# National Science and Technology Council Infrastructure Subcommittee (NSTC ISC)

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# NSTC ISC Overview

***The Infrastructure Subcommittee (ISC) of the NSTC*** has responsibility to develop and disseminate a national research and development agenda for the protection and resilience of national critical infrastructure and key assets (CIKR). The ISC focus includes current and emerging infrastructure development, protection, and resiliency, leadership in guiding the renewal of aging infrastructures and key assets, and advancing security, energy conservation and sustainable infrastructure goals. The ISC provides a forum within NSTC to develop consensus and resolve issues associated with coordinating research and development agendas, policy, and programs related to resilience against all-hazards, natural or man-made.

**18 Critical Infrastructure Systems/Sectors**

| | |
|---|---|
| **Agriculture and Food**<br>Department of Agriculture<br>Department of Health and Human Services | **Government Facilities**<br>Department of Homeland Security<br>Department of Education |
| **Banking and Finance**<br>Department of the Treasury | **Chemical**<br>Department of Homeland Security |
| **Commercial Facilities**<br>Department of Homeland Security | **Defense Industrial Base**<br>Department of Defense |
| **Dams**<br>Department of Homeland Security | **Emergency Services**<br>Department of Homeland Security |
| **Water**<br>Environmental Protection Agency | **Nuclear Reactors, Materials and Waste**<br>Department of Homeland Security |
| **Energy**<br>Department of Energy | **National Monuments and Icons**<br>Department of the Interior |
| **Information Technology**<br>Department of Homeland Security | **Healthcare and Public Health**<br>Department of Health and Human Services |
| **Postal and Shipping**<br>Department of Homeland Security | **Transportation Systems**<br>Department of Homeland Security |
| **Communications**<br>Department of Homeland Security | **Critical Manufacturing**<br>Department of Homeland Security |

**Assigned Sector Specific Agency Members**

# NSTC ISC Constitution

## Co-Chairs

- OSTP Tamara Dickenson
- DHS  Mary Ellen Hynes

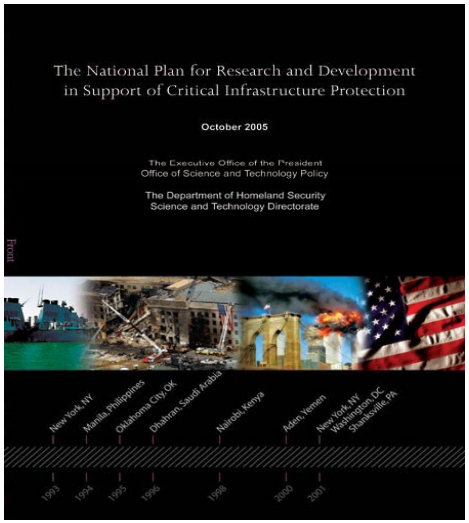
## Committee Member Organizations

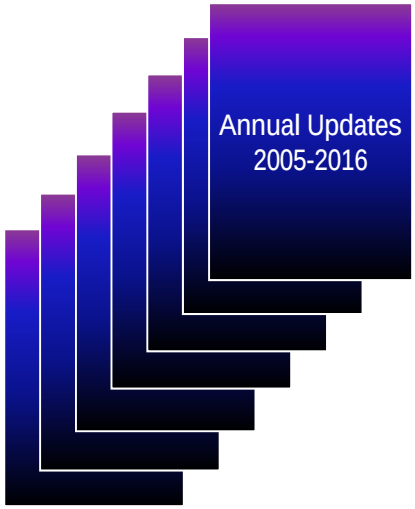
Department of Transportation (DOT), National Science Foundation (NSF), National Security Council (NSC), Environmental Protection Agency (EPA), Department of Defense (DOD), Department of Commerce (DOC - NIST), Department of the Interior (DOI – USGS), Department of Homeland Security (DHS), Department of Energy (DOE), Department of Agriculture (USDA), Department of Health and Human Services (HHS), Department of Justice (DOJ), Department of State (DOS), Department of Treasury (Treasury), Department of Housing and Urban Development (HUD), Department of Veterans Affairs (VA), National Aeronautics and Space Administration (NASA), Department of Labor Occupational Safety and Health Administration (OSHA), Office of the Director of National Intelligence (ODNI), National Economic Council (NEC), Office of Management and Budget (OMB),General Services Administration (GSA)

