U.S. DEPARTMENT OF ENERGY | Office of Science

Office of Science Update

Presented to the

Brookhaven Science Associates Board of Directors

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Office of Science (SC) FY 2011 Budget Request to Congress

(B/A in thousands)

	FY 2009		FY 2010	FY 2011		
	Current Base Approp.	Current Recovery Act	Current Approp.	Request to Congress	Request to Congress vs. FY 2010 Approp.	
Advanced Scientific Computing Research	358,772	161,795	394,000	426,000	+32,000	+8.1%
Basic Energy Sciences	1,535,765	555,406	1,636,500	1,835,000	+198,500	+12.1%
Biological & Environmental Research	585,176	165,653	604,182	626,900	+22,718	+3.8%
Fusion Energy Sciences	394,518	91,023	426,000	380,000	-46,000	-10.8%
High Energy Physics	775,868	232,390	810,483	829,000	+18,517	+2.3%
Nuclear Physics	500,307	154,800	535,000	562,000	+27,000	+5.0%
Workforce Development for Teachers & Scientists	13,583	12,500	20,678	35,600	+14,922	+72.2%
Science Laboratories Infrastructure	145,380	198,114	127,600	126,000	-1,600	-1.3%
Safeguards & Security	80,603	——	83,000	86,500	+3,500	+4.2%
Science Program Direction	186,695	5,600	189,377	214,437	+25,060	+13.2%
Small Business Innovation Research/Technology Transfer (SC)	104,905	18,719	——	——	——	——
Subtotal, Science	**4,681,572**	**1,596,000**	**4,826,820**	**5,121,437**	**+294,617**	**+6.1%**
Congressionally-directed projects	91,064	——	76,890	——	-76,890	-100.0%
Small Business Innovation Research/ Technology Transfer (DOE)	49,534	36,918	——	——	——	——
Use of prior year balances	-15,000	——	——	——	——	——
Total, Office of Science	**4,807,170**	**1,632,918**	**4,903,710**	**5,121,437**	**+217,727**	**+4.4%**

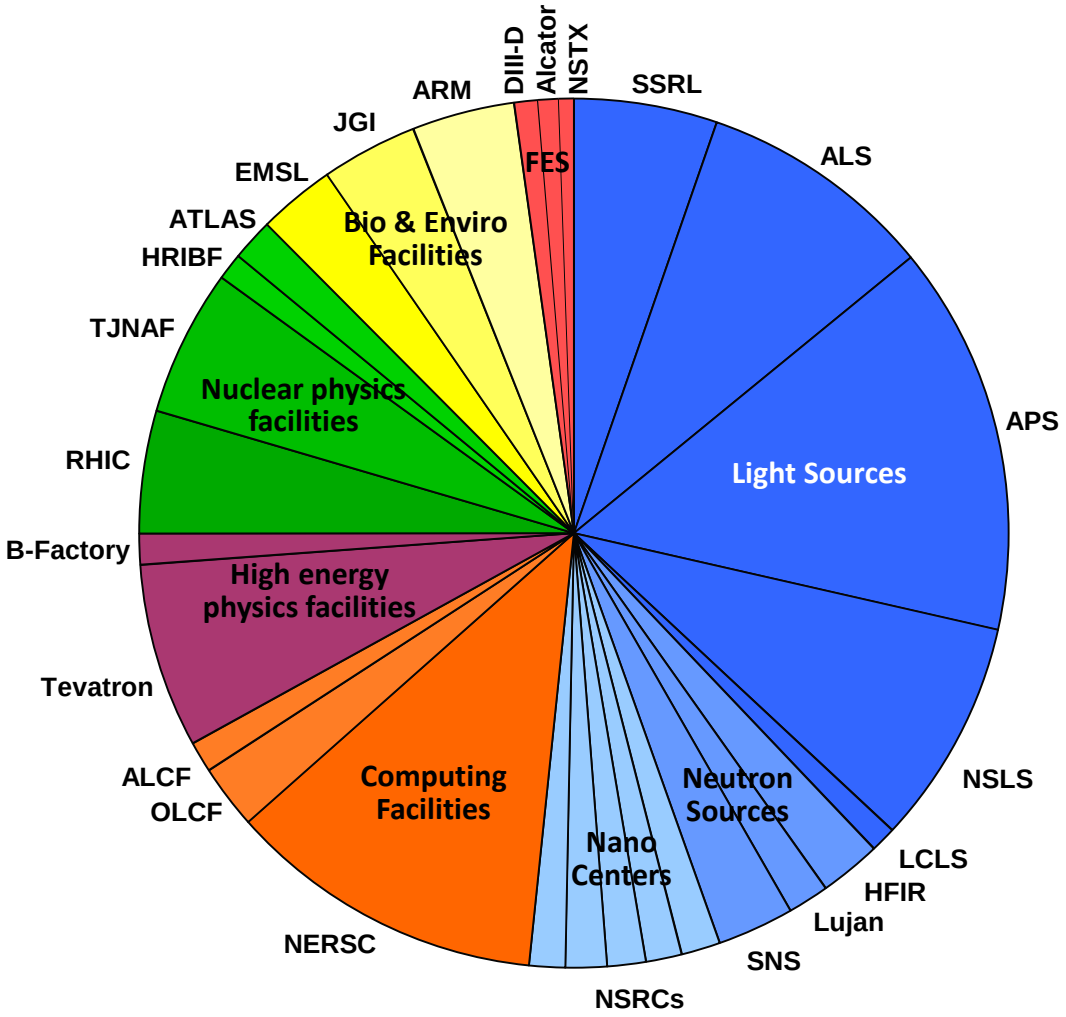
SC Supports World-Leading, Open Access Scientific User Facilities

