



Remarks and reminders: cellulose nanomaterials in the context of the National Nanotechnology Initiative

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Cellulose Nanomaterials – A Path Towards Commercialization

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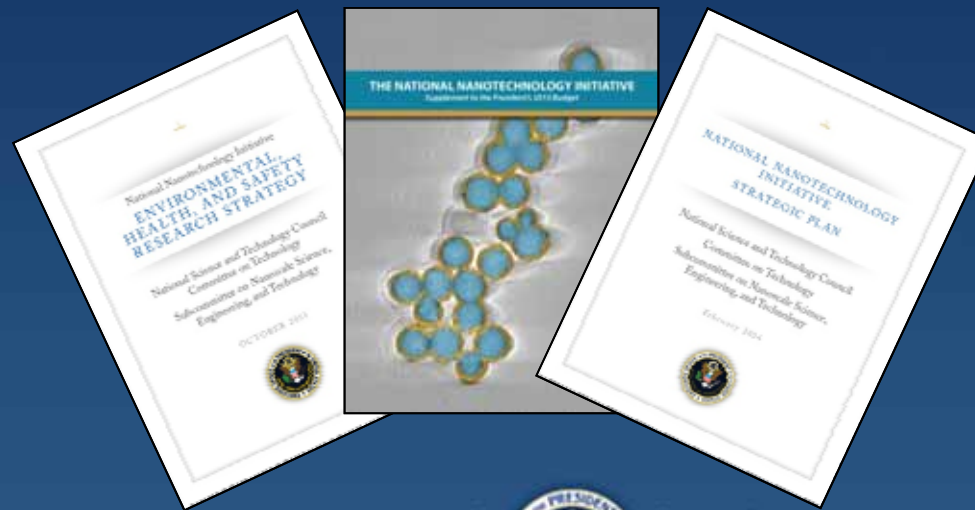
The National Nanotechnology Initiative (NNI): some background and history

- The NNI began as an executive branch initiative in FY 2001. Activities were codified and further defined, and statutory requirements put in place, in the 21st Century Nanotechnology Research and Development Act (the Act; December 2003)
- Initially launched with 8 agencies; now 20 top-level Federal entities participate (some with numerous subsidiary agencies), and 11 of those report funding
- Total Federal investments were ~\$270 million in the last year prior to the NNI (FY 2000), increased to \$464 million with the start of the initiative (FY 2001), and are now (FY 2015 request) ~\$1.5 billion annually
- The NNI is a government *initiative*, representing a priority area for investment and activity, but not a distinct *funding program* with separate (line-item) budget authority



Core NNI documents

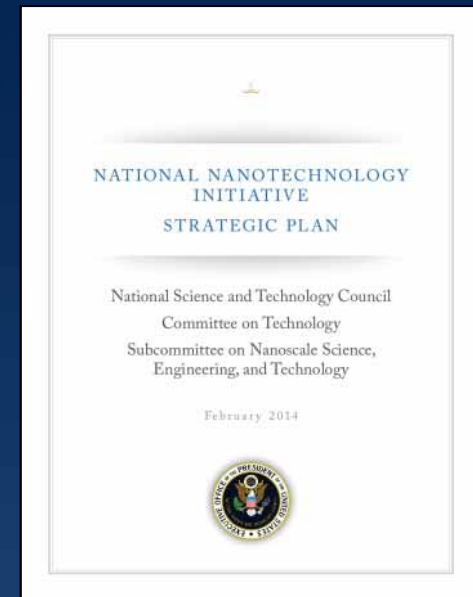
- **Strategic Plans** lay out a series of objectives under each NNI goal, and also describe Program Component Areas (PCAs), agency interests and priorities, coordination and assessment structures and mechanisms, collaborative agency activities and plans, and stakeholder input
- **Annual Budget Supplements** detail Federal nanotechnology investments and activities, and serve as the annual reports of the NNI
- The 2011 NNI **EHS Research Strategy** provides guidance to Federal agencies on research activities, priorities, and program planning in this area



The NNI's triennial Strategic Plan, and overarching Goals

- Most recent NNI Strategic Plan of February, 2014 updates prior strategic plans of 2011, 2007, & 2004
- Sets forth the four ongoing NNI goals:
 1. Advance a world-class nanotechnology research and development program
 2. Foster the transfer of new technologies into products for commercial and public benefit
 3. Develop and sustain educational resources, a skilled workforce, and a dynamic infrastructure and toolset to advance nanotechnology
 4. Support responsible development of nanotechnology

and provides information on specific objectives supporting them



- Describes updated Program Component Areas (PCAs), agency interests, coordination and assessment, and stakeholder input