# National Critical Infrastructure Protection and Resilience (NCIPR) Research & Development (R&D) Plan Overview

## Overview

- HSPD-7 mandates DHS, in cooperation with OSTP, prepare an annual R&D Plan supporting implementation of the National Infrastructure Protection Plan (NIPP)
- Through the NSTC-ISC and the NIPP, interagency R&D investments are coordinated, emerging threats and technologies identified, and an annual plan is prepared
- Delivered to the Executive Office of the President through the NSTC-CHNS following member agency approval
- 2010 Plan and future plans integrate infrastructure resiliency and high performance design with security and protection requirements with an all-hazard perspective




## Objectives & Deliverables

- Annual National Plan following consensus approval across agencies performing or needing CIP related R&D identifying and coordinating long range research goals and priorities
- Annual database of CIKR-related federal R&D programs
- Interagency coordination mechanism examining relevant current and emerging threats and technologies changing infrastructure protection (IP) and resilience R&D direction
- Use by R&D providers, decision makers, and industry providers to guide investments in technologies supporting longer-term infrastructure protection and resiliency needs
- Use by the White House and Congressional bodies to advise R&D budget priorities

## Unique Aspects

- Only report looking at physical and cyber structure R&D in an integrated manner developing national consensus on maturity in over 60 R&D focus areas
- Looks to emerging and strategic research better positioning the nation to anticipate current and future infrastructure protection and resilience demands
- Ensures a coordinated R&D program yielding the greatest value across a broad range of interests and requirements
- Provides for the revision of research goals and priorities responding to changes in threats, technology, environment, business continuity, and other factors

# 2010 NCIPR R&D Plan Specifics Why/Hazards

**"2010 Among the Six Most Loss-Intensive Years since 1980"**

Globally, a total of 950 natural catastrophes were recorded in 2010, nine-tenths of which were weather-related events like storms and floods. This total makes 2010 the year with the second-highest number of natural catastrophes since 1980, markedly exceeding the annual average for the last ten years (785 events per year). The overall losses amounted to around US$ 130bn, of which approximately US$ 37bn was insured. This puts 2010 among the six most loss-intensive years for the insurance industry since 1980.

Munich Reinsurance Company, February 3, 2011

http://www.preventionweb.net/english/professional/news/v.php?id=17793

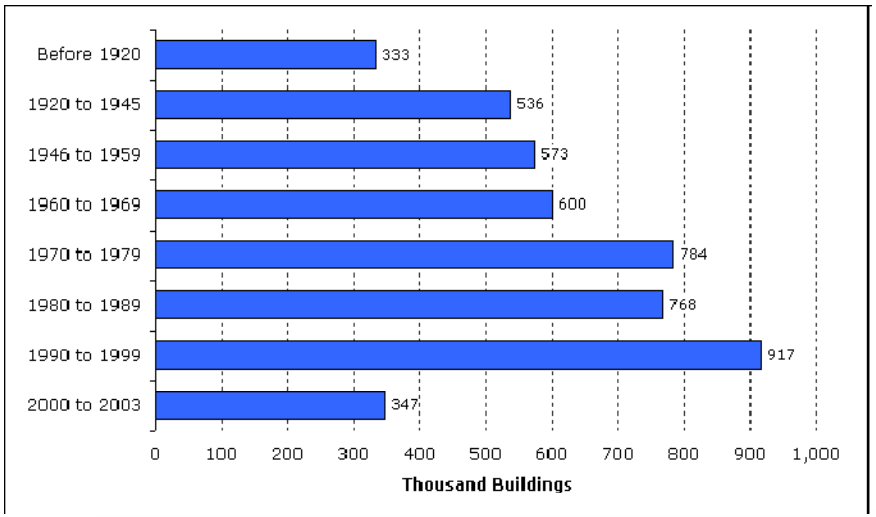
**Sector Impacts of Volcanic Ash Plumes and Fallout**

Of the 169 active volcanoes in the U.S. and its territories, 54 are considered a high or very high threat to public safety. The May 1980 eruption of Mount St. Helens was the most disruptive in U.S. history resulting in the loss of over $1bn in damages much from volcanic ash which can interfere with telecommunication, transportation, water, sewer, and power systems. The economic impacts of volcanoes can be extensive especially to the air transport industry which accounts for 0.7% of the world GDP and 35% of world trade by value. The 2010 eruption of Eyjafjallajokull is estimated to have caused a loss 1.7bn Euro to the aviation industry and a similar amount to the tourist industry. Advancements are needed in all aspects of the modeling, measurements, and forecasting of volcanic ash concentrations to reduce future impacts.

