

Presentation to Joint Meeting of the APSUO Steering Committee and PUC Executive Board

Dennis Mills

August 24, 2010

Agenda for my talk....

1. Goings-on at the APS
2. Accelerator Operations
3. Budget Picture
 - The big picture
 - APS
4. The APS Upgrade Project
5. University of Chicago Review
6. SAC Meeting and Surfaces/Interfaces Cross-Cut Review
7. Search Committee for the next APS Director
8. Workshop on Evolution and Control of Complexity
9. Argonne Distinguished Fellow for Life Sciences at the Advanced Photon Source



Goings-on at the APS

- Walter Lowe is leaving the APS
 - Unfortunately Walter is going back to the DC area, but the good news is that he will be working at DOE in the Scientific User Facility Division of BES and be involved with the operations of the BES Light Sources.
- Industrial use of the APS
 - Pilot program to begin next cycle that was being organized by Walter Lowe.
 - Nonetheless, we plan to continue on with this pilot program in his absence.
- Visit to NIH and BER Program Managers later this week.
 - Several APS and Bioscience staff will be meeting with NIH and BER Program Managers to inform them of opportunities the APS-U project will afford the life sciences community.



Accelerator Performance Continues to Excel

Run Identifier	Scheduled User Hours	Storage Ring Availability [hours]	Storage Ring Availability [%]	X-ray Availability [hours]	X-ray Availability [%]	Faults	Mean Time to Recovery [hours]	Average Fill Duration without a Fault [hours]	Faults Per Day of Delivered Beam
Run 09-3	1553.0	1535.8	98.9%	1535.8	98.9%	11	1.57	139.6	0.17
Run 10-1	1727.0	1698.6	98.4%	1698.6	98.4%	23	1.24	73.9	0.32
Fiscal Year	3280.0	3234.4	98.6%	3234.4	98.6%	34	1.34	95.1	0.25



APS Staff wins the UChicago Argonne Outstanding Service Award

- Ken Sidorowicz of the APS Engineering Support Division (AES) is one of four winners of the 2010 UChicago Argonne, LLC Board of Governors Outstanding Service Award. The award notes that Sidorowicz is recognized “as more than an outstanding manager; he is a true technical leader [who] has helped to ensure that important programs at Argonne have stayed at the leading edge of information technology [IT] for more than three decades.”



