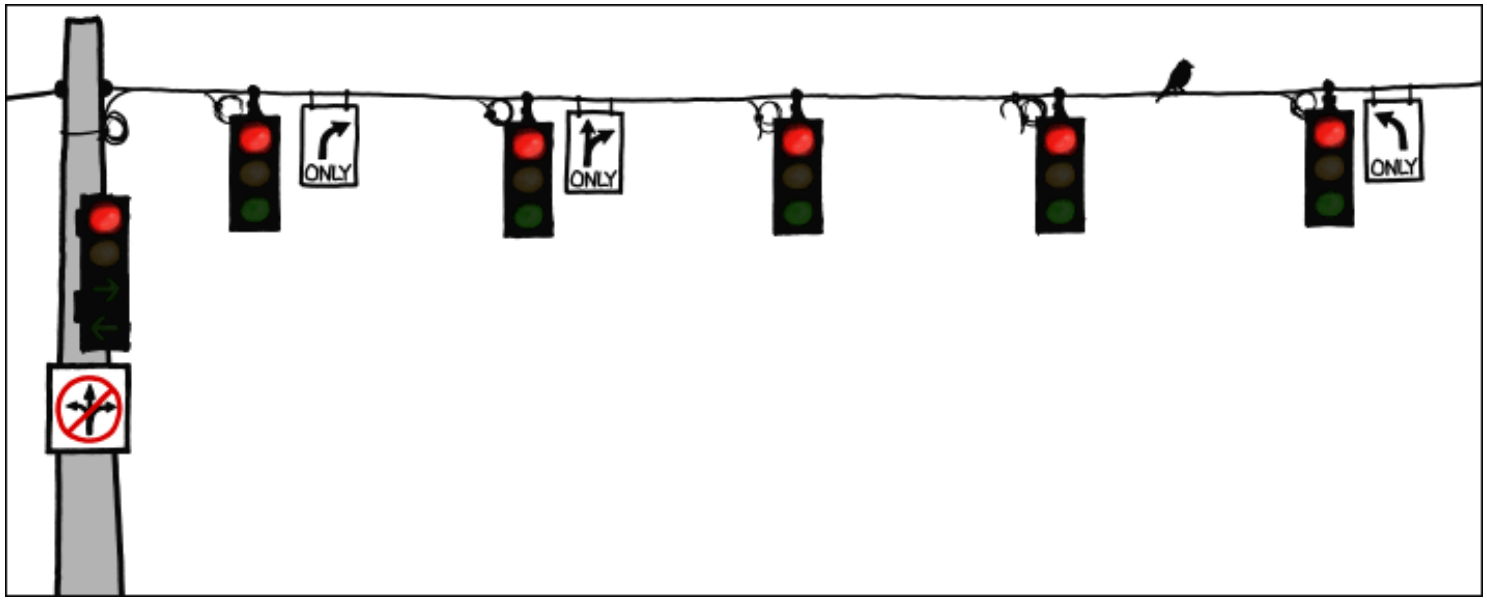


http://xkcd.com/1116/

BUDGET, STRATEGIC PLANNING AND COMMUNITY PROCESS

Jim Siegrist
Fermilab Users Meeting
June 13 2013

HEP Budget Overview

- **FY2014 budget philosophy was to enable new world-leading HEP capabilities in the U.S. through investments on all three frontiers**
  - **Accomplished through ramp-down of existing Projects and Research**
  - **When we were not able to fully implement this approach, converted planned project funds to R&D: Research ~~→ Projects~~ → Research**
  - **Therefore the FY14 Request shows *increases* for Research which are driven by this R&D "bump", while Construction/MIE funding is only slightly increased**
- **Impact of these actions:**
  - **Several new efforts are delayed: LBNE, LHC detector upgrades, 2nd Generation Dark Matter detectors**
  - **US leadership/partnership capabilities will be challenged by others**
  - **Workforce reductions at universities and labs**
- **Key areas in FY2014 Request**
  - **Maintaining forward progress on new projects via Construction and Research funding lines**

FY 2014 High Energy Physics Budget

(Data in new structure, dollars in thousands)

Description	FY 2012 Actual	FY 2014 Request	Explanation of Change
Energy Frontier Exp. Physics	159,997	154,687	Ramp-down of Tevatron
Intensity Frontier Exp. Physics	283,675	271,043	Completion of NOvA (MIE), partially offset by Fermi Ops
Cosmic Frontier Exp. Physics	71,940	99,080	Ramp-up of LSST
Theoretical and Computational Physics	66,965	62,870	Continuing reductions in Research
Advanced Technology R&D	157,106	122,453	Completion of ILC R&D
Accelerator Stewardship	2,850	9,931	FY14 includes Stewardship-related Research
SBIR/STTR	0	21,457	
Construction (Line Item)	28,000	35,000	Mostly Mu2e; no LBNE ramp-up
Total, High Energy Physics	**770,533***	**776,521**	**Down -1.8% after SBIR correction**
Office of Science	**4,873,634**	**5,152,752**	