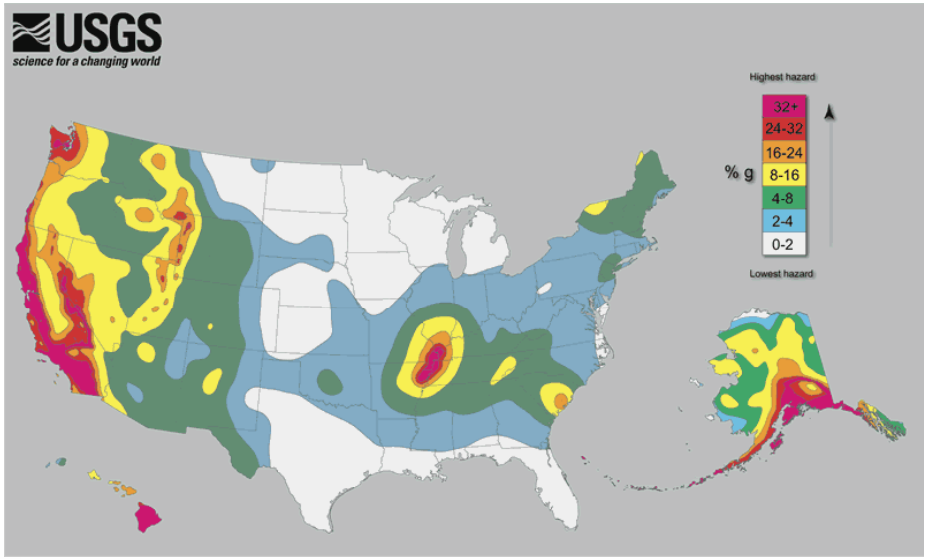
See http://volcanoes.usgs.gov/about/faq/faqmonitoring.php and http://en.keilir.net/static/files/Aviation/PDF/Summary_Keilir_Aviaition%20Conference.pdf

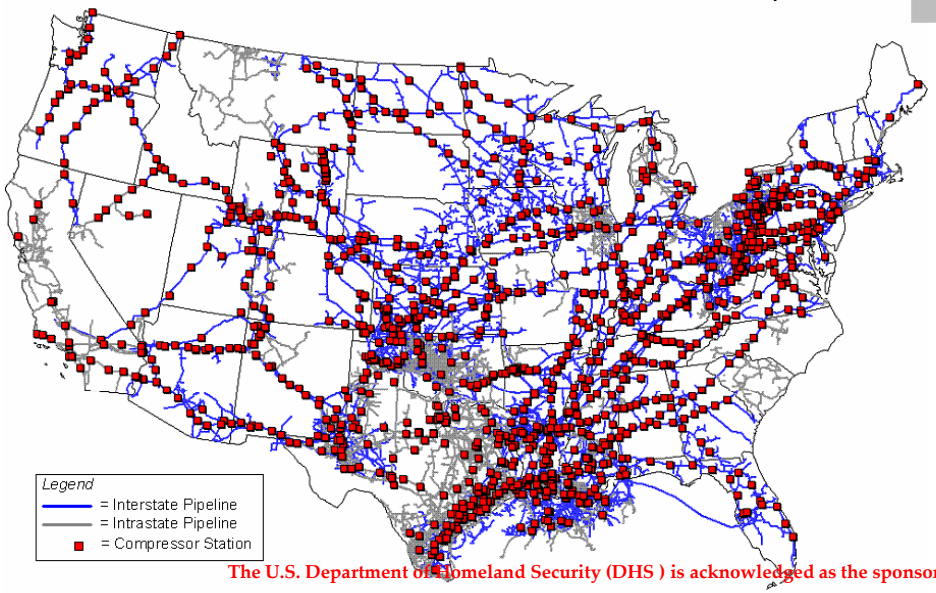
# 2010 NCIPR R&D Plan Specifics Why/Hazards

