

Summary Minutes of the

U.S. Department of Energy (DOE)
Secretary of Energy Advisory Board
Public Meeting

Committee Members: John Deutch, Co-Chair; Frances Beinecke, Rafael Bras, Albert Carnesale, John Deutch, Shirley Ann Jackson, Paul Joskow, Steve Koonin, Arun Majumdar, Michael McQuade, Richard Meserve, Dan Reicher, Dan Yergin

Date and Time: 2:00 – 2:45 PM, August 18, 2014

Location: Conference Call

Purpose: Meeting of the Secretary of Energy Advisory Board (SEAB)

SEAB Staff: Karen Gibson, Designated Federal Officer

Meeting Summary

The Co-chair John Deutch opened the meeting and recognized Michael McQuade, Task Force Co-Chair, to present a summary of the findings in the report. Dr. McQuade thanked staff for their help. He noted that there is an investable need for an exascale machine. From the NNSA mission in stockpile stewardship to industrial applications and basic sciences, there is a real need for a significant performance increase in classical high performance computing at several orders of magnitude beyond the tens of petaflop performance delivered by today's machines. The technology exists for development of a next current generation machine in the 1-10 exaflop / 1-10 exabyte regime, without having to resort to architectures that have not yet been deployed. Classical data centric needs and capabilities are impacted by many of the data volume and architecture issues. Data centrality at the exascale level is already important at DOE in NNSA and in science, and more broadly for other parts of the U.S. Government, and the private sector. Common challenges and under-girding technologies span compute needs. Mission, capabilities, and partnering mechanisms with industry and academia are there for DOE to continue to take the lead in computing. An ecosystem relying on research must be preserved and developed to reach the next HPC level. And finally, it is timely to invest in science, technology, and human capital for both exascale and beyond exascale at this time.

Shirley Ann Jackson, Task Force Co-Chair, presented a summary of the recommendations in the report. DOE, through a program jointly managed by NNSA and the Office of Science, should take the lead in developing the next generation of machines by the middle of the next decade - one that balances classical computational speed and data centric memory and computations architecture to get to the 1-10 exaflop level. The partnering mechanisms between DOE, academia, and industry have worked well, and should continue. The approximate investment required is \$3B over 10 years. DOE should lead, within the framework of the National Strategic Computing Initiative, a co-design process that jointly matures the technology base. DOE should lead a cross-government investment in "over-the-horizon" HPC development for hardware and software. The underlying ecosystem in mathematics, computer science, new algorithm development, physics, etc. should be led by DOE.

Three things to keep in mind include: partnerships with academia are important to advance state of the art, especially in computational science; there should be support and incentives to develop new algorithms for exploiting modern systems aspects; and the open source community should be strengthened by focused investment in universities.

The Task Force recommendations are focused on three timeframes: (1) the greater Petascale timeframe, which already has been initiated with industry partners for development and deployment of hardware and software; (2) the Exascale timeframe, which covers the next 5-10 years and characterized by systems in the 100's of petaflops to tens of exaflops and is part of the larger roadmap to exascale; and (3) Beyond Exascale, where ecosystem support is needed, but specific technology advancements are less clear.

Public Comment

No Public Comment

Chair Wrap-Up

Co-Chair John Deutch thanked the Task Force Co-Chairs for their hard work. Dan Yergin moved that the report be approved. Albert Carnesale seconded the motion. There was unanimous agreement to approve the report and send it to the Secretary.

Meeting adjourned at 2:45 PM.

Respectfully Submitted:

Karen Gibson, Designated Federal Officer

I hereby certify that these minutes of the August 18, 2014, SEAB meeting are true and correct to the best of my knowledge.

A handwritten signature in black ink that reads "John Deutch". The signature is written in a cursive, flowing style.

John Deutch, Chair