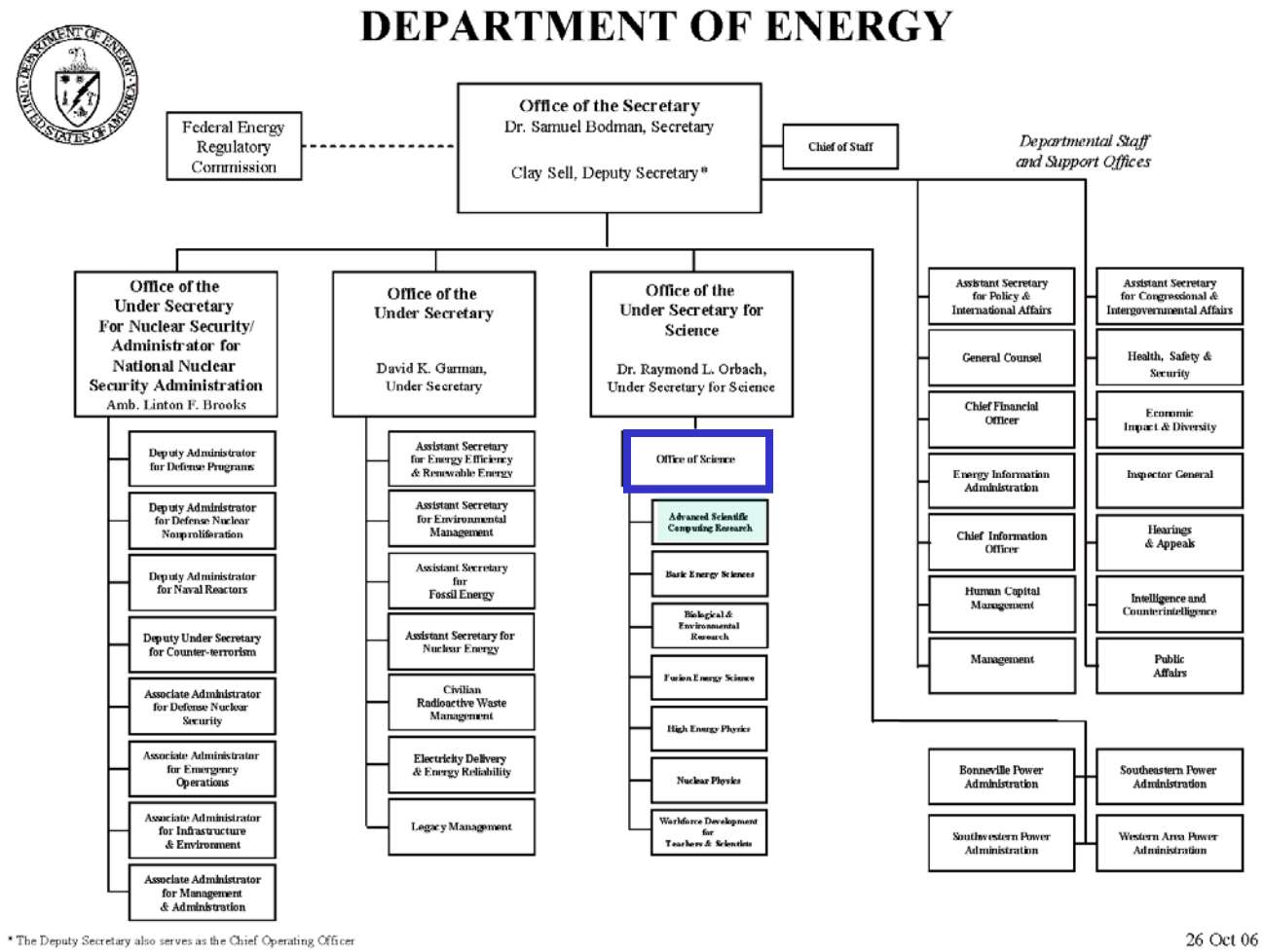
ADVANCED SCIENTIFIC COMPUTING RESEARCH

Facilities Overview

Department of Energy Organizational Structure

Advanced Scientific Computing Research Program



U.S. Department of Energy

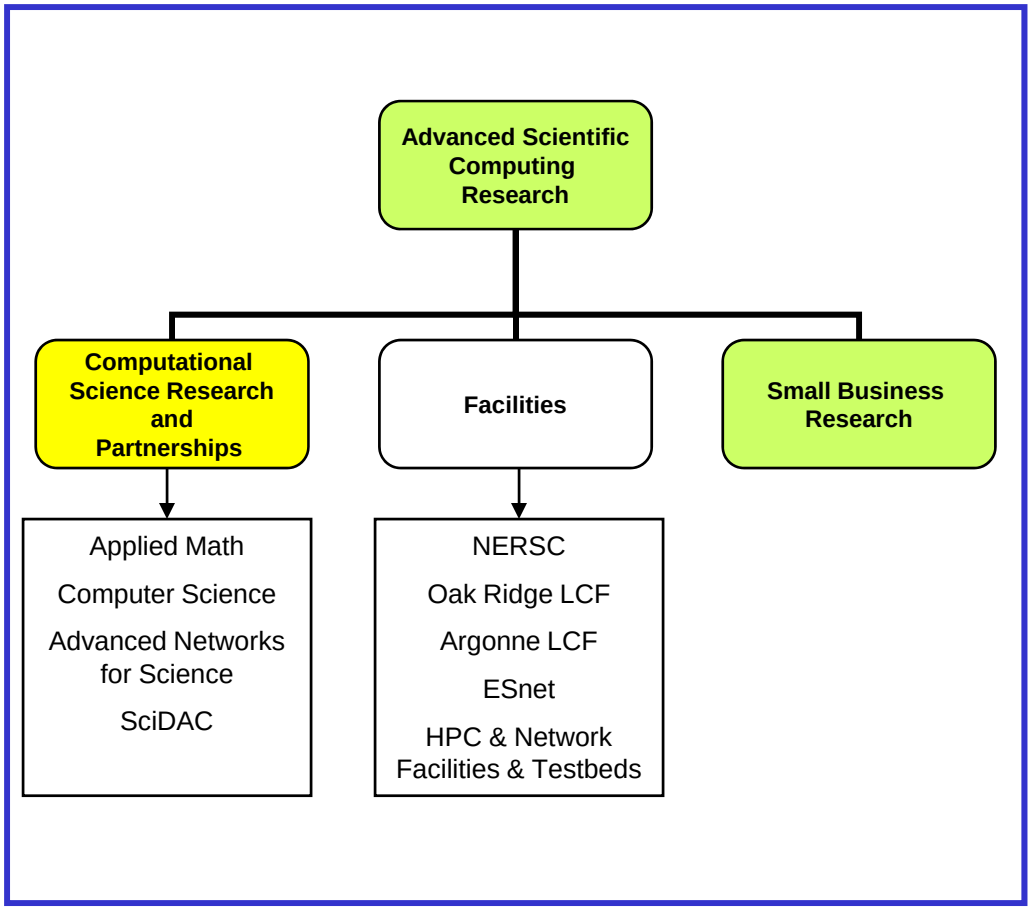
Office of Science

Advanced Scientific Computing Research

Advanced Scientific Computing Research Program

ASCR Mission: Steward of DOE's Computational Science, Applied Mathematics, Computer Science, High-Performance Computing and Networking Research for open science. Deploy and operate high performance computing user facilities at LBNL, ANL, and ORNL

ASCR Vision: Best in class advancing science and technological innovation through modeling and simulation



http://www.science.doe.gov/ascr

ASCR High Performance Computing Resources

- **High Performance Production Computing Facility (NERSC)**
  - Delivers high-end capacity computing to entire DOE SC research community
  - Large number of projects (200 – 300)
  - Medium- to very-large-scale projects that occasionally need a very high capability
  - Annual allocations
- **Leadership Computing Facilities**
  - Delivers highest computational capability to national and international researchers through peer-reviewed Innovative and Novel Computational Impact on Theory and Computation program
  - Small number of projects (10 – 20)
  - Multiple year allocations

Current Computing Facilities

Advanced Scientific Computing Research Program

- **NERSC (www.nersc.gov)**
  - 10 Teraflop IBM SP 375 RS/6000 (Seaborg) with 6080 processors, 7.2 terabytes aggregate memory
  - 6.7 Teraflop IBM Power 5 (Bassi) with 888 processors, 3.5 terabytes aggregate memory
  - 3.1 Teraflop LinuxNetworx Opteron cluster (Jacquard) with 712 processors, 2.1 terabytes aggregate memory
- **LCF at Oak Ridge (nccs.gov/leadership/index.html)**
  - 119 teraflop Cray XT3/XT4 (Jaguar) with 11,708 dual core AMD Opteron processor nodes, 46 terabytes aggregate memory
  - 18.5 Teraflop Cray X1E (Phoenix) with 1,024 multi-streaming vector processors,
- **Argonne LCF (www.alcf.anl.gov)**
  - 5.7 Teraflop IBM Blue Gene/L (BGL) with 2,048 PPC processors

