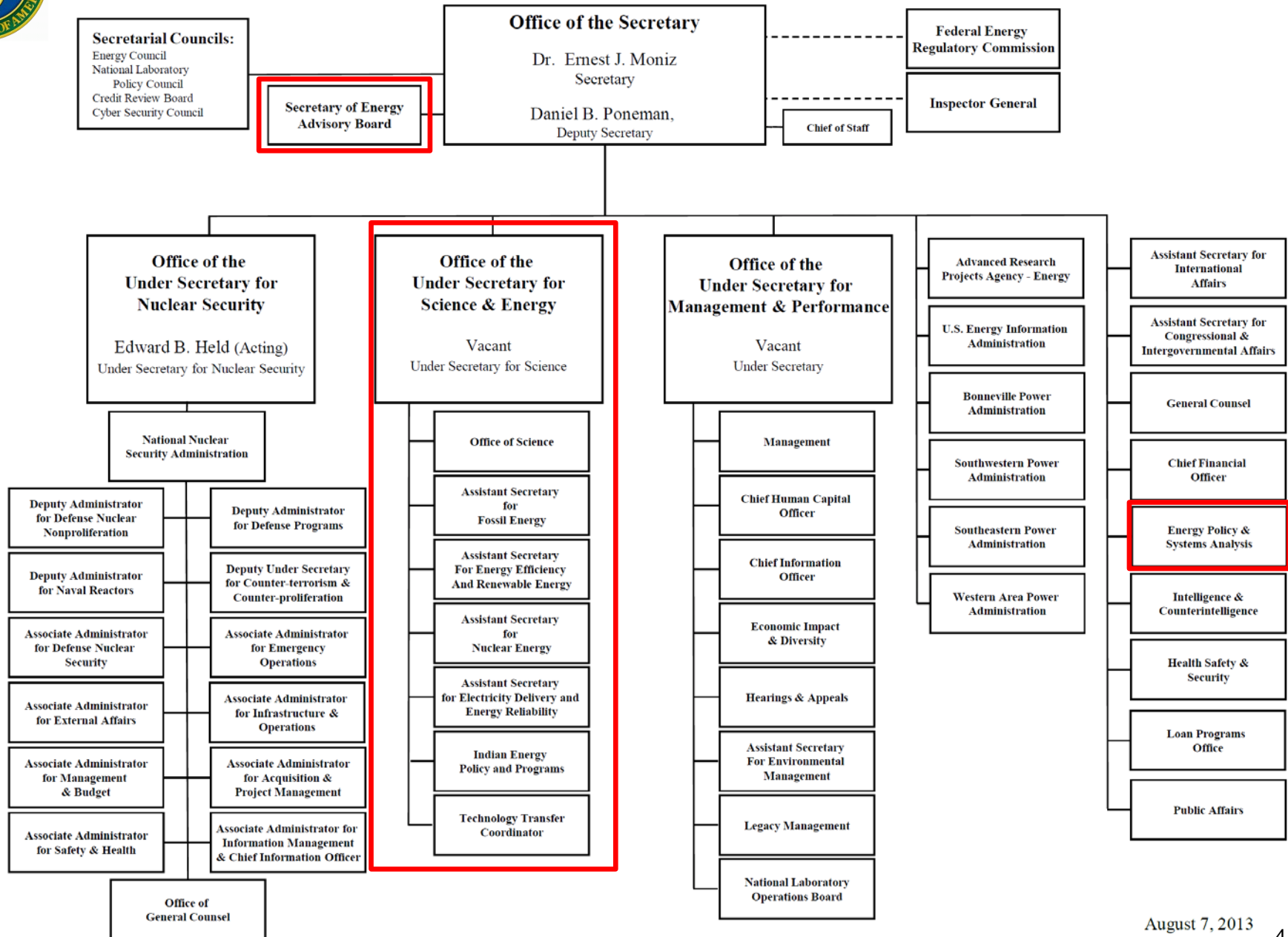
Outline

- **Organizational updates**
- **Budget**
- **Updates**
 - Big Data and Open Data
 - Applied energy programs
 - Exascale