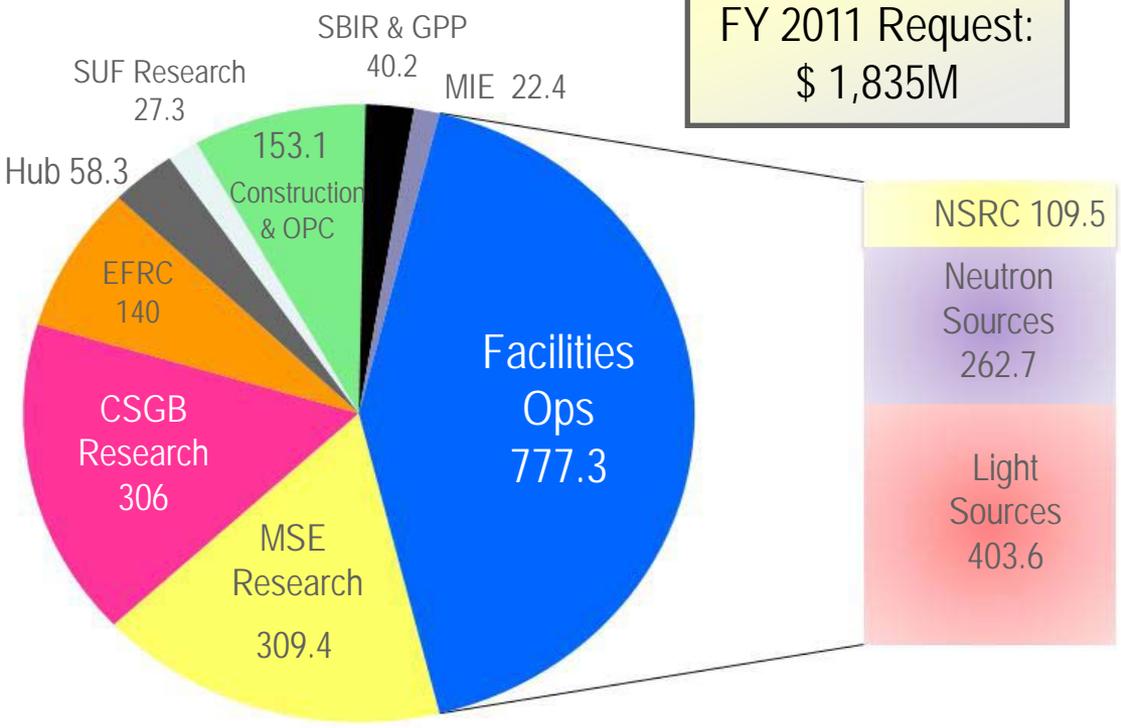
FY 2011 BES Budget Request

■ **Research programs**

- Energy Innovation Hubs
- Energy Frontier Research Centers
- Core research increases for grand challenge science, use-inspired science, accelerator & detector research

■ **Scientific user facilities operations**

- Synchrotron light sources
- Neutron scattering facilities
- Nanoscale Science Research Centers



■ **Construction and instrumentation**

- National Synchrotron Light Source-II
- Spallation Neutron Source instruments
- SNS Power Upgrade

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Status of FY 2011 Budget Request and Appropriations

(dollars in thousands)

	FY 2010	Total Recovery Act	FY 2011						
	Current Approp.		FY 2011 Request to Congress	House Mark	House Mark vs. Request	Senate Mark	Senate Mark vs. Request		
Office of Science									
Advanced Scientific Computing Research.....	394,000	+161,795	426,000				418,000	-8,000	-1.9%
Basic Energy Sciences.....	1,636,500	+555,406	1,835,000				1,739,115	-95,885	-5.2%
Biological & Environmental Research.....	604,182	+165,653	626,900				614,500	-12,400	-2.0%
Fusion Energy Sciences.....	426,000	+91,023	380,000				384,000	+4,000	+1.1%
High Energy Physics.....	810,483	+232,390	829,000				820,085	-8,915	-1.1%
Nuclear Physics.....	535,000	+154,800	562,000				554,000	-8,000	-1.4%
Workforce Development for Teachers & Scientists.....	20,678	+12,500	35,600				21,000	-14,600	-41.0%
Science Laboratories Infrastructure.....	127,600	+199,114	126,000				126,000	—	—
Safeguards & Security.....	83,000	—	86,500				86,500	—	—
Science Program Direction.....	189,377	+4,600	214,437				208,000	-6,437	-3.0%
Small Business Innovation Research/Tech. Transfer (SC).....	107,351	+18,719	—				—	—	—
Subtotal, Science.....	4,934,171	+1,596,000	5,121,437	4,881,650	-239,787	-4.7%	4,971,200	-150,237	-2.9%
Earmarks.....	76,890	—	—	18,350	+18,350	—	40,800	+40,800	—
Small Business Innovation Research/Tech. Transfer (DOE).....	60,176	+72,775	—	—	—	—	—	—	—
Total, Science.....	5,071,237	+1,668,775	5,121,437	4,900,000	-221,437	-4.3%	5,012,000	-109,437	-2.1%

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Office of Science - House Mark

(dollars in Thousands)

	FY 2010 Approp.	FY 2011 Request	House	House vs. FY 2010 Approp.		House vs. Request	
SC, Total	4,903,710	5,121,437	4,900,000	-3,710	-0.1%	-221,437	-4.3%

- No details are available, no vote on bill scheduled
- Includes \$18,350 in Earmarks.
- Approximately the same as FY 2010.
- Ensures the United States' continued global leadership of basic science research and develops the fundamental knowledge necessary for the next generation of energy innovations.
- Investments in HEP pushes the edges of scientific knowledge and fosters our nation's world-leading scientists.
- Research in BES, FES, ASCR, NP, and BER build the foundation of knowledge that will enable us to transform our energy sector to be more secure and sustainable.

