

Statement of

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Speaker Pelosi, Chairs DeLauro and Miller and distinguished Congressional leaders, I am grateful for the opportunity to contribute to the national discussion of the role of science and technology in America's economic recovery.

Let me begin by expressing my thanks to the members of the House present today for their stalwart support of science and technology. The fact that scientists, engineers and educators are sitting side by side with economists to chart the country's path forward highlights the recognition by the Congress that innovation rooted in scientific and technological advances represents the key to sustained, long-term economic growth.

The Members present provided the leadership that made the America COMPETES Act the law of the land in 2007. This law has the potential to be transformative in strengthening the country's basic research in the physical sciences, much as the enhancement of the NIH budget fueled advances in the life and health sciences. Unfortunately, with the current continuing resolution, this is the second consecutive year that American COMPETES has gone unfunded, and so the initiative is currently on life support. At last month's Innovation Roundtable convened at Princeton University by Speaker Pelosi and Representative Rush Holt, participants elucidated with eloquence why implementation of America COMPETES is critical and represents an excellent starting point. However, the testimony also made it loud and clear that the COMPETES Act is a down payment -- additional, consistent investment will be needed to assure America's future competitiveness.

There is underway much discussion of how to best direct funding for an economic stimulus and it is essential that we invest wisely.

The current recession appears to indicate a fundamental structural problem for the nation.

It does not seem to be a simple business cycle that will pass quickly. Significant sectors of our economy – in both manufacturing and services - are in very deep trouble. Because it is structural it may be deeper and last longer than cyclical recessions, and jobs that are lost may well not come back. Therefore, we must find a way to grow our way out of our economic woes. We cannot rely solely on the “quick-fix” stimulus approach that was applied in cyclic recessions that focused on creating short-term, largely temporary jobs in older areas of infrastructure that once represented high-growth innovation waves, but have since reached maturity. While steps to strengthen the economy in the near term are most certainly needed, they will not be sufficient to solve our problems. What are most needed are elements that stimulate real, sustained growth in the economy. Economists know how we do this: through the creation of new knowledge that drives innovative solutions to create new opportunities for real growth, and in so doing stimulate the country’s economic engine. Joseph Stiglitz, Chairman of the Council of Economic Advisers for President Clinton, has noted, “[S]timulus ... centered on infrastructure [and] bailouts ... are aimed at correcting mistakes of the past, so they are backward-looking. We would be much better off spending our money forward-looking. If we spend [billions] on new technology and innovation, we’d have a stronger, new, real economy.” If we pass only a short-term stimulus with short-term jobs, those employed will lose their jobs at the end of a year – instead, we must find ways to make our economy grow out of this recession and so create real and lasting jobs. It cannot be the only element, but we need a growth element in stimulus.

We need to bolster existing high-growth innovation areas, and we will need to create new areas. One path ahead is clear: the country is at the cusp of a revolution in energy science and technology. Energy is already a \$2 trillion sector in the U.S. alone. We don’t have to invent a new market; we have to find new ways to grow and dominate an existing but nascent market. The United States has led virtually every technology revolution since the mid-1800s, but it is by no means certain that we will lead the energy revolution. In addition to providing economic growth, investment in this area will have positive influences for the environment and will firmly establish our country as the world leader in a new mix of essential technology areas. The recent DOE Basic Energy Sciences Advisory Committee report “New Science for a Secure and Sustainable Energy Future,” concludes that we must develop the breakthrough energy technologies that will free of us our dependence on foreign oil, reduce our carbon emissions and create economic growth, but that will only happen with immediate, real investments.

Specific examples of sound investments in energy-related areas that will help us grow our way out of our problems abound.

- **Energy Frontier Research Centers:** The DOE received some 270 applications for Energy Frontier Research Centers that promise to advance promising energy technologies and provide new talent in commercial energy sectors. DOE has said there are many more highly ranked proposals than funding available and supporting as many worthy efforts as possible makes great sense. We need this R&D to lead in new technologies, and these centers will create R&D jobs promptly, but also pay off longer term.