Organizational Updates

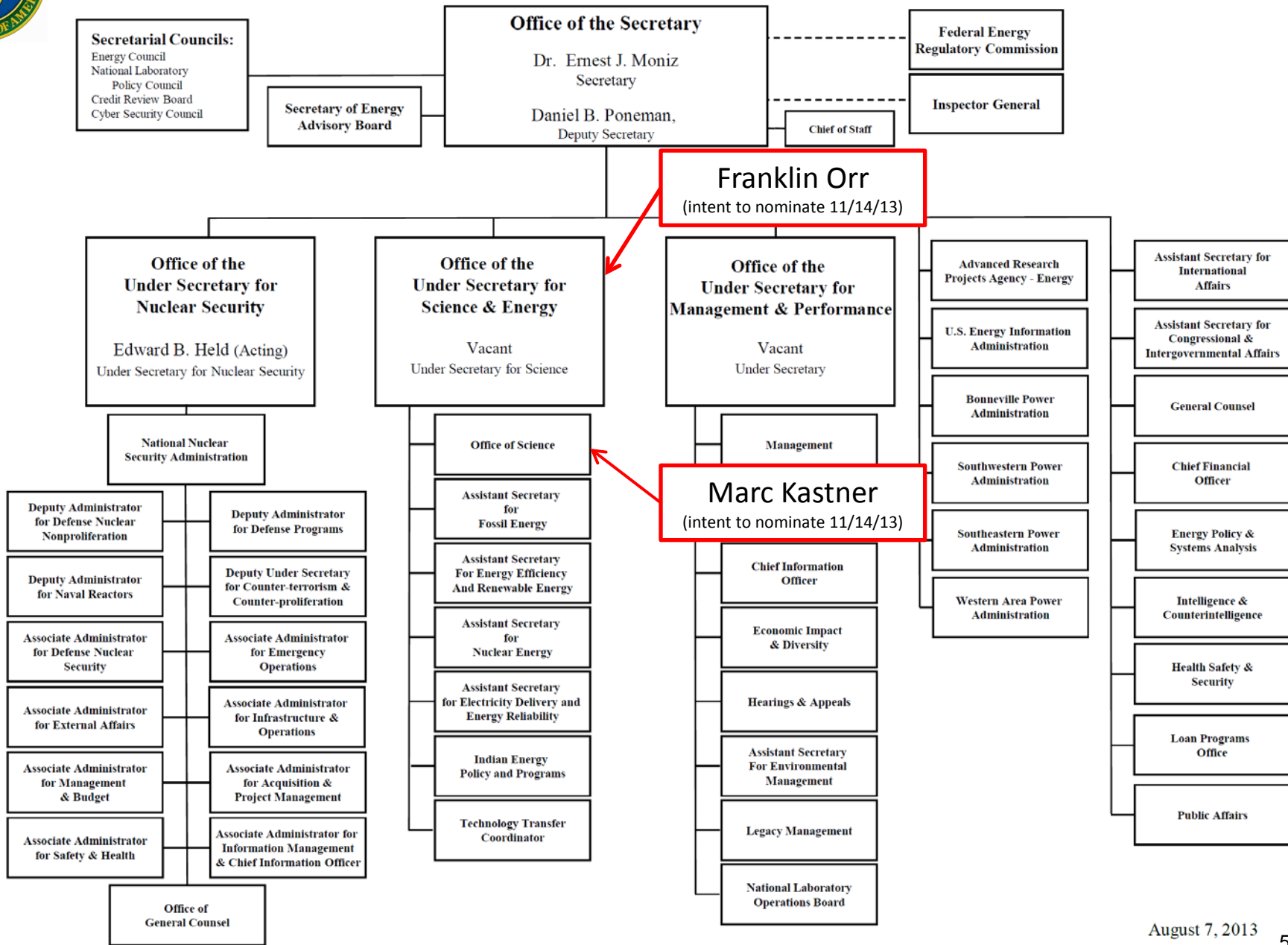


DEPARTMENT OF ENERGY





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Recent Nominations to Key DOE Posts

THE WHITE HOUSE
Office of the Press Secretary

FOR IMMEDIATE RELEASE

November 14, 2013

President Obama Announces More Key Administration Posts

WASHINGTON, DC - Today, President Obama announced his intent to nominate the following individuals to key Administration posts:

Debo P. Adegbile - Assistant Attorney General for Civil Rights, Department of Justice

Marc Kastner - Director of the Office of Science, Department of Energy

Mark E. Lopes - Member, Board of Directors of the Inter-American Foundation

Vivek Hallegere Murthy - Surgeon General, Department of Health and Human Services

Franklin Orr - Under Secretary for Science, Department of Energy

President Obama also announced his intent to appoint the following individuals to key Administration posts:

Susan L. Graham - Member, President's Council of Advisors on Science and Technology

J. Michael McQuade - Member, President's Council of Advisors on Science and Technology

Dr. Franklin Orr, Nominee for Under Secretary for Science, Department of Energy

Dr. Franklin Orr is the Director of the Precourt Institute for Energy at Stanford University, a position he has held since 2009. Dr. Orr has been an associate professor and professor in the Department of Petroleum Engineering since 1985. From 2002 to 2008, Dr. Orr served as the Director of the Global Climate and Energy Project at Stanford. He was the Dean of the School of Earth Sciences at Stanford from 1994 to 2002 and the Chairman of the Department of Petroleum Engineering from 1991 to 1994. Dr. Orr held several other research positions from 1970 to 1985 in New Mexico, Texas, and Washington, D.C. Dr. Orr received a B.S. from Stanford University and a Ph.D. from the University of Minnesota.