73 percent of all buildings in use today constructed before 1990



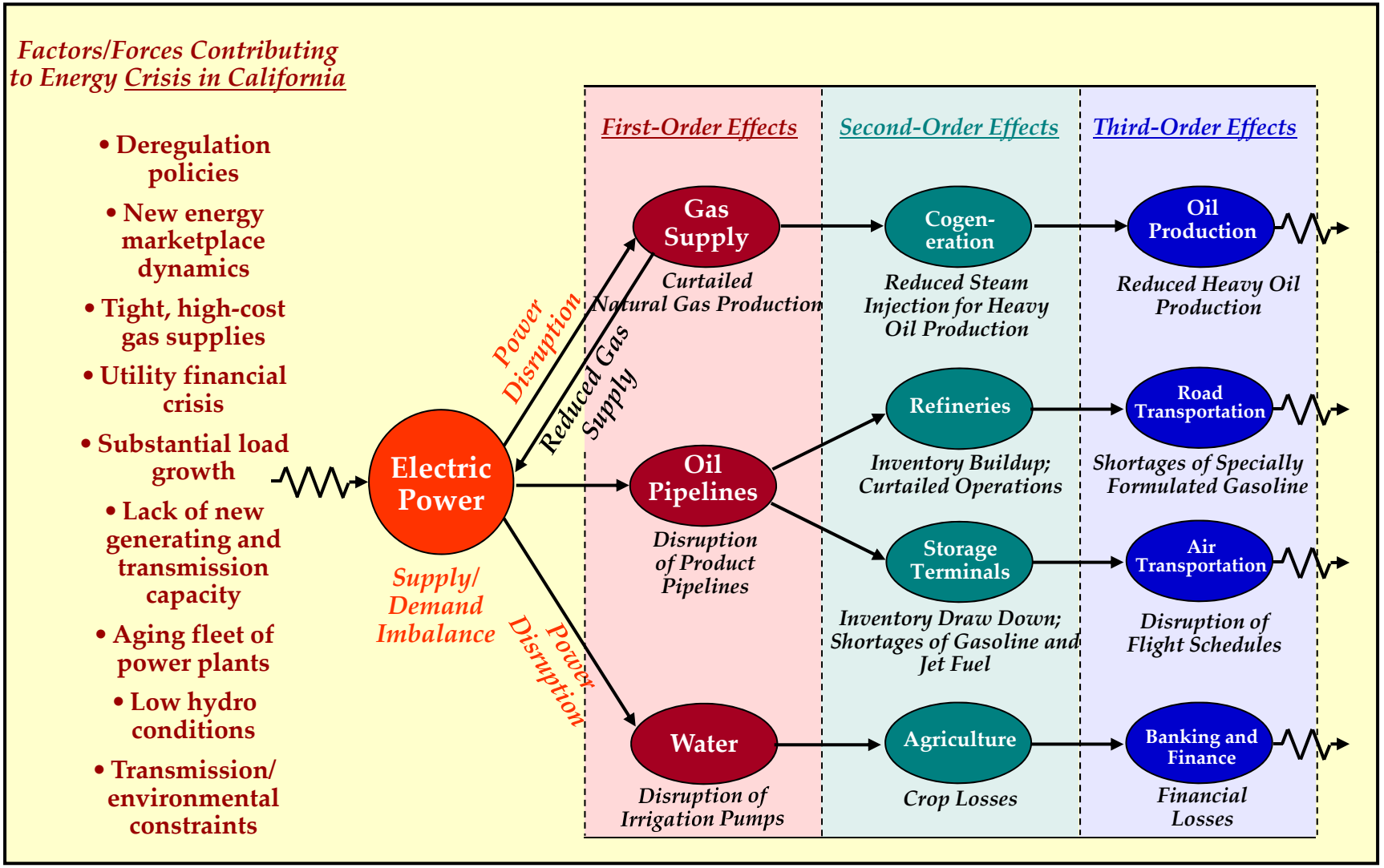

Seismic Hazard Map



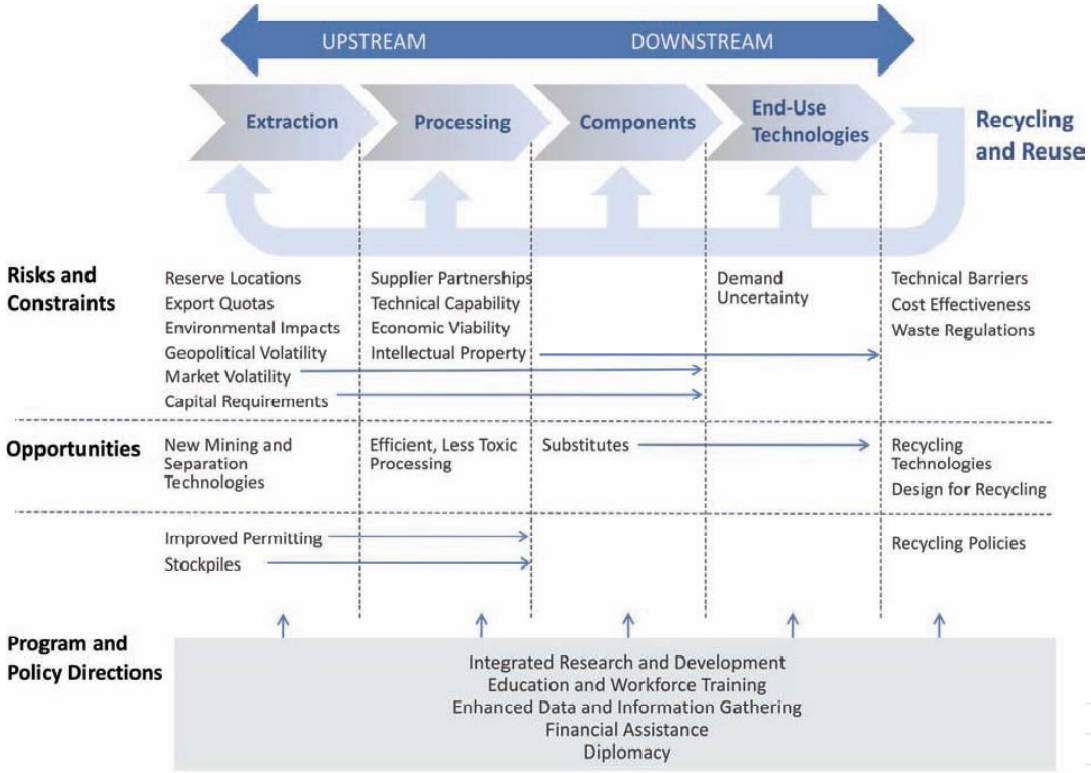




U.S. Natural Gas Pipeline Compressor Stations Illustration, 2008