Future Computing Facility Upgrades

- ALCF
  - 100 teraflop IBM Blue Gene/P delivered by end of FY 2007
  - 250-500 teraflop upgrade to IBM Blue Gene/P in late 2008

- LCF – Oak Ridge
  - Cray XT4 upgraded to 250 TF by end of 2007
  - 1 Petaflop Cray Baker system to be delivered by end of 2008

- NERSC
  - 100+ teraflop Cray XT4 in operation by October 2007

Access to ASCR Computing Resources

- Base NERSC Allocations
  - Managed by Programs
  - New 2008 Call for Proposals – Summer 2007 http://www.nersc.gov/nusers/accounts/allocations/ercap/

- INCITE
  - New 2008 Call for Proposals for over 250 Million processor hours of INCITE allocations should be announced in mid-May at http://hpc.science.doe.gov

Innovative and Novel Computational Impact on Theory and Experiment- INCITE

- Initiated in 2004
- Provides Office of Science computing resources to a small number of computationally intensive research projects of large scale, that can make high-impact scientific advances through the use of a large allocation of computer time and data storage
- Open to national and international researchers, including industry
- No requirement of DOE Office of Science funding
- Peer-reviewed
- 2004 Awards: 4.9 Million processor hours at NERSC awarded to three projects
- 2005 Awards: 6.5 Million processor hours at NERSC awarded to three projects

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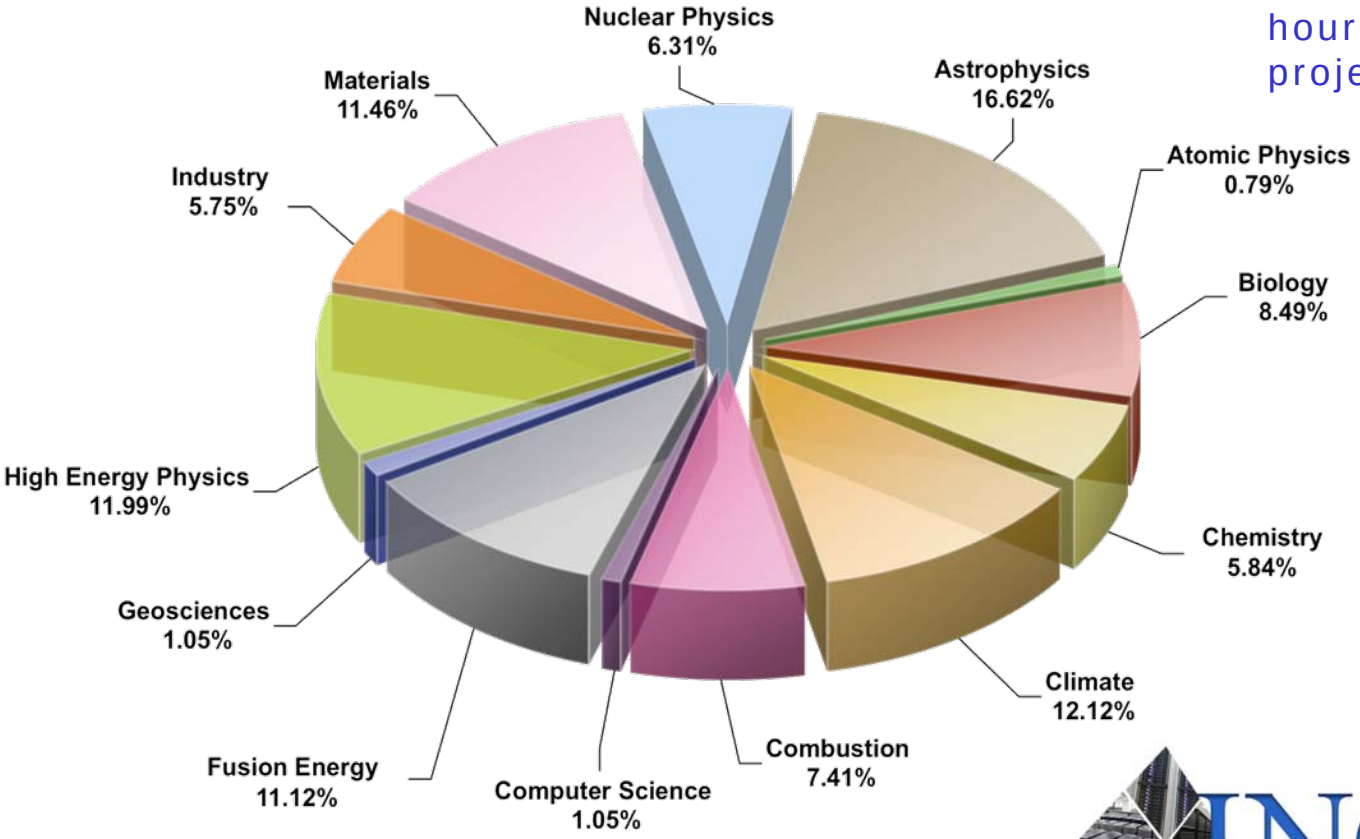
2007 INCITE Allocations by Disciplines