Dr. Marc Kastner, Nominee for Director of the Office of Science, Department of Energy

Dr. Marc Kastner is the Dean of the School of Science at the Massachusetts Institute of Technology (MIT), a position he has held since 2007. Previously, Dr. Kastner was the department head of the MIT Department of Physics from 1998 to 2007. From 1993 to 1998, he directed MIT's Center for Materials Science and Engineering, and from 1989 to 1992 he was the Associate Director of MIT's Consortium for Superconducting Electronics. In 1989, Dr. Kastner was named Donner Professor of Science at MIT and from 1983 to 1987 he served as Head of the MIT Department of Physics Division of Atomic, Condensed Matter, and Plasma Physics. He joined the MIT Department of Physics in 1973 and was previously a research fellow at Harvard University. Dr. Kastner received an S.B., M.S., and Ph.D. from the University of Chicago.

Secretary of Energy Advisory Board

John Deutch (co-chair) - MIT Chemist and Former Under Secretary of Energy

Persis Drell (co-chair) - Professor of Physics, Stanford University and Former Director, SLAC National Accelerator Laboratory

Frances Beinecke - President, Natural Resources Defense Council

Rafael Bras - Provost and Executive Vice President for Academic Affairs, Georgia Institute of Technology

Albert Carnesale - Chancellor Emeritus and Professor, University of California, Los Angeles

Shirley Ann Jackson - President, Rensselaer Polytechnic Institute

Deborah Jin - Physicist, National Institute of Standards and Technology and Professor Adjoint for Physics at the University of Colorado, Boulder

Paul Joskow - President, Alfred P. Sloan Foundation and MIT Professor of Economics, Emeritus

Steve Koonin - Director, Center for Urban Science and Progress, New York University and Former Under Secretary for Science

Michael McQuade - Senior Vice President for Science and Technology, United Technologies Corporation

Richard Meserve - President, Carnegie Institution for Science and Former Chairman, US Nuclear Regulatory Commission

Cherry Murray - Dean, Harvard University School of Engineering and Applied Sciences

John Podesta - Chair, Center for American Progress and Former White House Chief of Staff

Dan Reicher - Executive Director, Steyer-Taylor Center for Energy Policy and Finance; Professor, Stanford University and Former Assistant Secretary for Energy

