

Future Planning FY2015 and Beyond

Bill Boroski
LQCD-ext Contractor Project Manager
boroski@fnal.gov

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Fermi National Accelerator Laboratory
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LQCD-ext II Overview

- ▶ In April 2013, a proposal to extend the current computing project for another five years (FY15–19) was submitted by the USQCD Executive Committee and accepted by the DOE Office of Science.
- ▶ Project scope and operating model similar to current project
 - Acquire and operate dedicated hardware at BNL, JLab, and FNAL for the study of quantum chromodynamics during the period FY2015 through FY2019.
 - Site computing hardware at the three host laboratories; will be operated as a single distributed computing facility.
 - Each facility will continue to be locally managed following host laboratory policies and procedures (security, ES&H, etc.)
 - Management and oversight structure will be similar to existing structure, which has served the LQCD and LQCD-ext projects well.

LQCD-ext II Overview (2)

▶ Operations and Acquisition Strategy

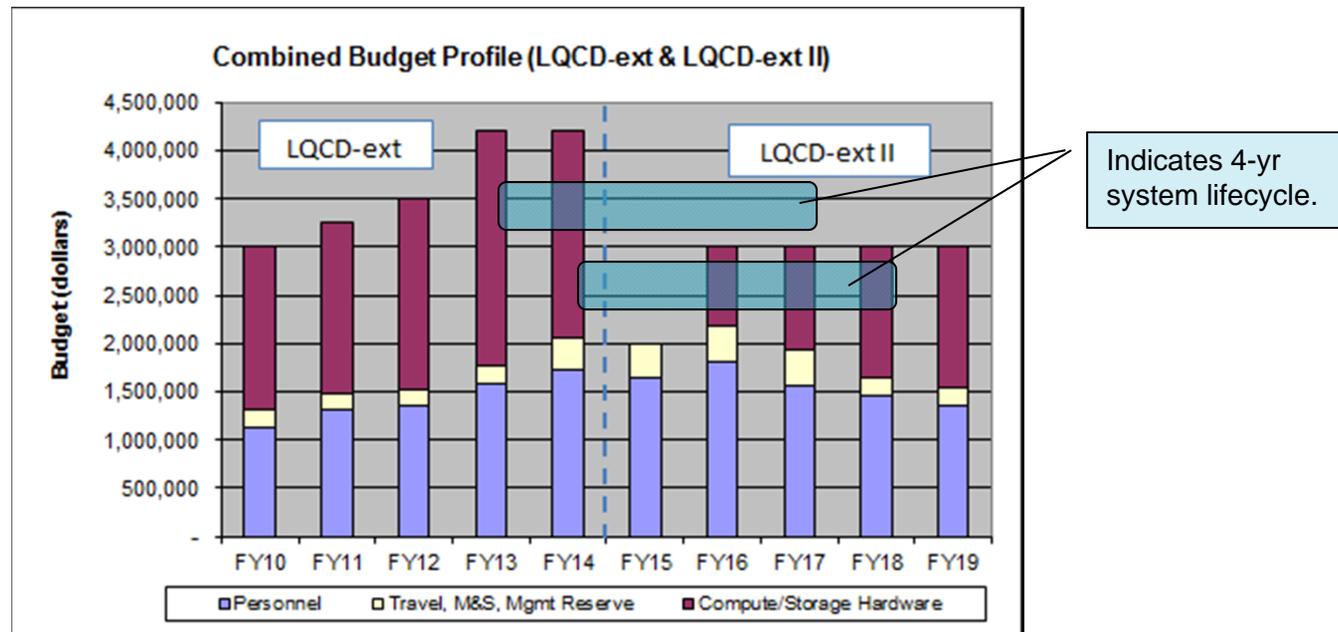
- Existing systems at BNL, FNAL, and JLab will be operated through their end of life
- New systems will be acquired annually in FY16–19 and will be operated from purchase through end of life, or through the end of the project, whichever comes first.
- No hardware acquisition is planned for FY15, based on current funding guidance.
- New computing systems will be sited at FNAL, JLab, and/or BNL based on the price/performance competitiveness of viable options during each acquisition cycle.

