

Fact Sheet

PROGRESS REVIEW ON THE COORDINATED IMPLEMENTATION OF THE NATIONAL NANOTECHNOLOGY INITIATIVE (NNI) 2011 ENVIRONMENTAL, HEALTH, AND SAFETY RESEARCH STRATEGY

- 1. What is the “Progress Review on the Coordinated Implementation of the National Nanotechnology Initiative 2011 Environmental, Health, and Safety Research Strategy” (the “Progress Review”, in short)?** The Progress Review is intended to provide an overview of progress on the coordinated implementation of the 2011 NNI Environmental, Health, and Safety (EHS) Research Strategy that was developed by the Nanoscale Science, Engineering, and Technology Subcommittee’s Nanotechnology Environmental and Health Implications (NEHI) Working Group. The participating agencies reported to the NEHI Working Group examples of ongoing, completed, and anticipated EHS research (from FY 2009 through FY 2012) relevant to implementation of the 2011 NNI EHS Research Strategy.

A copy the Progress Review is available at: <http://nano.gov/2014EHSPROGRESSREVIEW>

- 2. What is the 2011 NNI EHS Research Strategy?** The 2011 NNI EHS Research Strategy provides guidance to the Federal agencies that produce the scientific information for risk management, regulatory decision-making, product use, research planning, and public outreach. The core research areas providing this critical information are (1) Nanomaterial Measurement Infrastructure, (2) Human Exposure Assessment, (3) Human Health, (4) Environment, (5) Risk Assessment and Risk Management Methods, and (6) Informatics and Modeling. Consideration of ethical, legal, and societal implications (ELSI) of nanotechnology was also woven into the strategy. The 2011 NNI EHS Research Strategy describes the NNI’s EHS vision and mission, the state of the science, and the research needed to achieve the vision.

A copy the 2011 NNI EHS Research Strategy is available at: <http://www.nano.gov/node/681>

- 3. What is the Nanotechnology Environmental and Health Implications (NEHI) Working Group?** NEHI is a working group of the Nanoscale Science, Engineering, and Technology (NSET) Subcommittee of the National Science and Technology Council’s Committee on Technology. The NSET is the interagency body responsible for coordinating the NNI, the U.S. Federal Government’s interagency activity for coordinating research and development as well as enhancing communication and collaborative activities in nanoscale science, engineering, and technology. The NSET Subcommittee established the working group and charged NEHI with supporting Federal activities to protect public health and the environment by:

- Providing for information exchange among Federal agencies that support nanotechnology research and Federal agencies responsible for regulation and guidelines related to nanomaterials and products containing nanomaterials;

- Facilitating the identification, prioritization, and implementation of research and other activities required for the responsible research necessary to develop, use, and oversee nanotechnology;
- Promoting communication of information related to research on environmental, health, and safety implications of nanotechnology;
- Adaptively managing (i.e., coordinating, reviewing, and revising) the interagency EHS research strategy (EHS Strategy Document);
- Assisting in developing information and strategies as a basis for drafting guidance in the safe handling and use of nanomaterials and products;
- With input from the NSET Subcommittee and other interagency groups, supporting the development of tools and methods to identify, prioritize, and manage strategies for specific research to enable risk analysis and regulatory decision-making for nanomaterials and products incorporating nanomaterials;
- Supporting the development of nanotechnology standards, including nomenclature and terminology, by consensus-based nanotechnology standards; and
- Working with international organizations and governments to share information on and to develop strategies for nanotechnology EHS research.

More information on NEHI can be found at: <http://www.nano.gov/nehf>.

- 4. Why does the U.S. Government invest in nanotechnology EHS research?** Some of the unique properties that make nanomaterials promising for new applications also pose potential risks to human health and the environment. To maximize the benefits and minimize the potential risks of nanotechnology, the NNI agencies invest in nanotechnology EHS research. The 2011 NNI EHS Research Strategy was developed to serve as guidance to NNI agencies that produce and use scientific information to develop nanotechnology risk assessments that inform risk management and regulatory decisions.

Additional EHS research-related goals and objectives can be found in the 2014 National Nanotechnology Initiative Strategic Plan, available at <http://nano.gov/2014StrategicPlan>.

- 5. How much does the U.S. Government spend on nanotechnology EHS research?** The NNI Supplement to the President's FY 2015 Budget reports \$113.3 million of estimated agency investments in EHS research for fiscal year (FY) 2014, with a proposed investment of \$112.4 million for FY 2015. Sustained EHS research investments reflect the continued high priority NNI agencies place on this research area. EHS investments have risen from under 3% of the total NNI investment in 2005 to over 7% in the 2015 budget request. Cumulative EHS investments from 2005 through 2015 have now reached over \$900 million.