# Cascading Consequences

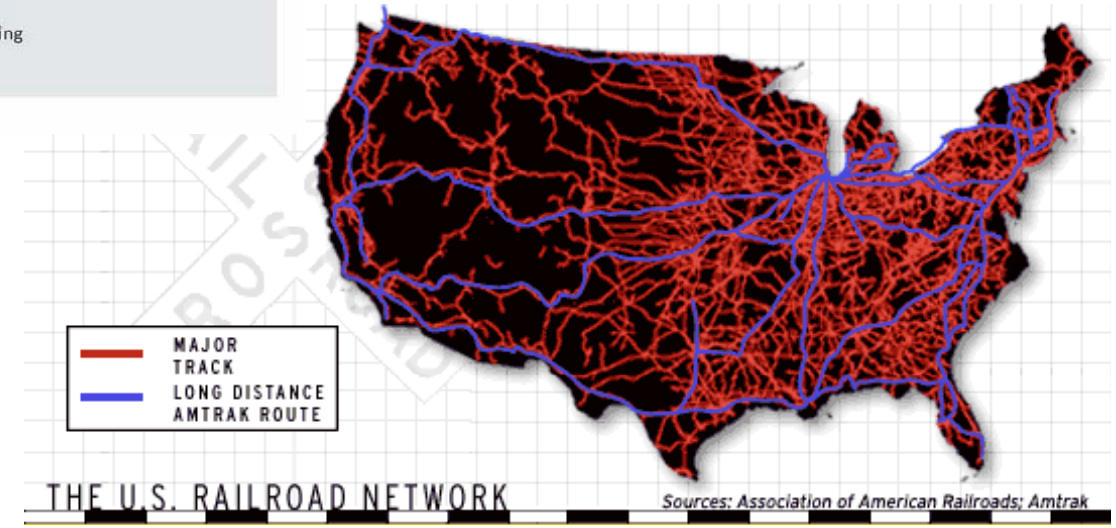


# 2010 NCIPR R&D Plan Specifics Why/Hazards




Program and Policy Directions and the Critical Material Supply Chain

Major Rail Lines in the U.S.