Advanced Scientific Computing Research Program

95 Million processor hours allocate to 45 projects



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INCITE

Advancing America's Science and Industrial Competitiveness

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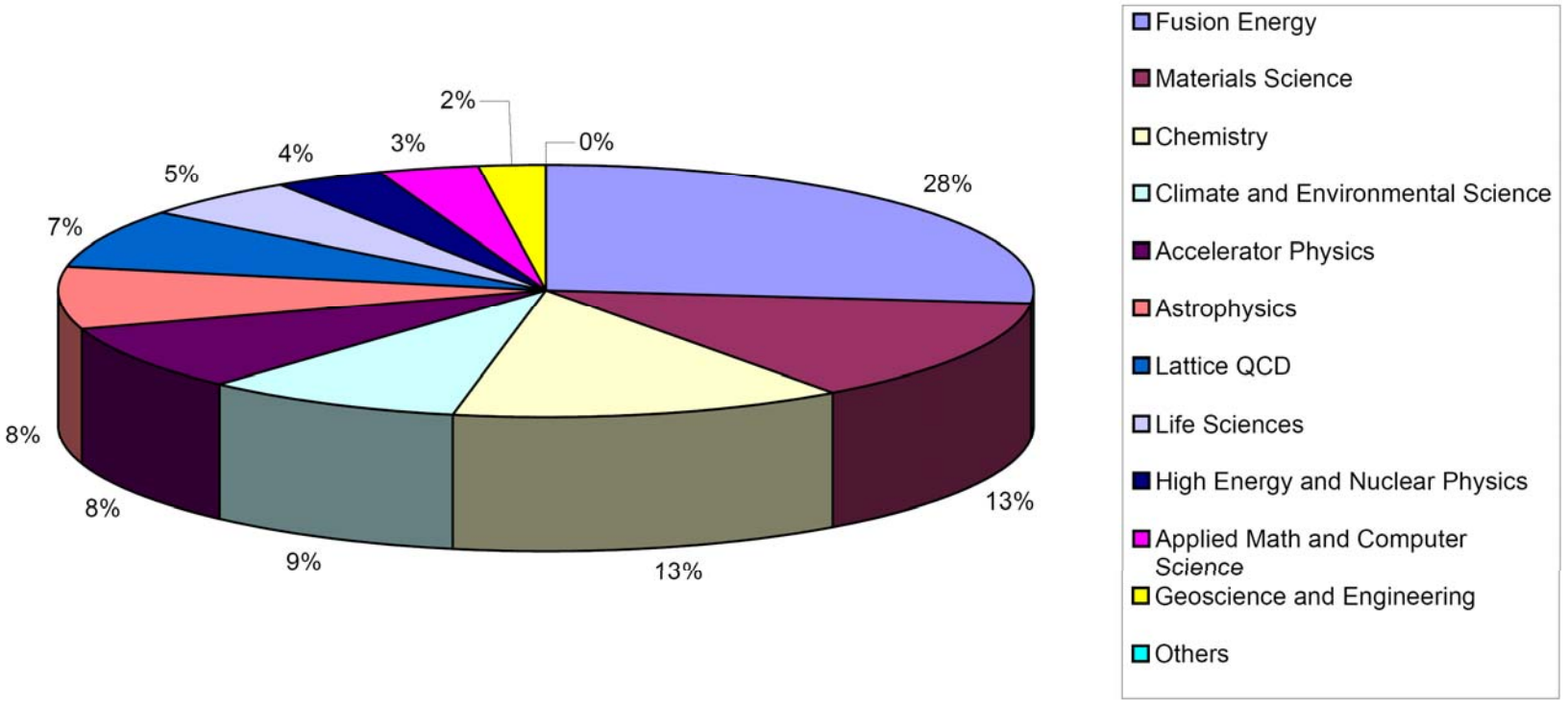
2006 NERSC Utilization by Discipline