***The FY 2012 Actual is reduced by $20,327,000 for SBIR/STTR**

Current LBNE Strategy

- We are trying to follow the reconfiguration (phased) plan for LBNE, though it has hit some snags
  - Out year budgets are challenging
  - Some members of the community objected that the phased LBNE was not what P5 (or they) had in mind
- The plan, as it currently stands:
  - Using time before baselining to recruit partners (international and domestic) that expand scope and science reach
  - Working to get more of the community on board

Strategic Planning

- **The HEP budget puts in place a comprehensive program across the three frontiers.**
  - In five years,
    - NOvA, Belle-II, g-2 will be running on the Intensity Frontier.
    - Mu2e will be in commissioning preparing for first data.
    - The CMS and ATLAS detector upgrades will be installed at CERN.
    - DES will have completed its science program and new mid-scale spectroscopic instrument and DM-G2 should begin operation
    - The two big initiatives, LSST and LBNE, will be well underway.
- **Need to start planning now for what comes next.**
  - Engaging with DPF community planning process that will conclude this summer.
  - Will set up a prioritization process (a la P5) using that input.

Customized Implementation Strategies

- **Energy Frontier**
  - US has a leading role in LHC physics collaborations but is not the **driver**
    - The issue is the scope and scale of US involvement. Requires US-CERN negotiation.
    - Could also be true for Japanese-hosted ILC
- **Intensity Frontier**
  - US is the world leader and needs new facilities and/or upgrades of existing facilities to maintain its position
    - Has the potential to attract new partners to US-led projects
    - Portfolio of experiments and science case is diverse. This complicates the case. The scale of the projected investments is a big challenge
- **Cosmic Frontier**
  - US HEP has a leading role in a competitive, multidisciplinary environment
    - HEP component of the physics case is simple and compelling. Only question is how far one needs to go in precision/setting limits on, e.g., dark matter.
    - DOE is a technology enabler, not a facilities provider (see NSF, NASA)
      - Analogous to LHC but the HEP physics goals are not those of the facility owners
    - DOE supports particle physics goals and HEP-style collaborations
      - Astronomy and astrophysics is not in our mission nor our *modus operandi*

Joint Agency Letter to the Community

- Fundamentally…[planning] is a multi-step process with several important milestones over the coming year, and each step will inform and prepare for the next.
  1. HEP Facilities Subpanel: Advise DOE/SC mgmt. on the scientific impact and technical maturity of planned and proposed SC Facilities, in order to develop a coherent 10-yr SC facilities plan
     - Subpanel can add or subtract from initial facilities list
     - Does not exclude/pre-empt later additions
  2. DPF/CSS2013 "Snowmass": community identifies compelling HEP science opportunities over an approximately 20 year time frame.
     - Not a prioritization but can make scientific judgments
  3. HEPAP/P5: Advises agencies on new strategic plan and priorities for US HEP in various funding scenarios, using input from #1 and 2 above (among others)

Snowmass / P5 Interface

What we hope to see from Snowmass:

- What are the most compelling science questions in HEP that can be addressed in the next 10 to 20 years and why
- What are the primary experimental approaches that can be used to address them? Are they likely to answer the question(s) in a "definitive" manner or will follow-on experiments be needed?
- What are the "hard questions" (science, technical, cost…) that a given experiment or facility needs to answer to respond to perceived limitations in its proposal?

These topics should be covered in the Snowmass reports and white papers. P5 will use these reports and white papers as its starting point.

- We expect to have the P5 panel selected and a formal charge issued by the time of the September HEPAP meeting

Goals for the P5 Process

DOE/NSF met in early May to kickoff P5 process and agree on goals:

- **The P5 process takes the science vision of the community and turns it into plan that is feasible and executable over a 10-20 year timescale**
- **HEP MUST have a planning and prioritization process that the community can stand behind and support once the P5 report is complete.**
- **We also need a process that repeats at more less regular intervals (5 years?)**
  - We also want to allow for less comprehensive updates and modest course corrections to the plan along the way (a la P5 updates in 2009, 2010)
- **Key elements envisioned for the P5 process:**
  - Revisit the questions we use to describe the field (eg. *Quantum Universe*, updated and corrected)
  - Decide on the project priorities within budget guidance (in detail for the next 10 years, in broad outline beyond that)
  - Propose the best way to describe the *value* of HEP research to society
  - Build on the investment in Snowmass process and outcomes

What P5 Is (and is Not)

P5 will prioritize HEP projects over a 10-20 year timeframe within reasonable budget assumptions and position the U.S. to a be a leader in some (but not all) areas of HEP.

