

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
SUBCOMMITTEES ON RESEARCH AND TECHNOLOGY**

*Federal Efforts to Reduce the Impacts of Windstorms*

**Wednesday, June 5, 2013  
10:00am-12:00pm  
2318 Rayburn House Office Building**

**Purpose**

On Wednesday, June 5, 2013, the Subcommittees on Research and Technology will examine the current role of research and development in mitigating the damaging effects of windstorms across the Nation and the methods of transferring the results of research into practice for stakeholders including building code developers, builders, and property owners. The hearing will review the activities of the National Windstorm Impact Reduction Program (NWIRP), a multi-agency program between the National Institute of Standards and Technology (NIST), the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA), and the National Science Foundation (NSF). The hearing will also review a bill to re-authorize this program--H.R. 1786, The National Windstorm Impact Reduction Act Reauthorization of 2013, sponsored by Rep. Randy Neugebauer.

**Witnesses**

- **Dr. Ernst Kiesling**, Research Faculty, National Wind Institute, Texas Tech University
- **Ms. Debra Ballen**, General Counsel and Senior Vice President, Public Policy, Insurance Institute for Business & Home Safety
- **Dr. David Prevatt**, Assistant Professor, Department of Civil and Coastal Engineering, University of Florida

**Background**

Wind hazards—which include tornados, hurricanes, and derechos—are threats to all fifty states and cause injuries, deaths, economic disruptions, and property damage. In a statistical summary for 2012 released last month, the National Weather Service (part of NOAA) reported that 641 Americans die annually (10-year average) from weather-related injuries with wind hazards representing, by far, the largest cause.<sup>1</sup> Hurricanes also dominate property estimates.<sup>2</sup> Although the number of wind hazard-related deaths has decreased, the costs of these disasters continue to rise.<sup>3</sup> In 2005, the National Science and Technology Council found that, “[d]ue to changes in population demographics and more complex weather-sensitive infrastructure, Americans today are more vulnerable than ever to severe weather events.”<sup>4</sup>

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<sup>1</sup> National Weather Service, “Summary of Natural Hazard Statistics for 2012 in the United States,” (May 2013) <http://www.nws.noaa.gov/om/hazstats/sum12.pdf>

<sup>2</sup> *Id.*

<sup>3</sup> National Science and Technology Council, Committee on Environment and Natural Resources, Subcommittee on Disaster Reduction, “Grand Challenges for Disaster Reduction” (June 2005), pg. 1, *available at* <http://www.sdr.gov/docs/GrandChallengesSecondPrinting.pdf>

<sup>4</sup> *Id.* at 4.

## **The National Windstorm Impact Reduction Program (NWIRP)**

The NWIRP was originally established in 2004 by the National Windstorm Impact Reduction Act of 2004 (P.L. 108-360), authored by Rep. Randy Neugebauer. NWIRP's objective is to achieve measurable reductions in losses of life and property from windstorms through coordinated Federal multi-agency research efforts, in cooperation with other levels of government, academia, and the private sector. It emphasized the improved understanding of windstorms and their impact, and the development and implementation of cost-effective mitigation measures to reduce those impacts while promoting community resilience.<sup>5</sup>

The program authorized the National Institute of Standards and Technology (NIST), the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA), and the National Science Foundation (NSF) to support activities that improve the understanding of windstorms and their impacts. The program was authorized for three years—through FY 2008.

NIST's role in NWIRP is to support research and development to improve building codes, standards, and practices for buildings, structures, and lifelines. To fulfill this role, NIST has engaged in the development of: software and procedures to facilitate the use of automated wind impact sensors on buildings; computational tools for determining realistic wind loads on buildings; and methodologies for predicting ultimate structural capacities.

FEMA's role in NWIRP is to support the development of risk assessment tools and effective mitigation techniques; data collection and analysis after windstorm events; and outreach to facilitate mitigation measures. Activities identified by FEMA that meet these goals include: update and development of HAZUS, a modeling tool for communities to estimate damage, economic loss, and social impacts of storms; Mitigation Assessment Team (MAT) studies of building performance after major storms; construction guidance for building in vulnerable coastal areas and storm shelters; and cooperation with NOAA to improve evacuation planning for hurricanes.

