

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE AND TECHNOLOGY**

**HEARING CHARTER**

*Averting the Storm: How Investments in Science Will Secure the Competitiveness  
and Economic Future of the U.S.*

**Wednesday, September 29, 2010  
10:00 a.m. – 12:00 p.m.  
2318 Rayburn House Office Building**

**1. Purpose**

On Wednesday, September 29, 2010, the Committee on Science and Technology will hold a hearing to receive testimony from distinguished members of the 2005 “Rising Above the Gathering Storm” Committee who participated in a recent review of the 2005 report and produced an updated report entitled, *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5*. Witnesses will comment on the findings included in the new report, and offer recommendations to the Committee and to Congress on how to maintain U.S. competitiveness and economic security for the long-term.

**2. Witnesses**

- **Mr. Norman R. Augustine**, retired Chairman and CEO of the Lockheed Martin Corporation and former Undersecretary of the Army
- **Dr. Craig Barrett**, retired Chairman and CEO of Intel Corporation
- **Mr. Charles Holliday, Jr.**, Chairman of the Board of Bank of America and retired Chairman of the Board and CEO of DuPont
- **Dr. C.D. (Dan) Mote, Jr.**, President Emeritus of the University of Maryland and Glenn L. Martin Institute Professor of Engineering

**3. Overarching Questions**

- Why is the promotion of science, technology and STEM education so critical to America’s prosperity? What are the principal challenges the United States faces in these areas as it competes in the global economy?
- What specific steps should the federal government take to ensure that the United States remains the world leader in innovation and job creation? What role can reauthorization of the *America COMPETES Act* play in securing U.S. competitiveness and economic security?

#### 4. Brief Overview

- In May 2005, at the request of Congress, the National Academy of Sciences (NAS) began a study of “the most urgent challenges the United States faces in maintaining leadership in key areas of science and technology.” NAS assembled a high-level panel of senior scientists and business and university leaders and produced a report entitled, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*.
- The NAS report offered four broad recommendations: (A) increase America’s talent pool by vastly improving K–12 science and mathematics education; (B) sustain and strengthen the nation’s traditional commitment to long-term basic research; (C) make the United States the most attractive setting in which to study and perform research; and (D) ensure that the United States is the premier place in the world to innovate. The NAS report also described 20 explicit steps that the federal government could take to implement its recommendations.
- In August 2007, in response to the recommendations in the *Gathering Storm* report, Congress enacted and the President signed the *America COMPETES Act*, an Act to invest in innovation through research and development, and to improve the competitiveness of the United States. The COMPETES conference report received overwhelming bipartisan support in both chambers of Congress, with a vote of 367 to 57 in the House, and by unanimous consent in the Senate.
- The 2007 COMPETES Act implemented the majority of the *Gathering Storm* recommendations that fell within the jurisdiction of the Science and Technology Committee and the Education and Labor Committee, and their respective counterparts in the Senate. Specifically, COMPETES placed the National Science Foundation (NSF), the National Institute of Standards and Technology’s (NIST) research labs, and the Department of Energy’s (DOE) Office of Science on a 7-year doubling path. In addition, the Act created ARPA-E at DOE, and addressed many specific policies to strengthen the research programs across all three of the agencies. Finally, the Act authorized a number of programs to strengthen K-12 STEM education, in particular by ensuring that current and future teachers are well prepared to teach STEM subjects. The COMPETES Act expires at the end of this month.
- It took two years to realize appropriations for the COMPETES Act. Most of this funding was provided through the American Recovery and Reinvestment Act (ARRA), a one-time, two-year infusion of funding into science and technology that helped research agencies provide support for a long backlog of world class R&D facilities and top-rated research proposals. The current budget and economic environment has challenged Administration, Congressional and stakeholder efforts to ensure sustainable increases in funding for agencies and programs authorized in COMPETES.
- In May 2010, the House passed a 5-year reauthorization of the *America COMPETES Act*, by a bipartisan vote of 262-150. The House bill reauthorized all of the programs in the 2007 Act that had been funded, repealed most programs that had never been funded, and in response to various reports since *Gathering Storm*, created a few new programs focused

primarily on innovation. The Senate Committee on Commerce, Science and Transportation reported out its own reauthorization bill in July. The Senate Energy and Natural Resources released a draft of its piece of the reauthorization last week. To date, the Senate has not taken any further action on COMPETES reauthorization.

- The *Rising Above the Gathering Storm, Revisited* report<sup>1</sup> opens as follows: “In the five years that have passed since *Rising Above the Gathering Storm* was issued, much has changed in our nation and world. Despite the many positive responses to the initial report, including congressional hearings and legislative proposals, America’s competitive position in the world now faces even greater challenges, exacerbated by the economic turmoil of the last few years and by the rapid and persistent worldwide advance of education, knowledge, innovation, investment, and industrial infrastructure. Indeed the governments of many other countries in Europe and Asia have themselves acknowledged and aggressively pursued many of the key recommendations of *Rising Above the Gathering Storm*, often more vigorously than has the U.S. We also sense that in the face of so many other daunting near-term challenges, U.S. government and industry are letting the crucial strategic issues of U.S. competitiveness slip below the surface.”
- The report goes further to state, “Although significant progress has been made as a result of the above legislation<sup>2</sup>, the Gathering Storm effort once again finds itself at a tipping point. It is widely agreed that addressing America’s competitiveness challenge is an undertaking that will require many years if not decades; however, the requisite federal funding of much of that effort is about to terminate. In order to sustain the progress that has begun it will be necessary to (1) reauthorize the *America COMPETES Act*, and (2) “institutionalize” funding and oversight of the *Gathering Storm* recommendations – or others that accomplish the same purpose – such that funding and policy changes will routinely be considered in future years’ legislative processes.

