Office of Management and Budget
Program Assessment Rating Tool Performance Measures

Basic Energy Sciences, Office of Science, U.S. Department of Energy

Long Term Measures

- By 2015, demonstrate progress in designing, modeling, fabricating, characterizing, analyzing, assembling, and using a variety of new materials and structures, including metals, alloys, ceramics, polymers, biomaterials and more – particularly at the nanoscale – for energy-related applications.
    - Definition of "Excellent" – BES-supported research leads to important discoveries that impact the course of others' research; new knowledge and techniques, both expected and unexpected, within and across traditional disciplinary boundaries; and high-potential links across these boundaries.
    - Definition of "Good" – BES-supported research leads to a steady stream of outputs of high quality.
    - Definition of "Fair" – BES-supported research leads to modest outputs of good quality.
    - Definition of "Poor" – BES-supported research leads to limited outputs.
    - How will progress be measured? – ***Expert Review every three years will rate progress as "Excellent", "Good", "Fair" or "Poor".***

- By 2015, demonstrate progress in understanding, modeling, and controlling chemical reactivity and energy transfer processes in the gas phase, in solutions, at interfaces, and on surfaces for energy-related applications, employing lessons from inorganic, organic, self-assembling, and biological systems.
    - Definition of "Excellent" – BES-supported research leads to important discoveries that impact the course of others' research; new knowledge and techniques, both expected and unexpected, within and across traditional disciplinary boundaries; and high-potential links across these boundaries.
    - Definition of "Good" – BES-supported research leads to a steady stream of outputs of high quality.
    - Definition of "Fair" – BES-supported research leads to modest outputs of good quality.
    - Definition of "Poor" – BES-supported research leads to limited outputs.
    - How will progress be measured? – ***Expert Review every three years will rate progress as "Excellent", "Good", "Fair" or "Poor".***

- By 2015, develop new concepts and improve existing methods for major energy research needs identified in the 2003 Basic Energy Sciences Advisory Committee workshop report, Basic Research Needs to Assure a Secure Energy Future.
    - Definition of "Excellent" - BES-supported research leads to important discoveries that are rapidly and readily available and feed, as appropriate, into use or projected use by the Department's technology offices, by other federal agencies, and/or by the private sector. There is evidence of substantive interactions with the Department's technology offices in most BES program areas.
    - Definition of "Good" - BES-supported research leads to a steady stream of outputs of high quality that show the potential to impact energy research.
    - Definition of "Fair" – BES-supported research leads to modest outputs of good quality that show the potential to impact energy research.
    - Definition of "Poor" – BES-supported research leads to limited outputs that show the potential to impact energy research.
    - How will progress be measured? – ***Expert Review every three years will rate progress as "Excellent", "Good", "Fair" or "Poor".***

- By 2015, demonstrate progress in conceiving, designing, fabricating, and using new instruments to characterize and ultimately control materials.
    - Definition of "Excellent" - BES-supported research leads to new concepts and designs for next-generation instruments and detectors for x-ray, neutron, and electron-beam scattering.
    - Definition of "Good" - BES-supported research leads to new instruments that are world class.
    - Definition of "Fair" – BES-supported research leads to modest outputs of good quality that show the potential to impact the concepts and designs for next generation instrumentations.
    - Definition of "Poor" – BES-supported research leads to limited outputs that show the potential to impact the concepts and designs for next generation instrumentations.
    - How will progress be measured? – ***Expert Review every three years will rate progress as "Excellent", "Good", "Fair" or "Poor".***

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Annual Measures

- Average achieved operation time of the scientific user facilities as a percentage of the total scheduled annual operating time. *(Efficiency measure)*
    - How will progress be measured? - Progress will be tracked quarterly through the Department of Energy's tracking system –Joule. Results will be reported in the Department's Performance and Accountability report that is published soon after the end of each fiscal year.
    - Targets -
        - 2001 – >90% 96.1%
        - 2002 – >90% 96.1%
        - 2003 – >90% 91.2%
        - 2004 – >90% 91.9%
        - 2005 – >90% 97.7%
        - 2006 – >90% 96.7%
        - 2007 – >90%
        - 2008 – >90%