LQCD-ext II Planning Progress

- ▶ We are currently going through the formal DOE Order 413.3B Critical Decision (CD) approval process.
 - **CD-0: Approval of Mission Need**
 - Granted Sep 9, 2013
 - **Science Review**
 - Review held Nov 18, 2013; report issued Jan 29, 2014; recommended proceeding to CD-1
 - **CD-1: Approve Alternative Selection and Cost Range**
 - Review held Feb 25, 2014; report issued Apr 21, 2014; CD-1 approved May 1, 2014
 - **CD-2: Approve Performance Baseline**
 - **CD-3: Approve Start of Execution**
 - Combined CD-2/3 review is scheduled for Jul 10, 2014
- ▶ If approved, project duration: Oct 1, 2014 through Sep 30, 2019
- ▶ The funding guidance we have received will fund the project at a lower level than requested.
 - Proposal requested \$23 million (comparable to LQCD-ext and LQCD-ARRA)
 - CD-1 guidance: \$14-18 million
 - CD-2 guidance: \$14 million

Total Project Cost Profile Comparison

\$14 million Budget Scenario

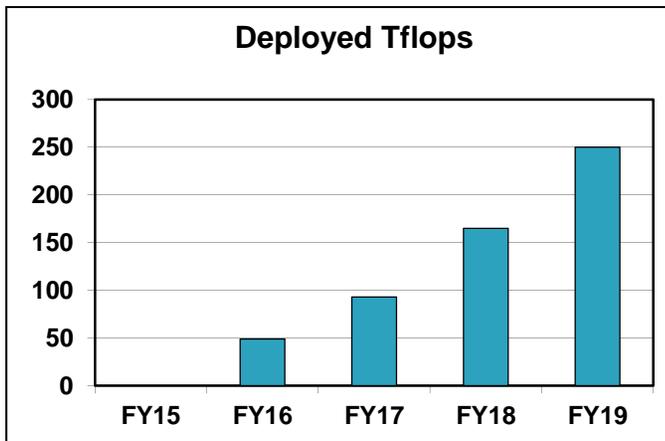


- ▶ The \$14 million budget scenario represents a significant reduction in funding from current levels, which had been back-loaded in the funding profile for the current project (LQCD-ext).
- ▶ Personnel cost requirements are based on a refined staffing model. Level of operations support is based on number of nodes and GPUs in production during each year.
- ▶ Reduced funding level directly affects the amount of compute capacity we will be able to deliver to the science program.

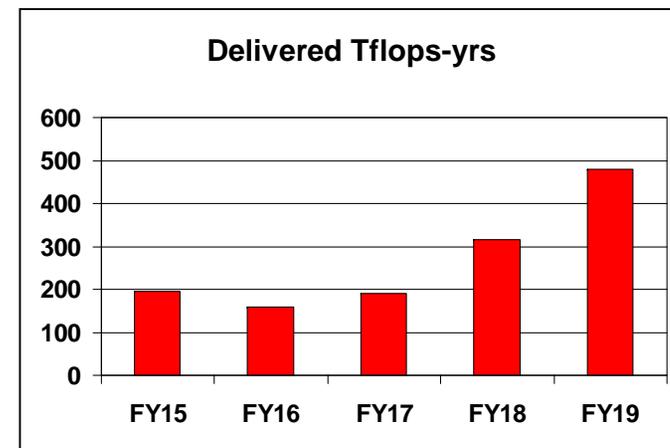
Computing Performance Milestones *(preliminary)*

- ▶ Deployment and cumulative performance milestones have been defined for each year, taking into account the funding guidance
- ▶ Deployment figures assume that 40% of the annual hardware budget is used to purchase accelerated hardware, and 60% to purchase conventional hardware.

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Planned computing capacity of new deployments, Tflop/s	0	49	93	165	250
Planned delivered performance (BNL + FNAL + JLab), Tflop/s-yr	195	160	190	315	480



Deployed Tflops – Incremental capacity brought on-line, expressed as average of domain wall fermion (DWF) and highly improved staggered quark (HISQ) algorithms



Delivered Tflops-yr – Available capacity expressed as average of DWF and highly improved staggered quark (HISQ) algorithms.

Status and Outlook

- ▶ We have received CD-1 approval and are working on refining our project plans in preparation for the July 10 CD-2/3 review, at which time the LQCD-ext II project will be baselined and (hopefully) approved to continue execution through FY2019.
- ▶ As we navigate the Critical Decision process, we continue to refine our staffing and operating model to maximize the amount of funds available for new computing and storage hardware.
- ▶ We have also adjusted our acquisition strategy so that procurements will straddle fiscal years. By lowering overhead costs, we increase the level of funds available for computing hardware. We are also planning to run machines longer than in the past (i.e., increasing planned lifetimes)
- ▶ We recognize the current budget climate and are working hard to develop a project plan that make the most effective use of resources to maximize the science program.
- ▶ We are working hard to achieve CD-2/3 approval for the LQCD-ext II project in a timely way to avoid an interruption in project operations.