Carmichael Roberts - General Partner, North Bridge Venture Partners

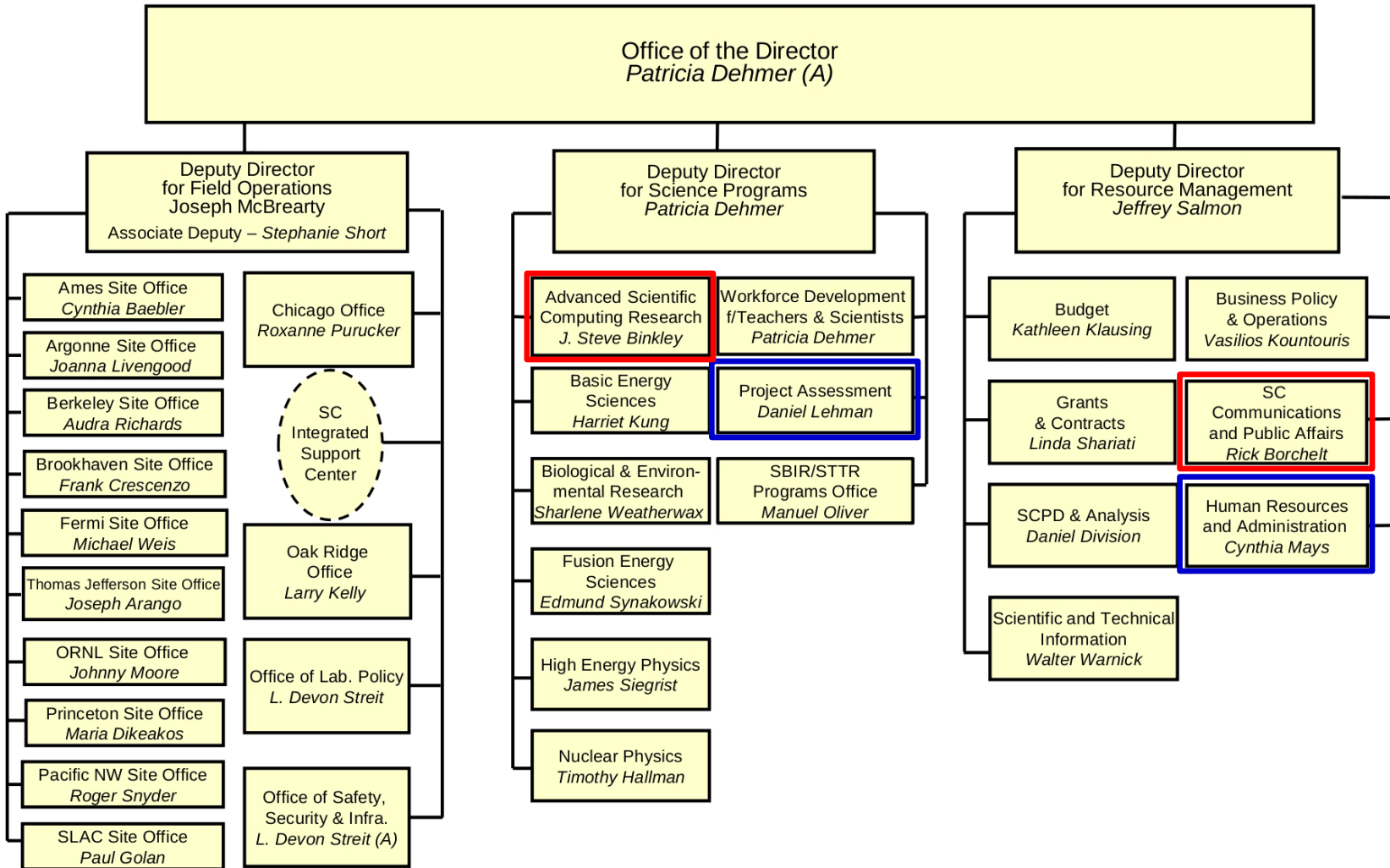
Martha Schlicher - Renewables and Sustainability Technology Lead, Monsanto Company

Brent Scowcroft - Retired U.S. Lieutenant General, Former National Security Advisor and President and Founder, Scowcroft Group

Ram Shenoy - Chief Technology Officer, ConocoPhillips

Daniel Yergin - Vice Chairman, IHS and Founder of IHS Cambridge Energy Research Associates

<http://energy.gov/leadership/secretary-energy-advisory-board>



Budget

Office of Science Budget, FY 2012-2014

Office of Science
FY 2012–FY 2014 Funding Levels
 (B/A in thousands)

	FY 2012		FY 2013		FY 2014		
	Enacted Approp.	Current Approp.	Enacted Approp.	Current Approp.	President's Request	House Mark	Senate Mark
Advanced Scientific Computing Research	440,868	428,304	417,778	405,000	465,593	432,365	493,773
Basic Energy Sciences	1,688,093	1,644,767	1,596,166	1,551,256	1,862,411	1,583,099	1,805,162
Biological and Environmental Research	609,557	592,433	578,294	560,657	625,347	494,106	625,347
Fusion Energy Sciences	400,996	392,957	385,137	377,776	458,324	506,076	458,324
High Energy Physics	790,860	770,533	748,314	727,523	776,521	772,521	806,590
Nuclear Physics	547,387	534,642	519,859	507,248	569,938	551,913	569,938
Workforce Development for Teachers and Scientists	18,500	18,500	17,486	17,486	16,500	16,500	16,500
Science Laboratories Infrastructure	111,800	111,800	105,673	105,673	97,818	46,558	97,818
Safeguards and Security	80,573	80,573	77,506	77,506	87,000	85,000	87,000
Program Direction	185,000	185,000	174,862	174,862	193,300	174,862	192,300
Small Business Innovation Research/Technology Transfer	.....	114,125	.....	116,088	.....	.....	.....
Subtotal, Office of Science	4,873,634	4,873,634	4,621,075	4,621,075	5,152,752	4,663,000	5,152,752
Small Business Innovation Research/Technology Transfer (DOE)	.....	61,346	.....	60,120	.....	.....	.....
Subtotal, Office of Science	4,873,634	4,934,980	4,621,075	4,681,195	5,152,752	4,663,000	5,152,752
Use of Prior Year Balances	.....	.....	.....	.....	.....	-10,000	.....
Total, Science Appropriation	4,873,634	4,934,980	4,621,075	4,681,195	5,152,752	4,653,000	5,152,752