# 2010 NCIPR R&D Plan Specifics

## New 2010 Plan Framework

- Integrates infrastructure resiliency and high-performance design with security and protection requirements
- Highlights R&D investments and strategies to help secure and fortify infrastructure and key resources from natural, technological, and manmade hazards (all-hazard perspective)
- Strives to accelerate private and public sector adoption and investment in CIKR security and resiliency
- Necessitates a change in the composition of representatives serving on the ISC

## Plan Goals/Focus

- Address common requirements across all eighteen sectors for CIKR assets focusing on enhanced protection, guiding renewal of aging assets, promoting integrated designs
- Responds to goals identified in the National Security Strategy and priorities of a board range stakeholders and interest groups
- Articulate and join common needs and efforts resulting in increased efficiency and effectiveness, cooperation, and faster results at reduced costs
- Focus on Physical, Human, Business/Regulatory components contributing to CIKR protection and resiliency including the interdependencies

# 2010 NCIPR R&D Plan Specifics

## Strategic Goals

- National common operating picture (COOP) for critical infrastructure
- Next-generation computing and communications network with security "designed-in" and inherent in all elements
- Resilient next-generation physical and cyber infrastructure systems

**Definition of Resiliency**

Infrastructure resilience is the ability to reduce the magnitude and/or duration of disruptive events. The effectiveness of a resilient infrastructure or enterprise depends upon its ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event.

*Critical Infrastructure Resilience - Final Report and Recommendations*
National Infrastructure Advisory Council, September 8, 2009

## Objectives

- Identify innovative technologies and strategies enhancing CIKR protection and resilience
- Identify business or financial vehicles that promote continuity of operations and resiliency assessments and metrics
- Increase human and social behavior emphasis
- Support local and state regulatory, code, zoning, and planning
- Address interdependencies of infrastructures, people, and communities

- High Performance Infrastructure Emphasized
  - Integrate and optimize on a life cycle basis major high performance attributes
    - Energy conservation
    - Environment
    - Safety
    - Security (Superior Protection and Resiliency)
    - Durability
    - Cost benefit
    - Productivity
    - Sustainability
    - Functionality
    - Operations

**New Integrated Design Tools and Criteria**

The full range of current integrated design approaches should be extended to infrastructure systems and include relevant superior protection and resiliency attributes. This extension will require development of the supporting tools, data, and criteria that will characterize protection and resiliency attributes appropriate to the infrastructure and their interdependencies.

*Designing for a Resilient America*, Stakeholder Summit on High Performance Resilient Buildings and Related Infrastructure, Nov. 30 - Dec. 1, 2010

# 2010 NCIPR R&D Plan Specifics

- Priority Areas
  - Physical Structures
  - Production and Distribution Networks
  - Financial, Information, and Communication Networks
  - Advanced Materials
  - Human Factors and Behaviors
  - Rapid Response and Recovery

> "Homeland security, particularly in the context of critical infrastructure and key asset protection, is a shared responsibility that cannot be accomplished by the Federal Government alone. It requires coordinated action on the part of Federal, state, and local governments; the private sector; and concerned citizens across the country."
>
> National Strategy for the Physical Protection of Critical Infrastructures and Key Assets, February 2003

- Ending Thoughts
  - Federal agencies, national and federal laboratories, universities, and other private and public sector research groups, CIKR owners and operators, standards organizations, professional societies, non-profit organizations and others will need to work together to implement the areas identified in the NCIPR R&D Plan.
  - A broad range of new tools, guides, criteria, and methodologies are needed
  - Codes and standards that include resiliency requirements will be developed, workforce capacity will expand, and broad acceptance will be gained by educating those involved, incentivizing application, inspection, and regulation of these approaches