Science, Technology, and Innovation: Climate and Global Change Research in the United States

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U.S. Global Change Research Program
Principal challenges and focuses

- Applied challenges
  - S&T for economic recovery & growth
  - public health: better care at lower cost
  - energy: lower imports & climate impacts, green jobs
  - other environment: species, land-soil, water, oceans
  - national & homeland security
Principal challenges and focuses

• Foundations of success
  – institutions/capacities for fundamental research
  – STEM education: preschool to grad school, and lifelong learning
  – information/communications technology
  – space capabilities
  – supporting guidelines & processes (IP, integrity, visas)
The President’s Initiatives

• National investment in R&D to ≥ 3% of GDP
• S&T in the stimulus/recovery package and the FY2009 / FY2010 budgets ($147.6 Billion)
  – NSF, NIH, DOE-science, NIST, NOAA, NASA, DoD basic research
• STEM education
  – science labs, teacher training, clean energy ($1.5B over 5 yr)
• Clean energy / climate
  – $150B over 10 yr for clean energy & efficiency; ARPA-E; energy centers of excellence; climate science
The President’s Initiatives (continued)

• Health
  – computerize medical records, $6B toward doubling cancer research
• CTO & CIO appointments
• New stem-cell guidelines
• Scientific integrity guidelines
Major Economies Forum on Energy and Climate

• Secretary Clinton:
  – Climate Change sits at the nexus of diplomacy, national security and development
    • Science is unambiguous
    • US fully engaged and ready to lead
    • Major economies have an obligation to work towards successful outcomes
    • New policies, new technologies are needed, and national action plans must enable these not only nationally, but also regionally and globally
National Goals

• Create millions of clean energy jobs

• Become a global leader in the clean energy industry

• Reduce dependence on foreign oil

• Combat climate change
  – Pass legislation that caps carbon pollution
  – Allow market forces to drive innovation and entrepreneurship in the clean energy sector
National Goals

• National Goal: Reduce carbon emissions by >80% by 2050
• Re-engage the international community
  – Fully engaged in the UNFCCC process
  – Major Economies Forum
  – Intensifying bi-lateral and regional dialogs
  – Share insights, costs, risks internationally by increasing international scientific, technical and innovative collaborations
  – Consultative stage before position development
• Fundamental belief in the returns on investment in STI.
The budget context for R&D

Outlays in billions of constant FY2009 dollars

- Net interest
- Other mandatory
- Medicaid
- Medicare
- Social Security
- Non-dod discretionary
- DOD discretionary
- Receipts

Other mandatory includes TARP and other fiscal stabilization costs. All years include effects of Recovery Act spending and tax cuts. Source: Budget of the United States Government FY 2010. FEB. '09 © 2009 OSTP
Climate Change Science Program

- FY2009 & 2010 Budgets: $4.46 Billion
  - Development of a Climate Services System
  - Research to inform Adaptation
    - Integrated Earth-system analysis
    - State of the Atmosphere record
    - End-to-end hydrologic projection and application
    - Carbon-cycle in high-latitudes
    - Aerosol forcing & feedback quantification
    - Role of Non-CO2 GHG, water vapor and clouds
    - Abrupt climate change
    - Climate change impact on ecological systems
    - Ecological forecasting
Climate Change Science Program

- Expect that CCSP scope, composition and responsibilities will be revisited and reauthorized by Congress
- All 21 of Synthesis and Assessment publications completed
- Unified Synthesis Product: *Global Climate Change Impacts in the United States*
  - Summarizes climate change science, current and future impacts, integrates those results from those around the world.
Total NSF Funding: President’s Plan for Science and Innovation
FY 2006-FY 2016 (dollars in billions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Funding (B)</th>
<th>% Over Previous FY</th>
<th>% Over FY 2006</th>
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<td>7%</td>
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Paleo Perspectives on Climate Change Program Objectives

• P2C2 projects may aim to produce paleoclimate data sets that can be used to test climate models

• P2C2 projects may synthesize this data and model outcomes to better understand the variability observed in the climate record

• P2C2 should provide insight into mechanisms and rates of change, into the sensitivity to changes in forcing, and the responses of the key Earth System components to these changes
Paleo Perspectives on Climate Change
Proposal Processing

- Proposal demand
  - ESH FY 2006: 87 projects, 147 proposals, $47 M req.
    - ATM: 27 projects, 40 proposals
    - EAR: 44 projects, 76 proposals
    - OCE: 23 projects, 32 proposals
    - OPP: 5 projects, 9 proposals
P2C2 Program Budgets

P2C2 Award Sizes & Durations
FY 2008 Average $151k/yr.
Average Duration 2.9 yrs.

P2C2 Budgets
ATM $3M
EAR $3M
OCE $3M
OPP $2M
Total $11 M

Success Rate
FY 2008 27%

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“Good” Proposals

- **Scientific Merit**
  - Well-posed questions (Breakout questions 3 & 5)
  - Hypothesis driven (commonly)
  - Methodology (science & education)
  - Appropriate resources (skills, time, equipment, budget)

- **Broader Impact**
  - Outreach (question 1)
  - Community building (question 2)
  - Publication and Data plans (question 4)
  - International linkages
International Cooperation

• NSF Proposals can include support for international components, but…
  – Program specific criteria may apply
  – Often must be only source
  – Often must be matched nationally

• TALK to the Program Officer
International Research Networks

• Asia-Pacific Network (APN)
  – http://www.apn-gcr.org
  – Linda Stevenson, lstevenson@apn-gcr.org

• Inter-American Institute for Global Change Research (IAI)
  – http://www.iai.int
  – Holm Tiessen, htiessen@dir.iai.int

• global change SysTem for Analysis, Research & Training (START)
  – http://www.start.org
  – Hassan Virji, hvirji@agu.org