- This will include an explicit discussion of the necessity (or not) of domestic HEP facilities in order to maintain such a world leadership position.
- Necessarily this will involve consideration of technical feasibility as well as plausible timescales and resources for future projects.
- There will be budget "fixed points" for projects already under construction and other prior commitments

The charge to P5 will NOT include explicit examination of

- Agency review processes
- Roles, responsibilities and funding of labs versus universities
- Relative funding of experimental HEP *vs* theory *vs* technology R&D

DRAFT New P5 Process (for discussion)

Based on adopting "best practices" from our colleagues in Nuclear Physics and Astrophysics, we are considering the following enhancements to the P5 process for this iteration:

- Greatly enlarged P5 panel (~50 members). Previous P5 had 21 members
  - Nominations will be sought from HEP and related communities through a 'Dear Colleague' letter
  - Snowmass output (reports, white papers) as a starting point, but may solicit additional material on specific projects
- Several "town meetings" as public forums not only to advocate for particular science opportunities but also to *prioritize*
  - Each sub-group of the community should be able to prioritize the most important science (and projects) within its specialty. P5 will recommend priorities across the entire field.
- Working subgroup for updating the *Quantum Universe* questions in parallel with science priority discussion
- Separate working group elucidating HEP benefits to society

DRAFT New P5 Timeline

May: DOE/NSF agree on outlines of P5 process and inform community via presentations

June: "Dear Colleague" letter (June 5); call for nominations to P5

July: Agencies draft P5 charge. HEPAP Chair reviews P5 nominations and begins selection process

August : Snowmass meeting concludes, reports issued. P5 charge sent to HEPAP Chair.

Sept : HEPAP Meeting. P5 charge and membership formally announced. Timeline for P5 meetings announced.

Fall 2013 : Town Meetings (4 or 5, venues and topics TBD)

Winter 2014: P5 meetings (phone in and face to face)

Spring 2014 : P5 report(s) due. Exact dates and deliverables to be spelled out in P5 charge.

Draft Proposed Town Meetings(1)

- **First meeting on the overall strategy, questions to describe the field, and discussion of how technology development priorities and other crosscutting issues should be covered in the P5 report**
  - Start with the current P5 plan and possible alternatives as well as global strategy considerations.
    - Need to understand "where we are now" and recognize much has changed since the last P5 – does this also change our strategy? Does this change how we think about the field?
    - Open discussion of issues so the community can better understand the constraints, and hopefully reach broader agreement.
  - Fundamental questions for the field and how to unify/connect the Frontiers framework will also be discussed
    - Input from the Theory community will be especially important in this area
  - Technology support will NOT be a main focus of P5, but the panel will benefit from wisdom in the community in this area.
    - E.g., Do we have a coherent technology R&D plan that dovetails with the science opportunities? If not, how do we get there?
    - Note that 'Accelerator Stewardship' is an Office of Science wide initiative managed by the HEP office, so should be discussed for information, but will not be modified by P5.

Draft Proposed Town Hall Meetings(2)

- **Subsequent meetings will focus on open community discussion of project priorities on each of the frontiers: Intensity, Energy, and Cosmic.**
  - The expected outcome will be advice to P5 on a *prioritized project list* by frontier. Each meeting will focus on one frontier, not flaws in the plan of the other frontiers.
  - The process will be moderated by P5 itself, and based on input from Snowmass whitepapers and project whitepapers updated from the facility panel, Snowmass, or just for this purpose.
  - P5 will see to it that the meetings to not descend into a shouting contest
  - The budget guidance to P5 will be public as part of its Charge, so proponents will have a good idea of the total budget envelope that can be considered and can debate what is a "reasonable" budget profile.
- **Based on the results of the first 4 meetings, we will consider a 5th meeting to 'wrap up' and discuss any broad matters arising.**

Next Steps

- **The agencies welcome input from the community on the shape of the P5 process.**
- **Read the June 5 'Dear Colleague' letter that reiterates the ideas contained in this presentation. Respond if you have ideas (especially better ideas).**
  - To be followed by request for nominations to P5
- **We have until the end of Snowmass to modify our P5 plans, and the agencies plan a series of talks at the Snowmass meetings to solicit further input.**
- **The agencies expect that our community is capable of adult behavior, and look forward to vigorous and open discussions of our challenges and opportunities.**

