



August 27, 2010

Janice Berman  
Senior Director  
IDSMP Policy and Integrated Resource Planning  
Pacific Gas and Electric

Dear Ms. Berman:

I am pleased to provide some background information regarding Lawrence Livermore National Laboratory's (LLNL's) planned investments in the High Performance Computing – Innovation Center (HPC-IC) within the Livermore Valley Open Campus described in "A Partnership for 21st Century Education Systems." I hope this information will provide some useful context for discussion at PG&E. I would also be happy to be available for a conversation (925) 423-6806 if additional detail would be of use to you.

We believe that High Performance Computing and Simulation will serve to stimulate and accelerate National competitiveness in the 21st Century. We envision the HPC-IC to be a unique, high-performance computing and predictive simulation operations and services resource that will enable innovative partnerships and collaborations among industry, academia, and government agencies. Pending PUC approval, the relationship with PG&E and the two major Southern California utilities would represent a key, initial partnership for the HPC-IC. In short, the HPC-IC will provide three critical capabilities to industrial partners:

- Access to some of the world's most capable high performance computer systems to help accelerate the transition to the clean energy economy of the future
- Sustained access both to industry and national laboratory proven expertise for operating and effectively using these systems
- A readily accessible location for collaborations, fostering close partnerships and potential longterm relationships between industrial partners, academia and LLNL.

The current financial plan for the HPC-IC (including the computer facility) has an aggregate budget of \$185 M between FY 10- FY 15 inclusive. The income reflects the following sources and levels of investment:

	FY 10 – FY 15
Total Income	\$ 185 M
LLNL (through NNSA)	\$ 70 M
Industrial Partners	\$ 65 M
Electric Utilities / PUC	\$ 50 M



The table above is focused on funds and services into the HPC-IC facility. The \$50M Utility/PUC portion would be focused on the procurement of computers and computing infrastructure; it would also help support the costs of the facility during this period. Not shown here is \$20M/year described in the aforementioned proposal for conducting a development program dedicated to major improvement of grid related applications and cyber security.

At this budget level, the HPC-IC would be able to acquire and operate state of the art HPC computer system(s) with preeminent capabilities for benefit of all of the HPC-IC partners. Allocations of computing resources will appropriately reflect investment levels from each partner.

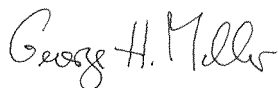
I view the development of the Livermore Valley Open Campus, and in particular its high performance computing joint venture with American industry, as establishing a keystone for the continued development of Lawrence Livermore National Laboratory. Consequently, the Laboratory intends to dedicate energy, time and resources to assure the success of the HPC-IC over the coming years. The LLNL funds shown above have been identified within current and expected budgets. As specific examples of the LLNL contribution, the Laboratory will cover costs of electrical power to run the operation. In addition, the Laboratory will provide necessary system administration, consulting services, account support and 24x7 operations to provide a highly functional and customer friendly simulation environment. In short there will be full services provided, emulating our current service structures for other ongoing programs.

In addition to the California utilities, we are in advanced discussions with another major industrial partner that would provide roughly 40% of the projected Industrial Partners' income shown in the table, with the remaining partnerships to be developed and finalized over the next six years. This company brings unsurpassed expertise in all aspects of high performance computing and hopes to interact and support other industrial partners – like the California utilities - in the advancement of the American energy economy.

The HPC-IC investment model provides major leveraging for all participants. Most important, hardware expenditures come at a reduced cost because the magnitude of the infrastructure procured permits very aggressive pricing. LLNL also maintains a consistent software solution across multiple computing environments, using a highly experienced staff. When this economy of scale is combined with LLNL's history of working with computing vendors to procure optimized solutions, LLNL can frequently realize cost savings exceeding 50% over less experienced government and industrial sites. LLNL and university partners have also developed code frameworks for building, operating and maintaining large applications for HPC systems. Adopting these frameworks reduces the overall manpower cost to develop new applications. All of these leveraging strategies could have a significant impact on the electrical grid project in providing a state of the art solution.

I hope this information is useful and I would be happy to answer any additional questions.

Respectfully yours,



George H. Miller  
Director