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Office of Science - Senate Mark

(dollars in Thousands)

	FY 2010 Approp.	FY 2011 Request	Senate	Senate vs. FY 2010 Approp.		Senate vs. Request	
SC, Total	4,903,710	5,121,437	5,012,000	+108,290	+2.2%	-109,437	-2.1%

- Includes \$40.8M in Earmarks, \$11M for Artificial Retina, \$15.4M for Nuclear Medicine research, \$100M to support EFRCs, \$16M for Fuels from Sunlight Energy Innovation Hub, \$22M for a new Batteries and Energy Storage Energy Innovation Hub, \$35M for EPSCoR, and \$5M for Graduate Fellowship.
- NP is down \$8M from request but has the nuclear medicine added
- Funding increase in FY 2011 will support initiatives to advance scientific understanding for new energy technologies.
- Concerned about LHC’s planned shutdown; the Federal commitment to nuclear medicine research; cost increases and schedule delays related to the ITER project; and finding that the United States risks losing leadership and competitiveness in material science.

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FY 2001 Senate Markup Details for BES

Basic Energy Sciences			
(in whole dollars)			
	House	Senate	Conference
FY 2011 Request.....	\$ 1,835,000,000	\$ 1,835,000,000	\$ 1,835,000,000
Committee Mark.....	—	1,739,115,000	—
Change to Request.....		-95,885,000	
Congressional Direction:			
Energy Frontier Research Centers.....	—	-40,000,000 ^{a/}	—
Energy Innovation Hub-Batteries and Energy Storage.....	—	-12,020,000 ^{b/}	—
Energy Innovation Hub-Fuels from Sunlight.....	—	-8,300,000 ^{c/}	—
Methane hydrates research returned to FE.....	—	-17,517,000 ^{d/}	—
Advanced Engine Design delayed.....	—	-20,000,000 ^{e/}	—
Experimental Program to Stimulate Competitive Research (EPSCoR).....	—	+26,365,000 ^{f/}	—
Total Congressional Direction.....		-71,472,000	
Net unspecified program impact.....		-24,413,000	

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FY 2011 BES Appropriations

Both Marks provide full funding for construction activities & allow for near optimal operations of scientific user facilities. They differ significantly on EPSCoR and Hub, and leave very limited funding (SEWD) to no funding (HEWD) for the proposed new research activities.

Both Marks keep BES off the budget doubling track.

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NSLS-II EXperimental Tools (NEXT)

- The NSLS-II construction project scope provides an initial suite of six “best-in-class” beamlines. The NEXT project will **design, build, install, test, and commission** additional **5 – 6** best-in-class beamlines for studying the properties and functions of complex materials using state-of-the-art techniques in spectroscopy, scattering, and imaging applied over various time scales with enhanced resolution and sensitivity.
- The state-of-the-art instrumentation of NEXT will increase user capacity by 300 – 400 users and enhance the scientific quality and productivity of NSLS-II .
- The technical concepts for the additional beamlines will be developed by close consultation with the scientific community through a series of workshops, conferences, and focused review committees aimed at identifying and meeting the most compelling needs and highest priorities of the user community. They will be endorsed by the NSLS-II Science Advisory Committee.
- Critical Decision-0 (Approval of Mission Need) for the NEXT project was approved on May 22, 2010.

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Advanced Photon Source Upgrade

- The project will design, build, install, test and commission an upgrade to the Advanced Photon Source.
- Key Components:
 - Accelerator and x-ray source upgrades
 - New and upgraded beamlines
 - Enabling technical capabilities
- The Upgrade to the APS will:
 - Provide an upgraded third-generation synchrotron light source facility that provides an unprecedented combination of high-energy, high-average-brilliance, and short-pulse x-rays together with state-of-the-art x-ray beamline instrumentation
 - Provide for the studies of real materials under real conditions in real time by the for groundbreaking scientific tools that observe, understand, and ultimately control the functions of materials on the nanoscale to develop new technologies
- Critical Decision-0 (Approval of Mission Need) for the APS-Upgrade was approved on April 22, 2010.

