

107TH CONGRESS  
1ST SESSION

# S. 90

To authorize funding for nanoscale science and engineering research and development at the Department of Energy for fiscal years 2002 through 2006.

---

IN THE SENATE OF THE UNITED STATES

JANUARY 22, 2001

Mr. BINGAMAN introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

## A BILL

To authorize funding for nanoscale science and engineering research and development at the Department of Energy for fiscal years 2002 through 2006.

1       *Be it enacted by the Senate and House of Representa-  
2 tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4       This Act may be cited as “Department of Energy  
5 Nanoscale Science and Engineering Research Act”.

6 **SEC. 2. FINDINGS.**

7       The Congress finds the following:

8           (1) The emerging fields of nanoscience and  
9 nanoengineering address the ability to create mate-

1       rials with fundamentally new compositions by  
2       prepositioning atoms within an overall molecular  
3       composition.

4               (2) The ability of the United States to respond  
5       to the energy and economic challenges of the 21st  
6       century will be driven by science and technology.  
7       Nanoscience and nanoengineering will enable the  
8       United States to develop new technologies for energy  
9       exploration and production, for monitoring energy  
10      infrastructure, for increasing energy efficiency in  
11      end-use application, and for developing new tech-  
12      nologies applicable to other Department of Energy  
13      statutory missions. These advances will also enhance  
14      the strength of U.S. science, technology, and medi-  
15      cine generally.

16               (3) The fundamental intellectual challenges in-  
17       herent in nanoscience and nanoengineering are con-  
18       siderable, and require public support for basic and  
19       applied research and development. Significant ad-  
20       vances in areas such as the self-assembly of atom  
21       clusters will be required before nanoscience or  
22       nanoengineering will be useful to the energy or man-  
23       ufacturing industries.

24               (4) The development of new scientific instru-  
25       ments will also be required to advance nanoscience

1 and nanoengineering. Such instruments are likely to  
2 be large and costly. Specialized facilities are also  
3 likely to be required in order to advance the field  
4 and to realize its promise. Such facilities will be suf-  
5 ficiently expensive that they will have to be located  
6 and constructed on a centralized basis, similar to a  
7 number of unique facilities already managed by the  
8 Department of Energy.

9 (5) Contributions from individual researchers as  
10 well as multidisciplinary research teams will be re-  
11 quired to advance nanoscience and nanoengineering.

12 (6) The Department of Energy's Office of  
13 Science is well suited to manage nanoscience and  
14 nanoengineering research and development for the  
15 Department. Through its support of research and  
16 development pursuant to the Department's statutory  
17 authorities, the Office of Science is the principal fed-  
18 eral supporter of the research and development in  
19 the physical and computational sciences. The Office  
20 is also a significant source of federal support for re-  
21 search in genomics and the life sciences. The Office  
22 supports research and development by individual in-  
23 vestigators and multidisciplinary teams, and man-  
24 ages special user facilities that serve investigators in  
25 both university and industry.

1 **SEC. 3. DEPARTMENT OF ENERGY PROGRAM.**

2 (a) ESTABLISHMENT.—The Secretary of Energy,  
3 through the Office of Science of the Department of En-  
4 ergy, shall support a program of research and development  
5 in nanoscience and nanoengineering consistent with the  
6 Department's statutory authorities related to research and  
7 development. The program shall include efforts to further  
8 the understanding of the chemistry, physics, materials  
9 science and engineering of phenomena on the scale of 1  
10 to 100 nanometers.

11 (b) DUTIES OF THE OFFICE OF SCIENCE.—In car-  
12 rying out the program under this Act, the Director of the  
13 Office of Science shall—

14 (1) support both individual investigators and  
15 multidisciplinary teams of investigators;

16 (2) pursuant to subsection (c), develop, plan,  
17 construct, acquire, or operate special equipment or  
18 facilities for the use of investigators conducting re-  
19 search and development in nanoscience and  
20 nanoengineering;

21 (3) support technology transfer activities to  
22 benefit industry and other users of nanoscience and  
23 nanoengineering; and

24 (4) coordinate research and development activi-  
25 ties with industry and other federal agencies.

1       (c) NANOSCIENCE AND NANOENGINEERING RE-  
2    SEARCH CENTERS AND MAJOR INSTRUMENTATION.—

3               (1) AUTHORIZATION.—Within the funds au-  
4    thorized to be appropriated pursuant to this Act, the  
5    amounts specified under section 4(b) shall, subject  
6    to appropriations, be available for projects to de-  
7    velop, plan, construct, acquire, or operate special  
8    equipment, instrumentation, or facilities for inves-  
9    tigators conducting research and development in  
10   nanoscience and nanoengineering.

11              (2) PROJECTS.—Projects under paragraph (1)  
12    may include the measurement of properties at the  
13    scale of 1 to 100 nanometers, manipulation at such  
14    scales, and the integration of technologies based on  
15    nanoscience or nanoengineering into bulk materials  
16    or other technologies.

17              (3) FACILITIES.—Facilities under paragraph  
18    (1) may include electron microcharacterization facili-  
19    ties, microlithography facilities, scanning probe fa-  
20    cilities and related instrumentation science.

21              (4) COLLABORATION.—The Secretary shall en-  
22    courage collaborations among universities, labora-  
23    tories and industry at facilities under this sub-  
24    section. At least one Department facility under this

1 subsection shall have a specific mission of technology  
2 transfer to other institutions and to industry.

3 (d) MERIT REVIEW REQUIRED.—All grants, con-  
4 tracts, cooperative agreements, or other financial assist-  
5 ance awards under this Act shall be made only after inde-  
6 pendent merit review.

7 **SEC. 4. AUTHORIZATION OF APPROPRIATIONS.**

8 (a) TOTAL AUTHORIZATION.—The following sums  
9 are authorized to be appropriated to the Secretary of En-  
10 ergy, to remain available until expended, for the purposes  
11 of carrying out this Act:

12 (1) \$160,000,000 for fiscal year 2002.

13 (2) \$270,000,000 for fiscal year 2003.

14 (3) \$290,000,000 for fiscal year 2004.

15 (4) \$310,000,000 for fiscal year 2005.

16 (5) \$330,000,000 for fiscal year 2006.

17 (b) NANOSCIENCE AND NANOENGINEERING RE-  
18 SEARCH CENTERS AND MAJOR INSTRUMENTATION.—Of  
19 the funds under subsection (a), the following sums are au-  
20 thorized to be appropriated to carry out section 3(c):

21 (1) \$55,000,000 for fiscal year 2002.

22 (2) \$135,000,000 for fiscal year 2003.

23 (3) \$150,000,000 for fiscal year 2004.

24 (4) \$120,000,000 for fiscal year 2005.

1 (5) \$100,000,000 for fiscal year 2006.

○