User numbers continue to increase with more than 26,000 users expected in FY 2011

Numbers of Users at SC Facilities

	FY 2009	FY 2010 (Est)	FY 2011 (Est)
ASCR	3,696	3,850	4,025
BES	11,509	12,780	13,560
BER	2,716	2,690	2,690
FES	542	575	580
HEP	2,960	2,600	2,100
NP	3,170	3,260	3,300
Total	24,593	25,755	26,255

Breakdown of the expected users in FY 2011 by facility.



Office of Science FY 2011 Investment Highlights

The FY 2011 budget advances discovery science and invests in science for national needs in energy, climate, and the environment; national scientific user facilities; and education and workforce development.

Discovery science addressing national priorities

- Energy Innovation Hub for Batteries and Energy Storage (+$34,020K, BES)
- Enhanced activities in climate science and modeling (Regional and Global Climate Modeling, +$6,495K; Earth System Modeling, +$9,015K; Atmospheric System Research, +$1,944K; ARM Climate Research Facility, +$3,961K; BER)
- Individual investigator, small group, and Energy Frontier Research Centers (EFRCs) in areas complementing the initial suite of 46 EFRCs awarded in FY 2009 (+$66,246K, BES)
- Leadership Computing Facilities operations and preparation for next generation of computer acquisitions for S&T modeling and simulation ($34,832K, ASCR)
- Multiscale modeling of combustion and advanced engine systems (+$20,000K, BES)

Scientific user facilities—21st century tools of science, technology, and engineering

- Facility construction is fully funded; projects are meeting baselines
- 28 scientific user facilities will serve more than 26,000 users
- Several new projects and Major Items of Equipment are initiated (e.g., the Long Baseline Neutrino Experiment, +$12,000K, HEP)

Education and workforce development

- Expansions of the SC Graduate Fellowship Program (+$10,000K, 170 new awards, WDTS) and the SC Early Career Research Program (+$16,000K, 60 new awards, funded in all of the SC research programs)

The Status of the DOE Energy Innovation Hubs

Three new Hubs are launched in FY 2010 with SC leading the Fuels from Sunlight Hub

Modeled after the Office of Science Bioenergy Research Centers, the Energy Innovation Hubs focus on critical energy technology challenges by building creative, highly-integrated research teams that can accomplish more, faster, than researchers working separately.

FY 2010 Hubs tackle three important energy challenges:

1. **Production of fuels directly from sunlight (SC)**
2. **Energy-efficient building systems design (EERE)**
3. **Modeling and simulation of advanced nuclear reactors (NE)**

The Fuels from Sunlight Hub will accelerate the development of a sustainable commercial process for the conversion of sunlight directly into energy-rich chemical fuels, likely mimicking photosynthesis, the method used by plants to convert sunlight, carbon dioxide, and water into sugar. In FY 2011, BES has budgeted $24,300K for the 2nd year of the Fuels from Sunlight Hub. The FOA was released on 12/22/2009, and proposals are due on 3/29/2010.

To access the Fuels from Sunlight FOA (reference number DE-FOA-0000214) go to:
https://www.fedconnect.net/FedConnect/PublicPages/PublicSearch/Public_Opportunities.aspx
and search for "Fuels from Sunlight" in the search box (note that the search flag should be set to "Title" or "Title/Description").