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Linac Coherent Light Source Expansion (LCLS-II)

- LCLS-II will enable BES to meet the scientific grand challenges by offering capabilities that currently do not exist:
 - Extended spectral range and control of x-ray polarization for the study of charge and spin order
 - Increased control of pulse intensity and length down to at least 1 femtosecond
 - Temporally coherent beams with reduced band width and increased peak brightness
 - Simultaneous operation of experimental stations to accommodate the fast growing number of users
- Strategically, LCLS-II will present a cost-effective and timely plan for U.S. to remain at the international forefront, surpassing the FLASH-II upgrade of the Hamburg FEL, and favorably competing with X-FELs in Europe and Japan
- Critical Decision-0 (Approval of Mission Need) for the LCLS-II was approved on April 22, 2010.

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What Does This Mean for ANL and APS?

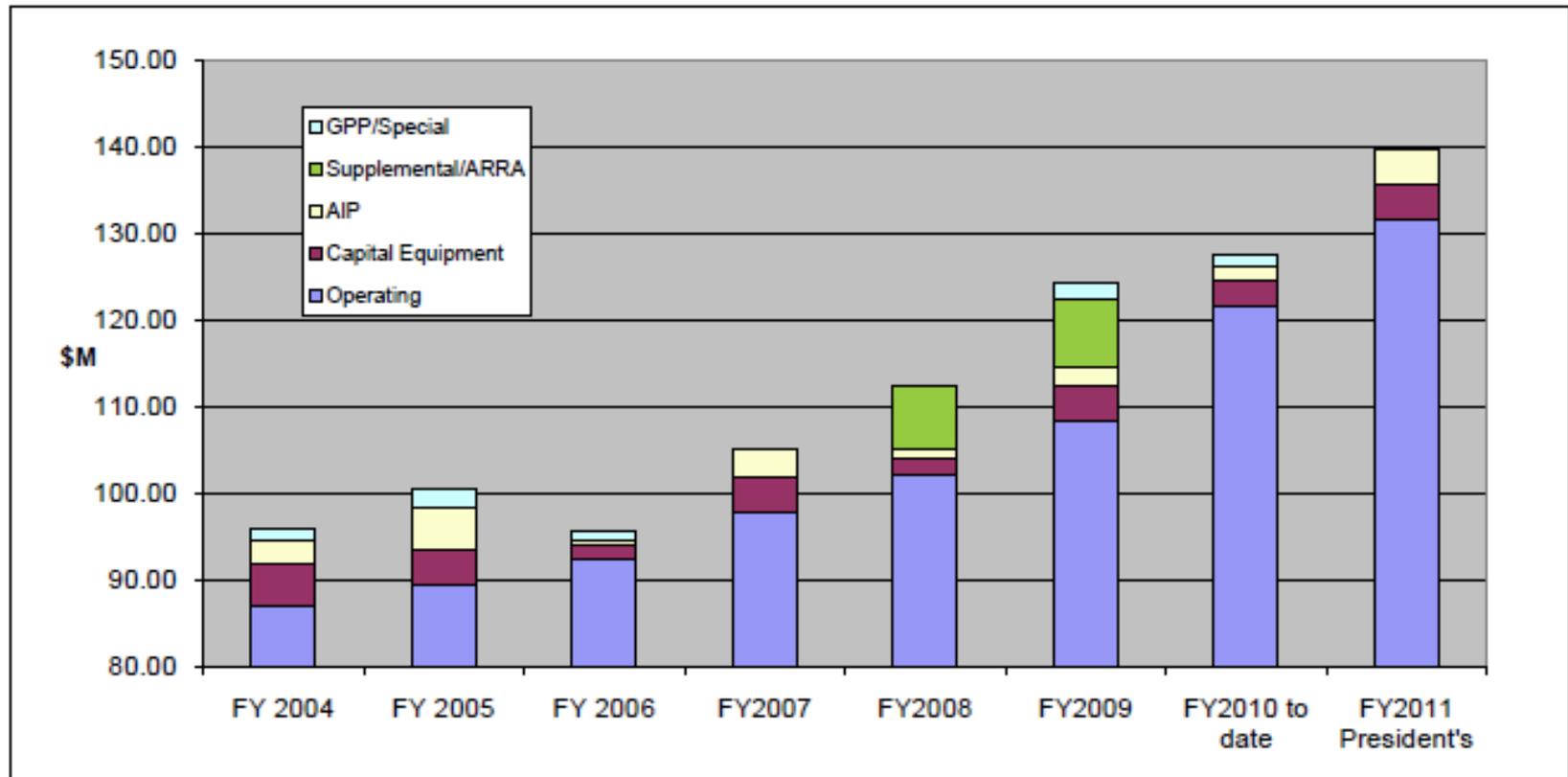
- “...it looks increasingly likely that the Laboratory’s budget will be flat for at least the first few months of fiscal year 2011, which begins Oct. 1, 2010.”
- Given Congressional concern about reducing federal deficits, it would be prudent to make plans based on a flat budget with the hope for pleasant surprises as Congress works through the details.
- Congress is expected to pass a *continuing resolution*, a bill that Congress uses to fund government agencies when a formal appropriations bill has not been signed into law.