ASCR Budget, FY 2012-2014

FY 2012 Enacted Approp.	FY 2012 Current	FY 2013 Current (prior to SBIR)	FY 2013 Current Approp.	FY 2014 President's Request	FY 2014 HEWD Marks	FY 2014 SEWD Marks
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Mathematical, Computational, and Computer Sciences Research

Applied Mathematics	45,547	45,547	43,341	43,341	49,500	35,103	49,500
Computer Science	46,131	46,131	44,299	44,299	54,580	38,970	57,000
Computational Partnerships (SciDAC)	45,961	45,961	41,971	41,971	46,918	46,918	46,918
Next Generation Networking Research for Science	13,929	13,929	11,779	11,779	15,931	15,931	15,954
SBIR/STTR	4,560	...	4,924	...	5,518	4,526	5,599
Total, Mathematical, Computational, and Computer Sciences Research	156,128	151,568	146,314	141,390	172,447	141,448	174,971

High Performance Computing and Network Facilities

High Performance Production Computing	57,800	57,800	62,000	62,000	65,605	62,000	66,000
Leadership Computing Facilities							
Leadership Computing Facility at ANL (ALCF)	62,000	62,000	61,000	61,000	60,000	61,500	67,000
Leadership Computing Facility at ORNL (OLCF)	94,000	94,000	85,000	85,000	87,000	87,000	93,000
Total, Leadership Computing Facilities	156,000	156,000	146,000	146,000	147,000	148,500	160,000
Research and Evaluation Prototypes	26,922	26,922	24,000	24,000	38,552	38,500	48,600
High Performance Network Facilities and Testbeds (ESnet)	36,014	36,014	31,610	31,610	32,608	32,608	34,000
SBIR/STTR	8,004	...	7,854	...	9,381	9,309	10,202
Total, High Performance Computing and Network Facilities	284,740	276,736	271,464	263,610	293,146	290,917	318,802
Total, Advanced Scientific Computing Research	440,868	428,304	417,778	405,000	465,593	432,365	493,773

FY14 ASCR Appropriations: HEWD vs. SEWD

HEWD Committee Report

- The HEWD Appropriations Committee recommended \$432,365,000, \$8,460,000 below FY 2013 and \$33,228,000 below the President's request.
- The House language indicated support for Exascale and ASCR Facilities, recommending:
 - \$68.5M for Exascale.
 - \$148.5M for LCFs
 - \$62M for NERSC
 - \$32.6M for Esnet

SEWD Committee Report

- The SEWD Appropriations Committee recommended
 - \$493,773,000 over the President's request for ASCR.
 - \$81M for exascale to "support the Department's plan to deploy the first exascale system by 2022 that is energy efficient with a peak power not to exceed 20 megawatts..."
 - \$93M for OLCF; \$67M for ALCF; \$65.6M for NERSC
 - \$6M for the Computational Science Graduate Fellowship program to maintain a healthy pipeline of computational scientists equipped and trained to address the Department's mission needs, including advanced in exascale computing.
- The Committee directs the Office of Science to submit a plan by May 1, 2014 that would 1) simplify access to computing resources at the labs, especially for small- and medium-sized business, 2) establish a few primary points-of-contact to help industry learn about advanced computing capabilities, and 3) engage relevant and qualified independent software vendors to partner with laboratories to help bridge the gap between the research capabilities of the labs and the commercial needs of companies by adapting and customizing lab-developed software for use by industry.

FY 2014 Initial Funding Plan

**Office of Science
Advanced Scientific Computing Research
FY 2014 Initial AFP**

FY 2013 Enacted	FY 2014 President's Request	FY 2014 House Mark	FY 2014 Senate Mark	Lowest of 13/R/H/S	FY 2014 Base Table	FY 2014 Initial AFP	FY 2014 CR through Jan. 15 (29.32%)	Reserve Amount
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Advanced Scientific Computing Research.....

417,778 465,593 432,365 493,773 417,778 417,778 417,778 **122,492** 295,285

Updates

Updates

- **Big Data and Open Data**
- **Applied energy programs**
 - Energy Efficiency / Renewable Energy
 - Buildings, Wind, Solar, Transportation, Manufacturing
 - Office of Electricity Delivery and Energy Reliability (the “Grid”)
 - Fossil Energy
 - Nuclear Energy
- **Exascale (will be covered in following presentation)**

ASCR at a Glance

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Relevant Websites

ASCR: science.energy.gov/ascr/

ASCR Workshops and Conferences:

science.energy.gov/ascr/news-and-resources/workshops-and-conferences/

SciDAC: www.scidac.gov

INCITE: science.energy.gov/ascr/facilities/incite/



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