
The American Institute of Physics Bulletin of Science Policy News Number 137

November 17, 2000

Science Highlighted in New Department of Energy Strategic Plan

What priority does science have at the Department of Energy? What are DOE's science goals, and how should the Department measure its progress in reaching these goals? A newly-released Department of Energy Strategic Plan answers these and many other questions.

Science, as well as Energy Resources, National Nuclear Security, and Environmental Quality are identified as DOE's "programmatic business lines" in this Strategic Plan. Intended to guide DOE for the next six years, this plan establishes goals, objectives, performance measures, and strategies. The plan is a refinement of a 1997 assessment, and was based on consultations within DOE, and with Congress, stakeholders, and the general public. This FYI will focus on the Plan's description of the Science component; to view the entire report see <http://www.cfo.doe.gov/stratmgmt/plan/DOESPLAN.htm>.

Energy Secretary Bill Richardson addressed the significance of this Plan in a statement accompanying the web version of this report as follows: "This Plan represents our best effort to provide measurable outcomes and accountability for the funds entrusted to us by Congress and the President on behalf of the American people. Through this plan we are making a clear statement to both Congress and the public what we plan to accomplish over the next six years."

The Plan acknowledges the critical role of public investment in the conduct of basic research, leading to its subsequent development into technology and the solution of various societal problems. Under Situational Analysis, the Plan states "The imperative for the science community has never been greater to deliver the most valuable research within available budgets." > Other topics include the importance of multidisciplinary research, the integration of science and applied research, and > a warning that "sufficient long-term, stable political and budgetary support" is required if the United States is to be included in international collaborations.

Regarding future federal funding, the Plan predicts "modest increases [are] expected over the near term." The Plan describes the need for modification or replacement of existing instrumentation and support facilities and buildings that "cannot be accommodated within a largely level funding base." > The replacement of retiring of program managers will be a challenge.

The Strategic Plan defined the "Science General Goal" as follows: "Advance the basic research and instruments of science that are the foundations for DOE's applied missions, a base for U.S. technology innovation, and a source of remarkable insights into our physical and biological world and the nature of matter and energy." Following this are four Science objectives, the first of which centered on advancing the supply of clean, affordable, and abundant energy. Five measures are then described that "will provide the basis by which the Department will know it has achieved the objective or making progress toward it." For this objective, these measures included progress in hydrogen production and storage, the synthesis of superconductivity materials, better seismic instrumentation for the imaging of hydrocarbon reservoirs, higher capacity rechargeable batteries, and new materials for manufacturing processes and power production. Work in condensed matter physics and plasma science and fusion research was identified as components of a strategy. Annual targets will be set for each measure.

The second Science objective involves the protection of the earth's environment. Among the five measures were the improvement of the spatial resolution of climate models, and the development of at least five new radio-pharmaceuticals and associated instrumentation.

The third Science objective is to "Explore matter and energy as elementary building blocks from atoms to life, expanding our knowledge of the most fundamental laws of nature spanning scales from the infinitesimally small

to the infinitely large." There are six measures: 1.) "Confirm the existence of the Higgs boson and the first supersymmetric particles," 2.) "Develop a quantitative understanding of how quarks and gluons provide the binding and spin of the nucleon based on quantum chromodynamics, further clarifying the theory of strong interaction as a component of the Standard Model," 3.) "Prepare a coherent model of the origin and fate of the universe, supported by and consistent with observations of neutrino mass, cosmic background radiation, distant quasars and supernovas, and dark matter," 4.) "Develop optical, ion, and plasma beam technology that can lead to electronic circuitry 10 times denser than that on today's chips," 5.) "Complete a draft of the human DNA sequence by the end of 2000 and the entire sequence by 2003...", and 6.) "Validate new approaches and supporting science for plasma confinement and basic plasma phenomena, providing the foundations for possible energy applications."

The fourth Science objective is "Provide the extraordinary tools, scientific workforce, and multidisciplinary research infrastructure that ensures success of DOE's science mission and supports our Nation's leadership in the physical, biological, environmental, and computational sciences." DOE describes five measures: 1.) "Meet milestones for new accelerators, testbeds, and detectors for particle and nuclear physics, and (as supported by the physics communities) next-generation machines such as the Next Linear Collider, Muon Collider, Rare Isotope Accelerator, and advanced laser-based optical accelerators," 2.) "Meet commitments and make progress toward new and upgraded probes and instruments for investigating materials, chemical processes, and life, including the completion of the Spallation Neutron Source, fourth-generation light sources such as free electron lasers and femtosecond x-ray lasers, and new accelerator and reactor designs for the production of research and medical isotopes," 3.) "Create the software that enables parallel-processor supercomputers that are capable of petaflop speeds...", 4.) "Complete a needs assessment by early 2001, for modernizing DOE's science laboratories to ensure their continued vitality..." and 5.) "Implement effective programs for science education through fellowships in universities and colleges, teacher training for secondary schools, outreach to communities, and broad partnership programs in science and technology."

DOE will evaluate its progress toward the attainment of these and other objectives in a report which will be submitted early next year with the FY 2002 budget request.

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