Eric Isaacs on ANL’s
management Blog Aug 18, 2010

APS Ops Budget update

- As of August 2010 we have received \$128.3M



- We will make our plans for FY11 assuming a 6 month CR, but should be in relatively good shape as our carry-over from FY10 will be > \$10M.

APS Upgrade

- CD-0 awarded April 22, 2010 and since that time, the APS staff have been moving forward with the development of a Conceptual Design Report (CDR).
- The draft CDR will be subjected to a series of reviews over the next several months (see next several viewgraphs), the first being the University of Chicago Review which will take place next week and the APS SAC, which will meet in October.
- During the time between APS SAC review and the end of the calendar year, it is our plan to make a draft of the CDR available to the users upon request.
- So that your voice is heard, I would strongly suggest that users direct their comments to the APSUO, PUC and/or Life Science Council representatives on the APS-U Steering Committee. This will ensure that all comments are brought to the attention of the Steering Committee as a whole and be communicated to the APS-U Project Director, Derrick Mancini.

More details will be given in the talk by Derrick Mancini.

Funding Types, Timelines and Schedule Goals

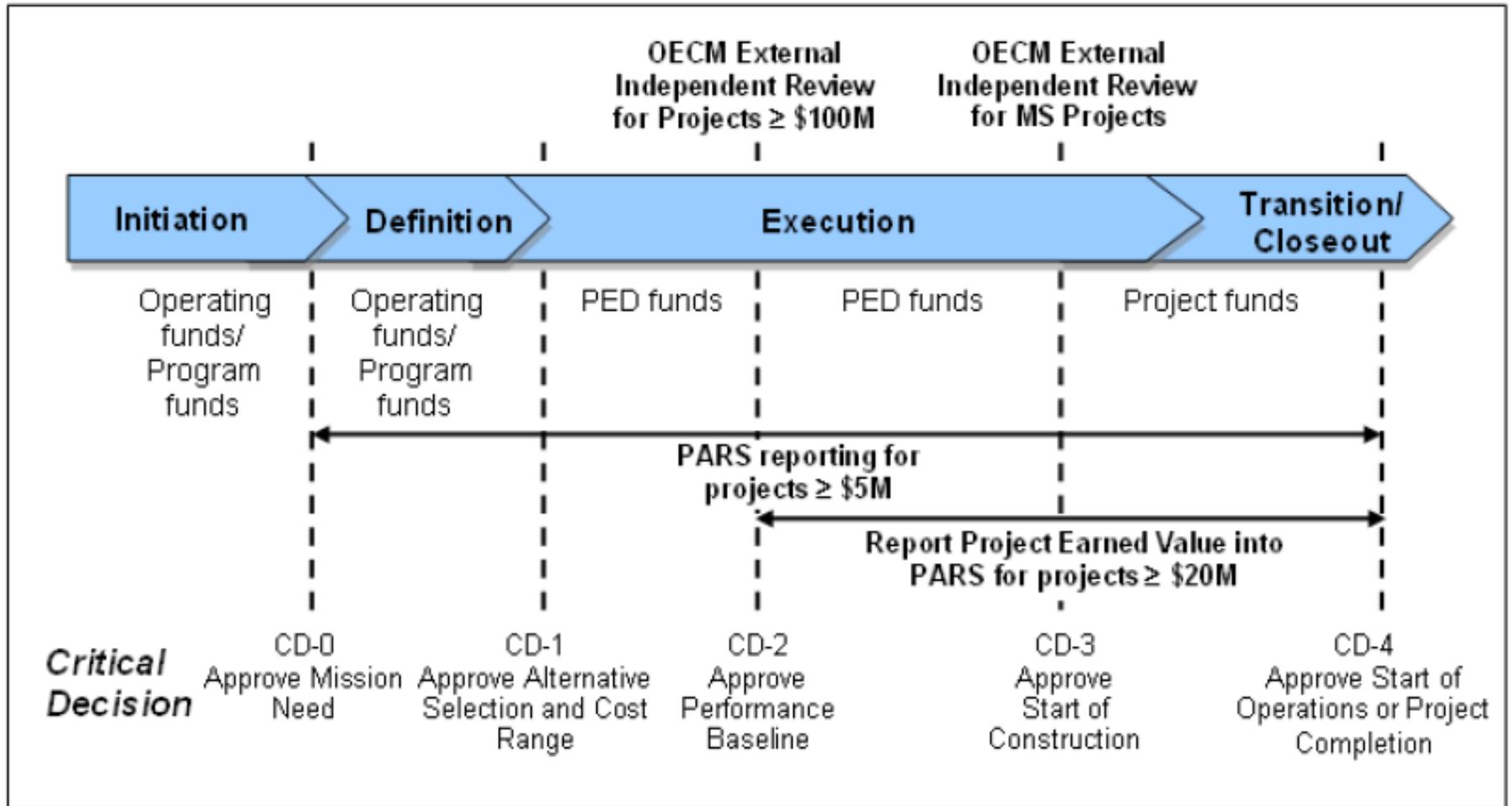
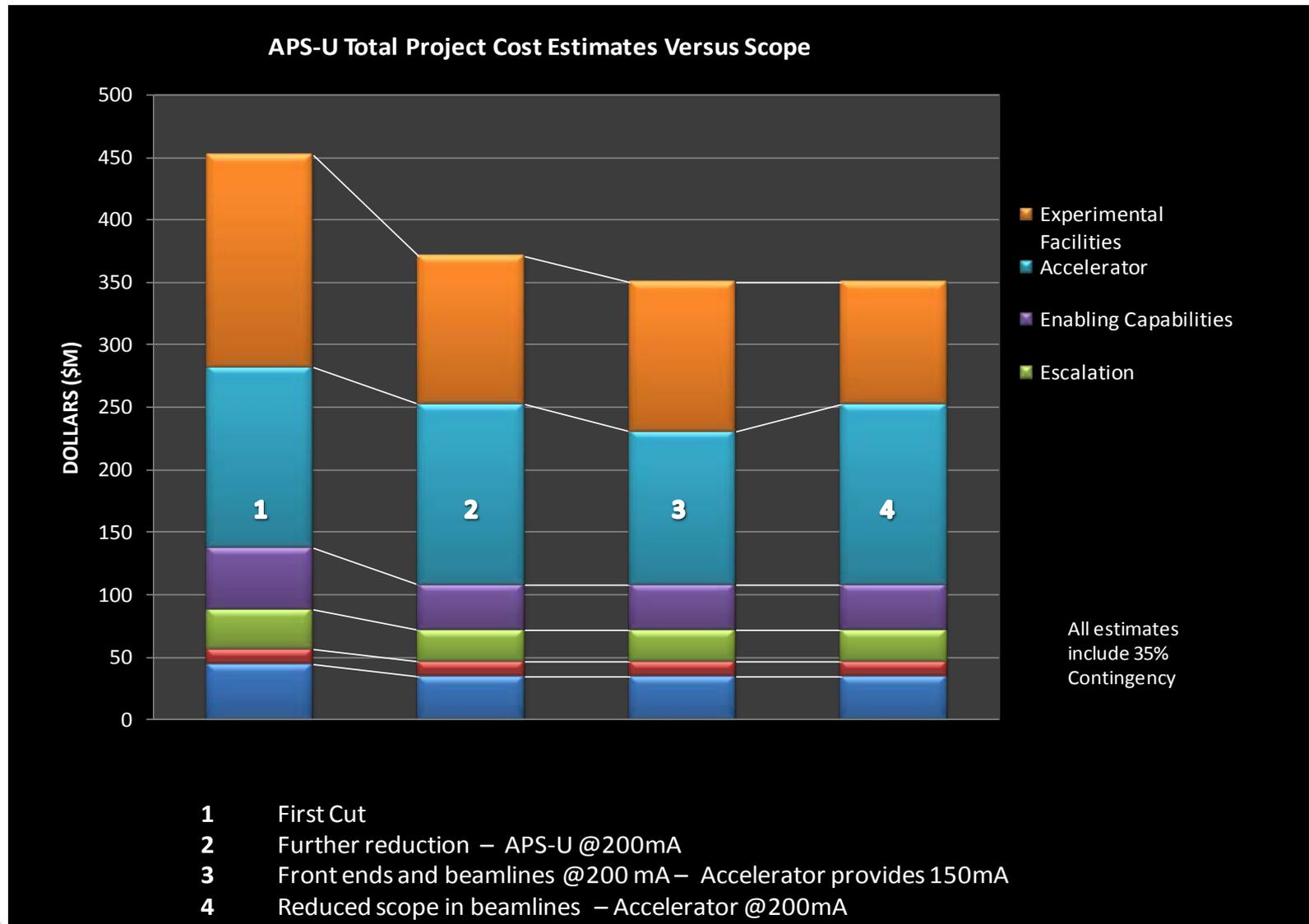