NOAA's role in NWIRP is to support atmospheric sciences research to improve the understanding of windstorms and their impacts. Aligned with NWIRP's goals, NOAA performs education and outreach related to hazards through Sea Grant institutions and other means; supports research and operations at the National Weather Center for improved prediction and monitoring of severe storms and hazardous winds; gathers field data on hurricane dynamics; develops probes and other monitoring equipment for data collection in extreme weather; develops decision support tools that map wind-speeds; provides information and planning assistance to increase community storm resiliency; and participates on the U.S.-Japan Panel on Wind and Seismic Effects.

NSF's role in NWIRP is to support basic research on engineering and the atmospheric sciences to improve the understanding of windstorms and their impacts on the built environment

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<sup>5</sup> National Science and Technology Council, "Windstorm Impact Reduction Implementation Plan" (2006), pg. 3, available at [http://www.whitehouse.gov/sites/default/files/microsites/ostp/windstorm\\_impact\\_reduction\\_implementation\\_plan\\_final.pdf](http://www.whitehouse.gov/sites/default/files/microsites/ostp/windstorm_impact_reduction_implementation_plan_final.pdf)

and lifelines. To that end, NSF has funded research in the atmospheric dynamics that form storms and hazardous winds; document and preserve engineering data on buildings following wind hazard events; and perform social science research about how people respond to wind hazard warnings to gain a better understanding of evacuations.

H.R. 1786, introduced by Rep Neugebauer (R-TX) in the 113th Congress, re-authorizes the NWIRP program; assigns responsibilities to the agencies that make up the program; requires a strategic plan; sunsets the NWIRP advisory committee at the end of the authorization period; authorizes funding for the programs through FY 2016; and transfers the leadership of the NWIRP program from the Office of Science and Technology Policy (OSTP) to NIST.

## **Issues of Concern**

The costs associated with windstorms are increasing, but limited Federal research funding is focused on understanding windstorms and their impacts and developing mitigation measures. OSTP's 2006 NWIRP Implementation Plan strongly recommended a coordinated effort for research and development to reduce hazards from windstorms. The limited research that NSF, NIST, NOAA, and FEMA have supported in wind hazards requires a greater level of coordination.

Long-term research on hazard reduction may achieve a reduction in the massive economic losses from windstorms; however, researchers in the wind engineering community point to a consistent lack of funding as a cause in the decline in the number of graduate students and professors in the wind engineering profession and as a hindrance to advancing knowledge that would have useful applications in reducing losses from windstorms.<sup>6</sup>

Research and development on improving the resilience of structures to windstorms may be available, but model building codes are not always adopted by states. For example, in 2012, the Insurance Institute for Business & Home Safety (IBHS) analyzed the residential building codes in 18 hurricane-prone coastal states along the Gulf of Mexico and the Atlantic Coast and found that while some states have implemented well-developed systems for all aspects of code adoption and enforcement, others have virtually no regulatory process in place for building codes.<sup>7</sup>

## **Summary**

The hearing will examine ways to improve the existing federal wind research and development portfolio, advance an understanding of the gaps in wind research and development, and explore how to reduce the loss of life and economic losses the United States currently experiences from windstorms.

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<sup>6</sup> See RAND, "Assessing Federal Research and Development for Hazard Loss Reduction" (2003), *available at* [http://www.prgs.edu/content/dam/rand/pubs/monograph\\_reports/2005/MR1734.pdf](http://www.prgs.edu/content/dam/rand/pubs/monograph_reports/2005/MR1734.pdf).

<sup>7</sup> See Insurance Institute for Business and Home Safety, "Rating the States" (2011), *available at* [http://www.disastersafety.org/building\\_codes/rating-the-states\\_ibhs/](http://www.disastersafety.org/building_codes/rating-the-states_ibhs/).