- Cost-weighted mean percent variance from established cost and schedule baselines for major construction, upgrade, or equipment procurement projects (Cost variance listed first). *(Efficiency measure)*
    - How will progress be measured? - Progress will be tracked quarterly through the Department of Energy's tracking system –Joule. Results will be reported in the Department's Performance and Accountability report that is published soon after the end of each fiscal year.
    - Targets
        - 2001 – <10%, <10% +0.4%, -6.3%
        - 2002 – <10%, <10% -0.2%, -1.8%
        - 2003 – <10%, <10% -0.5%, -1.4%
        - 2004 – <10%, <10% +1.3%, +0.8%
        - 2005 – <10%, <10% +0.2%, -2.5%
        - 2006 – <10%, <10% -1.7%, -3.2%
        - 2007 – <10%, <10%
        - 2008 – <10%, <10%

- Improve Spatial Resolution: Demonstrated spatial resolutions for imaging in the hard and soft x-ray regions, and spatial information limit for an electron microscope (measured in nanometers).
    - How will progress be measured? - Progress will be tracked quarterly through the Department of Energy's tracking system –Joule. Results will be reported in the Department's Performance and Accountability report that is published soon after the end of each fiscal year.
    - Targets
        - 2002 – - 150, 24, 0.09
        - 2003 – - 130, 20, 0.09
        - 2004 – ≤115, ≤19, ≤0.08 100, 19, 0.078
        - 2005 – ≤100, ≤18, ≤0.08 90, 15, 0.078
        - 2006 – ≤100, ≤18, ≤0.08[a] 90, 15, 0.078
        - 2007 – ≤100, ≤18, ≤0.08[a]
        - 2008 – ≤100, ≤18, ≤0.08[a]

- Improve Temporal Resolution: Demonstrated duration (measured in femtoseconds) and intensity (measured in millions photons per pulse) of an x-ray pulse.
    - How will progress be measured? - Progress will be tracked quarterly through the Department of Energy's tracking system –Joule. Results will be reported in the Department's Performance and Accountability report that is published soon after the end of each fiscal year.
    - Targets
        - 2002 – - 100, 0.0003
        - 2003 – - 500, 1.0
        - 2004 – ≤200, ≥0.005 20, 0.01
        - 2005 – ≤100, ≥100 70, 100
        - 2006 – ≤100, ≥100[a] 70, 100
        - 2007 – ≤100, ≥100[a]
        - 2008 – ≤100, ≥100[a]

[a] No further improvement is expected in FY 2006–FY 2008 as compared to the level of achievement for FY 2005. Performance levels for resolution (temporal and spatial) have reached the maximum for the current suite of available instruments. This target is a measure of SC's intent to maintain the maximum level of performance for users of the current SC facilities until the next generation of instruments and facilities becomes available.

- Number of reacting species and billions of grid points in a three-dimensional combustion reacting flow computer simulation, as a part of the Scientific Discovery through Advanced Computing (SciDAC) effort.
    - How will progress be measured? - Progress will be tracked quarterly through the Department of Energy's tracking system –Joule. Results will be reported in the Department's Performance and Accountability report that is published soon after the end of each fiscal year.
    - Targets
        - 2002 – - 8, 0.0005 (2-D simulation)
        - 2003 – - 8, 0.001 (2-D simulation)
        - 2004 – ≥44, ≥0.0005 44, 0.0005184 (2-D simulation)
        - 2005 – ≥10, ≥0.2 (3D) 16, 0.5 (3-D simulation)
        - 2006 – ≥30, ≥0.02 (3D) 33, 0.0212 (3-D simulation)
        - 2007 – Discontinued measure[b]

[b] Beginning in FY 2007, increasing the size of the simulation will no longer provide useful new information. Thus, this measure has been discontinued.