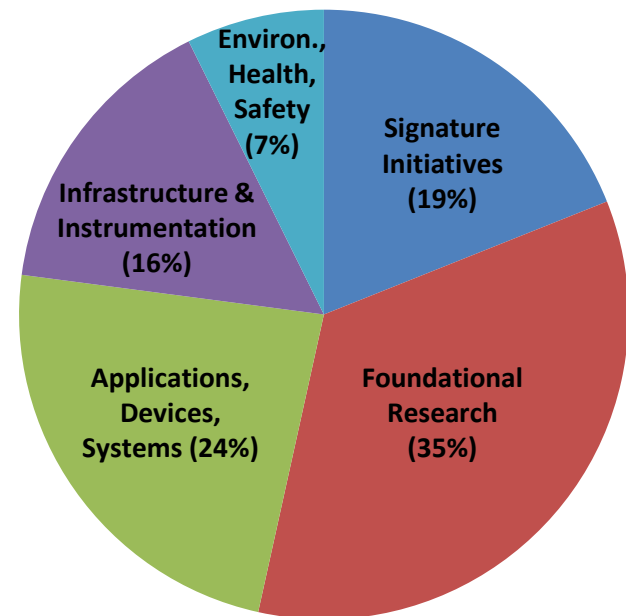


Program component areas (PCAs) revised in 2014

New PCAs defined in 2014 Strategic Plan, planned investments first reported in FY2015 budget request:

- Nanotechnology signature initiatives
 - Solar energy
 - Sustainable nanomanufacturing
 - Nanoelectronics
 - Nanotechnology knowledge infrastructure (nanoinformatics)
 - Sensors
- Foundational research
- Nanotechnology-enabled applications, devices, and systems
- Research infrastructure and instrumentation
- Environment, health, and safety

2015 NNI Investments by PCA



The NNI's Nanotechnology Signature Initiatives

- Represent topical areas of national importance that may be more rapidly advanced through enhanced interagency coordination and focused investment.
- Are intended to be dynamic; topical areas will likely be added and evolve over time.
- Current portfolio of five NSIs:
 - Sustainable **Nanomanufacturing** (launched 2010)
 - **Nanoelectronics** for 2020 and Beyond (2010)
 - Nanotechnology for **Solar Energy** Collection and Conversion (2010)
 - Nanotechnology Knowledge Infrastructure (**nanoinformatics** +) (2012)
 - Nanotechnology for **Sensors** and Sensors for Nanotechnology (2012)



NSI white papers can be accessed at:
<http://nano.gov/signatureinitiatives>



The Nanotechnology Signature Initiatives:

- Address R&D gaps within areas of critical national need
- Identify research thrust areas
- Select key research targets associated with near-and long-term expected outcomes
- Leverage skills, resources, and capabilities among multiple NNI agencies to maximize scientific and technological progress
- Provide a forum for communication and ongoing assessment of direction and progress
- Catalyze communities of practice and public-private partnerships to accelerate development and commercialization



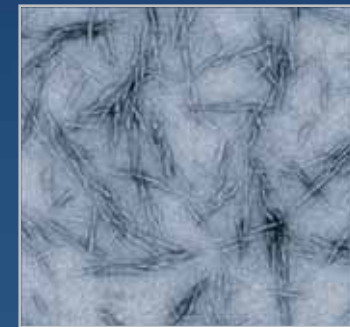
Sustainable Nanomanufacturing: Creating the Industries of the Future

- **Goal:** Establish manufacturing technologies for economical and sustainable integration of nanoscale building blocks into complex, large-scale systems.
- **Thrust Areas:**
 - Design of scalable and sustainable nanomaterials, components, devices, and processes
 - Nanomanufacturing measurement technologies
- **Cellulosic nanomaterials are specifically cited in the NSI white paper, including development of “manufacturing technology, characterization techniques, life cycle and sustainability data, (and) applications research”**



Sustainable Nanomanufacturing: Creating the Industries of the Future

- Development of public-private partnerships, including industry/academic/government consortia, is an explicit objective of the nanomanufacturing signature initiative – your engagement is key!
- USDA nanocellulose pilot plants provide one venue for engagement, providing consistent materials in sufficient quantities for exploratory product or processing purposes
- For this sector, your help in engaging – and educating – potential end users of cellulosic nanomaterials will be of great value





Thank you!

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**For further information,
see www.nano.gov**