- **New Energy Technologies:** Research in solar, wind, geothermal, biofuels and carbon capture and sequestration provide examples of technologies that are on the verge of development. Investment in these areas would accelerate the entry of the most mature projects to market and boost the U.S. economic technology sector. We need to bring on an energy technology transformation, and this is a key way to do it.
- **Upgrade the Grid:** By investing in and updating our electricity grid we create jobs and move toward our ultimate goal of a more efficient electricity supply mechanism that will increase efficiency and enable access to renewable energy.

New energy technology should not be the only item on the menu. Other promising science and technology programs should be bolstered in the stimulus, too. Many worthwhile programs managed by NIH, NASA, NSF, and other agencies will also foster economic growth, create jobs, educate our future innovators, and lead to critical new and enhanced technologies. A number of ideas have been outlined by the National Association of State Universities and Land Grant Colleges (NASULGC) and the Association of American Universities (see:

<http://www.nasulgc.org/NetCommunity/Page.aspx?pid=1113&srcid=183>).

Specifically, I would like to highlight two needs:

- **Innovation Infrastructure:** Universities provide much of the training to young people on the use of complex equipment for advanced, precision analyses of many kinds. The private sector will get support to buy new equipment, and our research system should, too. But research instrumentation at even our strongest research universities is largely inadequate and antiquated. The Major Research Instrumentation Program of the National Science Foundation is an established, competitive program that could be enhanced immediately and to great benefit. Funding research equipment provides an immediate stimulus, supports a longer-term economic gain, and provides state-of-the art equipment on which to train the scientists and engineers of the future.
- **Student Support:** A technology revolution requires a strong talent base. Let's provide fellowships to educate our best science and engineering talent to tackle broad aspects of the energy and other critical challenges. Much of the existing workforce in energy and other technical fields will retire with the baby boomers. We also need programs at community colleges to train a new workforce generation of technicians in both existing and new technologies and we need programs at research universities that encourage the brightest students to pursue training in science, math and engineering.

The last two points above underscore that a crucial aspect of our science and technology investment must be developing the workforce required to solve the country's energy, environment and other innovation challenges. This is both an ongoing and longer-term issue. These are hard problems and we must develop the entire talent pool in order to maintain a competitive economy. As I testified this past summer to Chairman Gordon and the House Science Committee, the entire education system needs attention. But

middle school is of special importance because that is the time when decisions are made whether to pursue advanced courses in math and science. This is the time when girls lose interest. Investment in highly qualified teachers who inspire, encourage and challenge students is key to continued engagement. The America COMPETES Act tries to address this issue, if we fund it. There is also significant anecdotal evidence to support the fact that summer jobs or internships are highly effective in helping students to decide whether to pursue college majors in science, math and engineering.

In the context of training the coming generation of researchers, I would also like to emphasize the importance of a broad portfolio of scientific investment, from applied to basic research, encouraging exploration of ideas that span the range from those sufficiently understood to be close to development to some whose application may not presently be clear. The fact is that we don't often know what part of parameter space the best solution lies, but the accumulation of fundamental knowledge allows progress to occur much more quickly once a certain area or approach is recognized as promising. In this way basic research accelerates the innovation economy.

Let me underscore that energy and climate could be our Sputnik challenge – a new way to infuse our best talent into our science and technology system. Our students care deeply about solving these problems. We have more than 700 members in the student-run MIT Energy Club. These students want to solve our problems, but when these students graduate the jobs have got to be there. The reality is falling short. Let me tell you a story I am living through right now. It required an act of heroic intervention for a new Ph.D. of mine to keep a job that had already been offered him because a major research university instituted a hiring freeze in response to the current financial turmoil. As an undergraduate, this student was a triple major in physics, math and Earth sciences who graduated with straight As and wrote an extraordinary Ph.D. thesis. He wants to have a career in science and technology, but before he started we were about to take it away.

For the sake of our country's future young people of this caliber simply must be able to find the kinds of jobs that fully utilize their talents. As all of you know, that requires ensuring the R&D investments that will keep this country's innovation system strong. Otherwise, our economic future is not assured.

Thank you again for the opportunity to provide this commentary and I will be pleased to answer any questions.