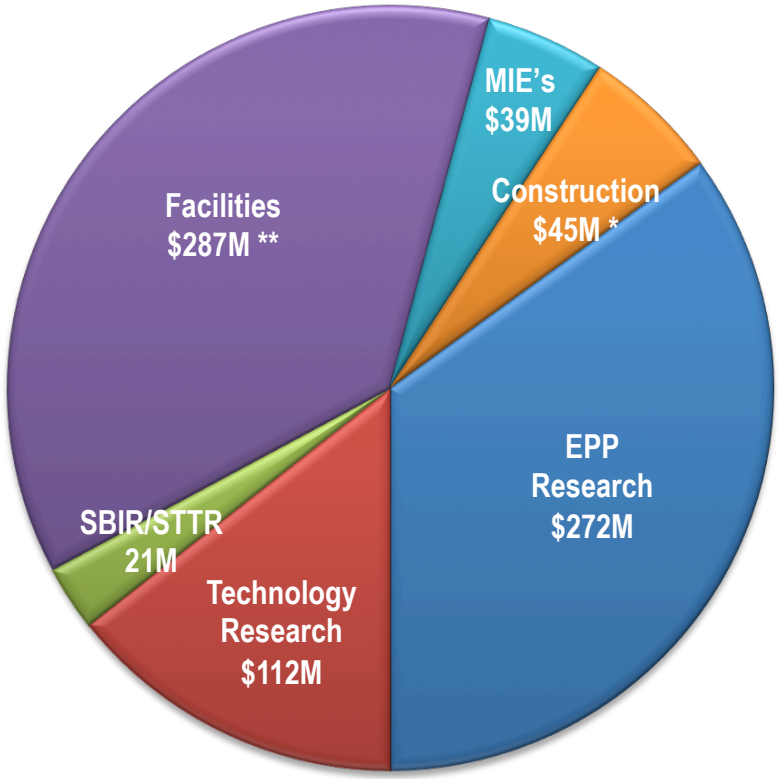
BACKUP

Major Recommendations of 2008 Advisory Panel (P5)

- The panel recommends that the US maintain a leadership role in world-wide particle physics. The panel recommends a strong, integrated research program at the three frontiers of the field: the Energy Frontier, the Intensity Frontier and the Cosmic Frontier.
- The panel recommends support for the US LHC program, including US involvement in the planned detector and accelerator upgrades. (highest priority)
- The panel recommends a world-class neutrino program as a core component of the US program, with the long-term vision of a large detector in the proposed DUSEL and a high-intensity neutrino source at Fermilab.
- The panel recommends funding for measurements of rare processes to an extent depending on the funding levels available… (Mu2e)
- The panel recommends support for the study of dark matter and dark energy as an integral part of the US particle physics program.
- The panel recommends a broad strategic program in accelerator R&D, including work …, along with support of basic accelerator science.
- **These are still relevant, and this is still the plan.**

FY 2014 Request Crosscuts

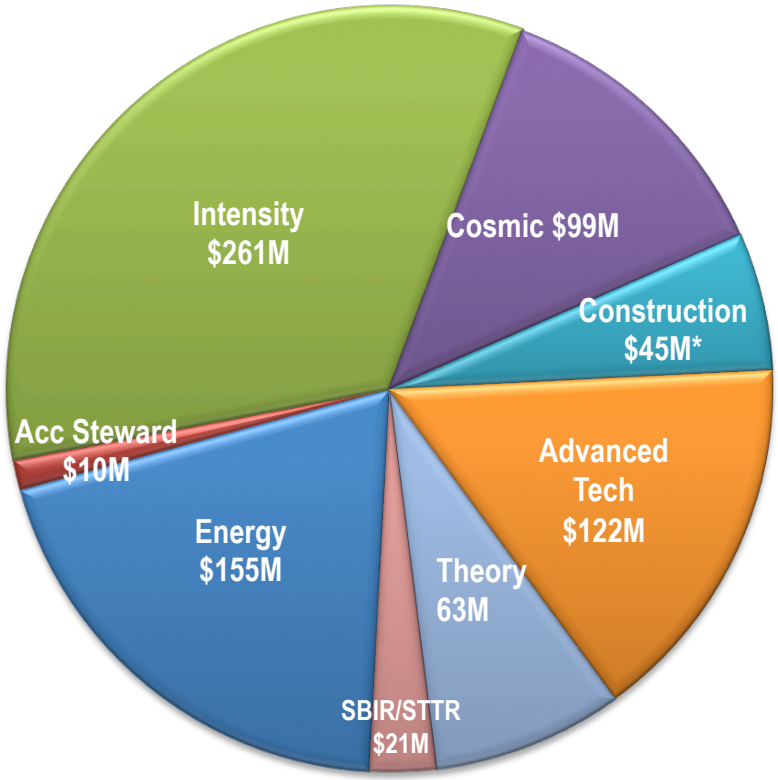
By Function



*Includes Other Project Costs (R&D) for LBNE

**Includes $15.9M Other Facility Support

By Frontier



* Includes Other Project Costs (R&D) for LBNE

MIE Issues

- We were not able to implement (most) new MIE starts in FY14 request
  - Muon g-2 experiment is the only new start in HEP
- This upsets at least 2 major features of our budget strategy:
  - Strategic plan : "Trading Research for Projects"
  - Implementation of facilities balanced across Frontiers