## 5. Indicators of U.S. Competitiveness

The 2010 “Gathering Storm” Committee assembled 64 factoids in support of their finding that the “nation’s outlook has worsened” since 2005. A few of them are listed here. Citations for these data, in addition to a fuller analysis of the current state of U.S. competitiveness, can be found in the *Gathering Storm, Revisited* report.

- In 2009, 51 percent of United States patents were awarded to non-United States companies.
- In less than 15 years, China has moved from 14th place to second place in published research articles (behind the United States).
- GE has now located the majority of its R&D personnel outside the United States.

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<sup>1</sup> [http://www.nap.edu/catalog.php?record\\_id=12999](http://www.nap.edu/catalog.php?record_id=12999)

<sup>2</sup> America COMPETES Act and the American Recovery and Reinvestment Act

- In the 2009 rankings of the Information Technology and Innovation Foundation the U.S. was in sixth place in global innovation-based competitiveness, but ranked 40th in the rate of change over the past decade.
- The World Economic Forum ranks the United States 48th in quality of mathematics and science education.
- Ninety-three percent of United States public school students in fifth through eighth grade are taught the physical sciences by a teacher without a degree or certificate in the physical sciences.
- According to the 2008 ACT College Readiness report, 78 percent of high school graduates did not meet the readiness benchmark levels for one or more entry-level college courses in mathematics, science, reading and English.
- The United States graduates more visual arts and performing arts majors than engineers.
- Almost one-third of U.S. manufacturing companies responding to a recent survey say they are suffering from some level of skills shortages.

## **6. Summary of 2005 *Gathering Storm* report recommendations**

The 2005 NAS report made four recommendations, each of which was supported by explicit steps that the federal government could take to implement the recommendations. These recommendations and steps are provided verbatim below.

### 10,000 Teachers, 10 Million Minds and K–12 Science and Mathematics Education

Recommendation A: Increase America’s talent pool by vastly improving K–12 science and mathematics education.

#### Implementation Steps:

- A-1: Annually recruit 10,000 science and mathematics teachers by awarding four-year scholarships and thereby educating 10 million minds.
- A-2: Strengthen the skills of 250,000 teachers through training and education programs at summer institutes, in master’s programs, and Advanced Placement and International Baccalaureate (AP and IB) training programs and thus inspire students every day.
- A-3: Enlarge the pipeline by increasing the number of students who take AP and IB science and mathematics courses.

### Sowing the Seeds through Science and Engineering Research

Recommendation B: Sustain and strengthen the nation's traditional commitment to long-term basic research that has the potential to be transformational to maintain the flow of new ideas that fuel the economy, provide security, and enhance the quality of life.

#### Implementation Steps:

- B-1: Increase the federal investment in long-term basic research by 10 percent a year over the next seven years.
- B-2: Provide new research grants of \$500,000 each annually, payable over five years, to 200 of our most outstanding early-career researchers.
- B-3: Institute a National Coordination Office for Research Infrastructure to manage a centralized research infrastructure fund of \$500 million per year over the next five years.
- B-4: Allocate at least eight percent of the budgets of federal research agencies to discretionary funding.
- B-5: Create in the Department of Energy an organization like the Defense Advanced Research Projects Agency called the Advanced Research Projects Agency-Energy (ARPA-E).
- B-6: Institute a Presidential Innovation Award to stimulate scientific and engineering advances in the national interest.

### Best and Brightest in Science and Engineering Higher Education

Recommendation C: Make the United States the most attractive setting in which to study and perform research so that we can develop, recruit, and retain the best and brightest students, scientists, and engineers from within the United States and throughout the world.

#### Implementation Steps:

- C-1: Increase the number and proportion of U.S. citizens who earn physical-sciences, life-sciences, engineering, and mathematics bachelor's degrees by providing 25,000 new four-year competitive undergraduate scholarships each year to U.S. citizens attending U.S. institutions.
- C-2: Increase the number of U.S. citizens pursuing graduate study in "areas of national need" by funding 5,000 new graduate fellowships each year.
- C-3: Provide a federal tax credit to encourage employers to make continuing education available (either internally or through colleges and universities) to practicing scientists and engineers.

- C-4: Continue to improve visa processing for international students and scholars.
- C-5: Provide a one-year automatic visa extension to international students who receive doctorates or the equivalent in science, technology, engineering, mathematics, or other fields of national need at qualified U.S. institutions to remain in the United States to seek employment. If these students are offered jobs by U.S.-based employers and pass a security screening test, they should be provided automatic work permits and expedited residence status.
- C-6: Institute a new skills-based, preferential immigration option.
- C-7: Reform the current system of “deemed exports.”

#### Incentives for Innovation and the Investment Environment

Recommendation D: Ensure that the United States is the premier place in the world to innovate; invest in downstream activities such as manufacturing and marketing; and create high-paying jobs that are based on innovation by modernizing the patent system, realigning tax policies to encourage innovation, and ensuring affordable broadband access.

#### Implementation Steps:

- D-1: Enhance intellectual property protection for the 21<sup>st</sup> century global economy.
- D-2: Enact a stronger research and development tax credit to encourage private investment in innovation.
- D-3: Provide tax incentives for U.S.-based innovation.
- D-4: Ensure ubiquitous broadband Internet access.