Figure 1. Typical DOE Acquisition Management System for Line Item Projects.

The APS Upgrade will be a Major Item of Equipment (MIE) Project rather than a Construction Project.

Upgrade Scenarios - Presented to DOE October 2009



Joint APS-U and PBC Meeting August 2010



Total Project Cost (TPC) for APS-U Scope 3

- Project support - \$35M
 - Accelerator Systems - \$122M
 - Beamlines – \$119M \$88.1M + \$30.9M contingency (35%)
 - Enabling Capabilities - \$ 37M
 - Escalation and R&D - \$37M
- Total project cost - \$350M* \$259M + \$91M contingency (35%)**

University of Chicago Review of the APS

- The triennial University of Chicago (U of C) review of the APS is scheduled for August 30 and 31, 2010.
 - We will use that review as an opportunity to obtain feedback on a priority list of beamlines to be included in the APS Upgrade.
 - We will be presenting a first cut at the prioritization of projects for their comment.
 - Our plan is to fold the comments we received from that review into an updated draft CDR that will subsequently be reviewed by the APS SAC and the Project Scientific Advisory Committee (PSAC), a team selected by and reporting to ANL Director Eric Isaacs.
- No open sessions

Cross-Cut Review and APS SAC Meeting

- The X-ray Interface Science/Liquid Surface Scattering (XIS/LSS) Cross-Cut Review will be held October 6, 2010.
 - A summary of the Liquid Surface Scattering Workshop will be presented
 - Also a series of science talks on X-ray Interface Science and Liquid Surface Scattering will be presented.
- The Cross-Cut Review will be open to the public.
- The full APS SAC will meet October 7 and 8, 2010.
 - 8:30: Review of the XIS/LSS Cross-cut Review and Open Forum Discussion
Friso van der Veen, Discussion Leader
 - The remainder of the SAC Meeting will be in closed session and will be devoted to discussions of the APS Upgrade Project.

