Biological & Environmental Research Advisory Committee

October 15, 2012

Dr. William Brinkman
Director, Office of Science
US Department of Energy
### FY 2012 Budget and FY 2013 Marks

**Office of Science**

**FY 2013 House and Senate Mark**

(B/A in thousands)

<table>
<thead>
<tr>
<th>FY 2012</th>
<th>FY 2013</th>
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<tbody>
<tr>
<td></td>
<td>Current Approp.</td>
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<tr>
<td>ASCR</td>
<td>440,868</td>
</tr>
<tr>
<td>BES</td>
<td>1,688,093</td>
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<tr>
<td>BER</td>
<td>609,557</td>
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<tr>
<td>FES</td>
<td>400,996</td>
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<tr>
<td>HEP</td>
<td>790,860</td>
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<tr>
<td>NP</td>
<td>547,387</td>
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<tr>
<td>WDTS</td>
<td>18,500</td>
</tr>
<tr>
<td>SLI</td>
<td>111,800</td>
</tr>
<tr>
<td>S&amp;S</td>
<td>80,573</td>
</tr>
<tr>
<td>PD</td>
<td>185,000</td>
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<tr>
<td>SBIR/STTR (SC)</td>
<td>——</td>
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<tr>
<td>Subtotal, Science</td>
<td>4,873,634</td>
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<td>Recession</td>
<td>——</td>
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<td>Use of PY Bal.</td>
<td>——</td>
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<td>Total, Science Approp.</td>
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Global Average Temperature Increases with CO$_2$

http://berkeleyearth.org/results-summary/
US energy-related CO2 emissions by sector and fuel, 2005 and 2035

Total energy-related carbon dioxide emissions

(million metric tons)

- Residential
- Commercial
- Industrial
- Transportation
- Electric power

- Petroleum
- Natural gas
- Coal
- Electricity
Regional mean annual temperature anomalies for 2011 with respect to a 1971-2000 base period
Tesla – 300 miles per charge car
Hybrid Sales 1999-2012 (per cent)

Per Cent of All Vehicles

0.0% 0.5% 1.0% 1.5% 2.0% 2.5% 3.0% 3.5%

46 EFRCs in 35 states were launched in Fall 2009

- Science crosscuts energy-use-inspired and grand challenge research
- ~850 senior investigators and ~2,000 students, postdoctoral fellows, and technical staff at ~115 institutions
- >250 scientific advisory board members from 13 countries and >40 companies

Impact to date (~2.5 years):

- >2,400 peer-reviewed papers including more than 60 publications in Science and Nature.
- > 125 patents applications, nearly 55 additional patent/invention disclosures, and 22 licenses
- >30 companies have benefitted from EFRC research results

- Solar Energy
- Combustion
- Bio-Fuels
- Catalysis
- Energy Storage
- Solid State Lighting
- Geosciences for Energy Applications
- Superconductivity
- Advanced Nuclear Energy Systems
- Materials Under Extreme Environment
- Hydrogen
Fuels from Sunlight Hub: Joint Center for Artificial Photosynthesis (JCAP)

JCAP R&D will focus on:
- Robustness of components
- Accelerating the rate of catalyst discovery for solar fuel reactions
- Discovering earth-abundant, robust, inorganic light absorbers with optimal band gap
- System integration, benchmarking, and scale-up

JCAP’s role as a solar fuels Hub:
- Incorporating the latest discoveries from the community (EFRCs, single-PI or small-group research)
- Providing metrics and benchmarking to the community

JCAP Mission: To demonstrate a scalable, manufacturable solar-fuels generator using Earth-abundant elements, that, with no wires, robustly produces fuel from the sun ten times more efficiently than (current) crops.
Other hubs or hub like structures

**Existing:**

- **Biofuel Centers – (Science)**
  - Joint BioEnergy Institute
  - BioEnergy Science Center
  - Great Lakes Bioenergy Research Center
- **Energy Efficient Buildings Hub (EERE)**
- **Consortium for Advanced Simulation of Light Water Reactors (Nuclear Energy)**

**Coming soon:**

- **Battery Hub** *(Science, EERE and ARPA-E)*
- **Critical Materials Hub** *(EERE, Science ARPA-E)*