Advanced Scientific Computing Research Program



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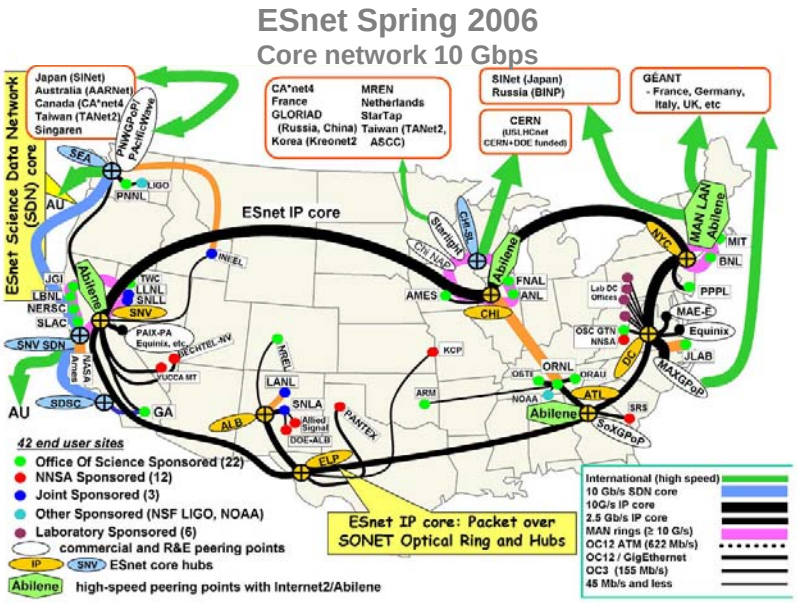
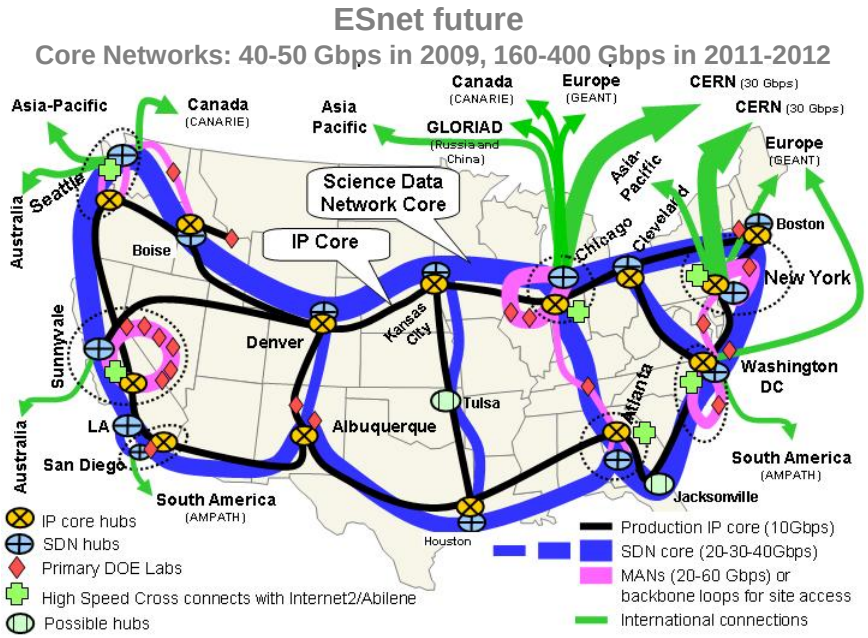
ESnet (www.es.net)

Advanced Scientific Computing Research Program





August 31, 2006 NEWS

ESnet and Internet2 Partner To Deploy Next Generation Network for Scientific Research and Discovery

http://www.es.net/hypertext/esnet.083106-1.html

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A Stealth ASCR/ASC Project

Advanced Scientific Computing Research Program