Draft Agenda for the Cross-Cut Review of Interface and Liquid Surface Scattering Science

8:30 am Charge to the Review Committee Dennis Mills

8:45 Overview of Interface Science Capabilities: Current and Proposed Paul Zschack, X-ray Science Division, APS

9:30 Invited XIS Impact Talk Paul Fenter, Chemical Sciences and Engineering Division, ANL

10:00 Invited XIS Impact Talk Brian Stephenson/Paul Fuoss, Materials Science Division, ANL

10:30 Break

11:00 Invited XIS Impact Talk Tai-chang Chiang, University of Illinois at Urbana-Champaign

11:30 Invited XIS Impact Talk Darrell G. Schlom, Cornell University

12:00 noon Executive Session/Working Lunch

1:30 pm Poster Session (Contributed posters)

3:00 Overview of Liquid Surface Scattering Science at the APS/Review of 8/2/10 LSS Workshop at the APS Mark Schlossman, University of Illinois at Chicago

3:45 LSS Impact Talk J. Kent Blasie, University of Pennsylvania

4:30 LSS Impact Talk Oleg Shpyrko, University of California at San Diego

5:15 Executive Session with Invited Speakers

5:45 Executive Session with Review Committee Only

6:30 Adjourn

Search Committee for New APS Director

Dr. Eric Isaacs, Director of ANL, recently announced the formation of a committee charged with conducting an international search for candidates to fill the position of Associate Laboratory Director (ALD) for Photon Sciences.

This committee will serve as a resource to recruit outstanding candidates to take on the challenges and excitement of stewarding the Advanced Photon Source through a major upgrade, as well as becoming an integral part of Argonne's senior leadership team. The committee will recommend the top candidates to Eric Isaacs, who is responsible for the final selection.

Helmut Dosch (Deutsches Elektronen-Synchrotron)

Bob Dynes (University of California)

Paul Fuoss (Materials Science Division, Argonne)

Janos Kirz (Lawrence Berkeley National Laboratory, retired)

Keith Moffat (The University of Chicago)

Monica Olvera de la Cruz (Northwestern University)

Brian Stephenson (Materials Science Division, Argonne) (Chair)

Linda Young (X-ray Science Division, Argonne)

Tracey Rossett (Human Resources Division, Argonne) ex-officio

Recommendations can be sent directly to the Search Committee (trossett@anl.gov) or made by contacting any of the Committee members. The search is expected to last no longer than six months.

Workshop on Evolution and Control of Complexity

- The Advanced Photon Source/Argonne National Laboratory, DESY and SLAC National Accelerator Laboratory are co-sponsoring a major ***Workshop on Evolution and Control of Complexity: Key Experiments Using Sources of Hard X-rays.***
- This will be held at APS/ANL on October 11-13, 2010.
- The focus of the workshop is to identify unexplored opportunities in the emerging field of non-equilibrium science and to assess the type of hard x-ray sources required to understand the spatiotemporal evolution of complexity of structures in either their native environment or when they are controlled by flow of energy. The identified focus areas cover a very broad range of science on reaching states of matter far-away from equilibrium, challenging experimentalists to measure and theorists to predict the pathways to their emergent properties. The workshop will also question our ability to control the pathways and resulting functions in molecular systems, nanostructures, condensed matter, chemical and biological reactions, as well as the creation and understanding of high energy density matter. The scope of the workshop additionally covers non-linear x-ray interactions in matter and extends to cosmology in which there are new x-ray metrology opportunities using seeded XFELs.

(See <http://www.aps.anl.gov/complexity> for more details.)

Argonne Distinguished Fellow for Life Sciences at the Advanced Photon Source

- We are continuing to pursue candidates for the ANL Distinguished Fellow for Life Sciences at the APS.
- The Search Committee is interviewing candidates for that position and will develop a report that will be provided to the new APS Director with pros and cons of each of the candidates.

Questions?

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