More information on the budget can be found at: <http://www.nano.gov/2015BudgetSupplement>.

- 6. Why was the Progress Review developed?** The NSET Subcommittee and NEHI Working Group continue to periodically review the status of nanotechnology EHS science, progress towards achieving

the goals of the 2011 NNI EHS Research Strategy, and stakeholder concerns. This document provides examples of EHS research relevant to implementation of the 2011 NNI EHS Research Strategy. This adaptive management approach facilitates the assessment of the state of science and current research, as well as the development of joint projects and programs.

- 7. How was the Progress Review developed?** Agencies participating in the NEHI Working Group reported examples of ongoing, completed, and anticipated EHS research from FY 2009 to FY 2012 that are relevant to implementation of the 2011 NNI EHS Research Strategy. These examples were matched to the 2011 NNI EHS Research Strategy's six core research areas and corresponding research needs, with specific activities and outcomes documented with citations when available.
- 8. How is the Progress Review document structured?** The Progress Review provides examples of significant research activities in nanotechnology EHS research, as identified by NEHI agencies. These examples of current, ongoing, and anticipated activities are organized by the 2011 NNI EHS Research Strategy's six core research areas and corresponding research needs in the document:
- Nanomaterial Measurement Infrastructure
 - Human Exposure Assessment
 - Human Health
 - Environment
 - Risk Assessment and Risk Management Methods
 - Informatics and Modeling

The section on "Implementation and Coordination of the 2011 NNI EHS Research Strategy" describes the NEHI Working Group's efforts in international coordination of NNI EHS research and standards, improvement of internal operations, support for regulatory decision making and industry partnerships, and increasing communication with stakeholders. Appendix A reviews the core research areas and research needs of the 2011 NNI EHS Research Strategy. Acronyms and abbreviations are provided in Appendix B. Appendix C summarizes the scope of the nanotechnology EHS-related research centers and facilities supported by the NEHI participating agencies, and Appendix D provides references for the specific research examples described in the Progress Review.

- 9. What key areas of progress are highlighted in the Progress Review?** Coordination and implementation of the 2011 NNI EHS Strategy across the NEHI agencies has enabled:
- Development of comprehensive measurement tools that consider the full life cycles of engineered nanomaterials (ENMs) in various media;
 - Collection of exposure assessment data and resources to inform workplace exposure control strategies for key classes of ENMs;
 - Enhanced understanding of the modes of interaction between ENMs and physiological systems relevant to human biology;
 - Improved assessment of transport and transformations of ENMs in various environmental media, biological systems, and over full life cycles;

- Development of principles for establishing robust risk assessment and risk management practices for ENMs and nanotechnology-enabled products that incorporate ENMs, as well as approaches for identifying, characterizing, and communicating risks to all stakeholders; and
- Coordination of efforts to enhance data quality, modeling, and simulation capabilities for nanotechnology, towards building a collaborative nanoinformatics infrastructure.

10. Is the research highlighted in this Progress Review comprehensive of all nanotechnology EHS research supported by the U.S. Federal Government? No, this document is not intended to be a comprehensive review of all EHS research supported by the Federal Government; rather, it is intended to document the range of coordinated activities undertaken to implement the 2011 strategy with examples selected to demonstrate the breadth of activities in all six core research areas of the strategy.

11. How have NEHI agencies implemented and continued to implement the 2011 NNI EHS Research Strategy? Coordination of the 2011 NNI EHS Research Strategy across the NEHI agencies and the six core research areas ensures integrated development and implementation of agency research programs. The NEHI Working Group, through joint alignment of research activities, has continued to actively and adaptively manage the 2011 NNI EHS Research Strategy through:

- Increased agency participation in NNI EHS research;
- Utilizing the NNI Coordinator for EHS research;
- Refocusing the NEHI Working Group;
- Implementing media and networking opportunities;
- Enabling a broad base for nanotechnology EHS research to support regulatory decision making;
- Coordinating NEHI activities with the Emerging Technology Interagency Policy Coordination Committee (ETIPC) Working Group on Nanotechnology;
- Facilitating partnerships with industry;
- Coordinating research efforts internationally;
- Supporting the development of international standards; and
- Adaptively managing the NNI EHS Research Strategy.

More information can be found at the “Implementation and Coordination” section of the Progress Review (pg. 22).