FY 2011 Energy Innovation Hub for Batteries and Energy Storage

Addressing science gaps for both grid and mobile energy storage applications

A new FY 2011 SC/BES Hub for Batteries and Energy Storage ($34,020K) will address the critical research issues and will include:

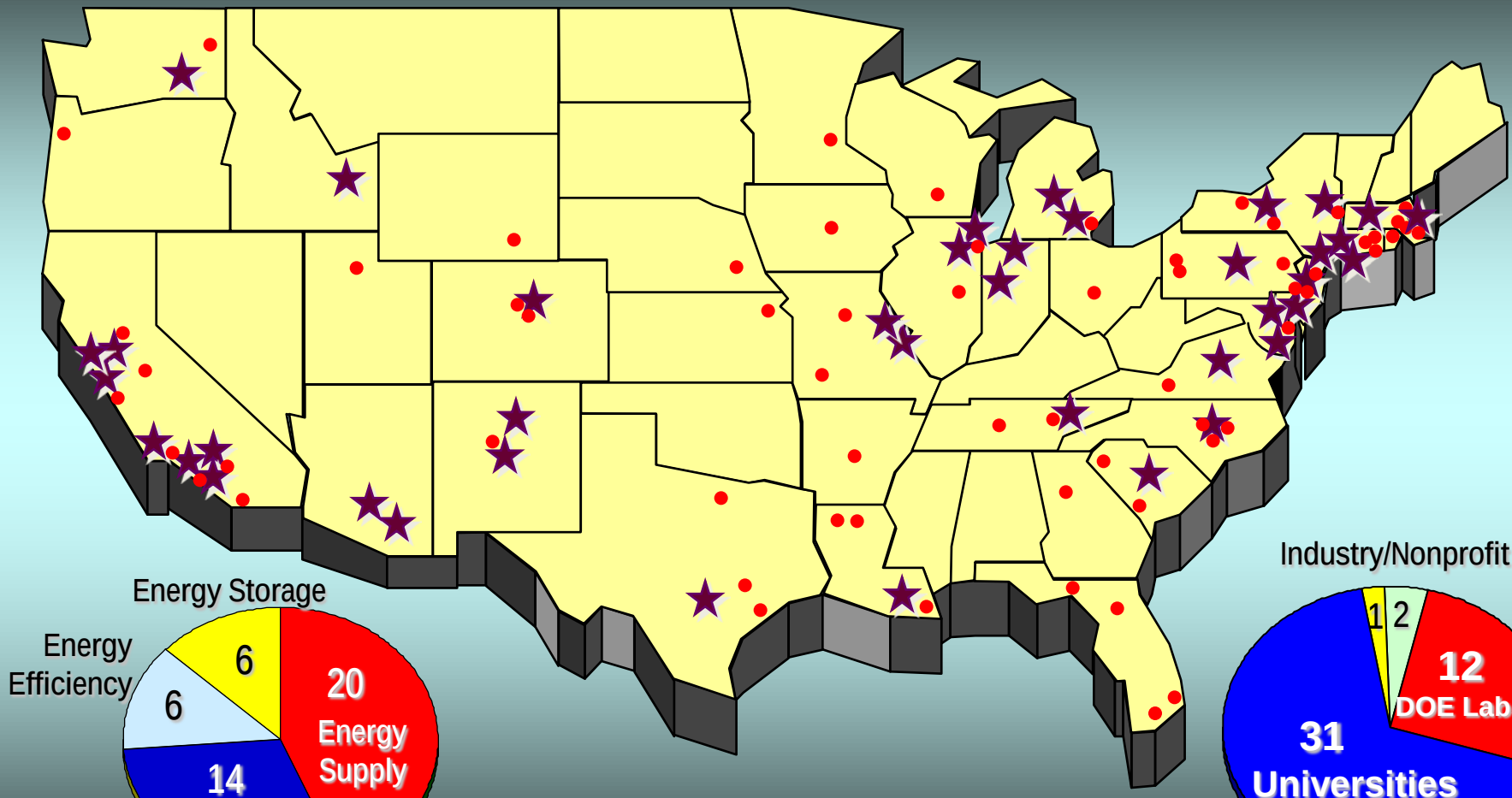
- **Design of advanced materials architectures**: design of low-cost materials that are self-healing, self-regulating, failure tolerant, and impurity tolerant
- **Control of charge transfer and transport:** control of electron transfer through designer molecules; electrolytes with strong ionic solvation, yet weak ion-ion interactions, high fluidity, and controlled reactivity
- **Development of probes of the chemistry and physics of energy storage:** tools to probe interfaces and bulk phases with atomic spatial resolution and femtosecond time resolution
- **Development of multi-scale computational models**: computational tools to probe physical and chemical processes in storage devices from the molecular scale to system scale

The Status of the SC/BES Energy Frontier Research Centers

46 EFRCs were launched in late FY 2009 using FY 2009 Appropriations and Recovery Act Funds

46 centers awarded, representing 103 participating institutions in 36 states plus D.C

Energy Frontier Research Center Locations (★ Leads; ● Participants)



By Topical Category

By Lead Institution