April 12, 2011

U.Va. COMMENTS ON THE DEPARTMENT OF ENERGY QUADRENNIAL TECHNOLOGY REVIEW

On behalf of the University of Virginia, we would like to join our university organizations in submitting public comments on the Department of Energy's (DOE) Quadrennial Technology Review to assess and transform DOE's energy technology development programs. These programs include the Advanced Research Projects Agency-Energy (ARPA-E), the Office of Science, and the Offices of Electricity Delivery & Energy Reliability, Energy Efficiency & Renewable Energy, Fossil Energy, and Nuclear Energy. They also include annual loan guarantee and direct loan programs to eligible clean energy projects and manufacturers of advanced vehicle technologies.

We recognize that DOE is seeking to advance the President's ambitious goals of supplying the nation with clean energy, energy conservation, deploying electric vehicles, reducing greenhouse gas emissions, and reducing the use of foreign oil by one-third by 2025. We also acknowledge the Department's goal to better integrate basic and applied research in the energy sector to generate increased commercial development of advanced energy technologies in the U.S. The President's FY 2012 budget request for DOE seeks funding for initiatives that could bridge the gap between basic research and commercial development of advanced energy technologies and address some of our most pressing energy challenges. These include the use of modeling and simulation techniques, a focus upon scalable clean energy generation systems, multi-disciplinary and multi-institutional collaborations, new initiatives in energy policy, incentives to businesses for adoption of cleantech systems, large-scale collaborations through Energy Frontier Research Centers, the Energy Innovation Hubs, as well as energy innovation ecosystem initiatives to enhance translation of research to social benefit. We believe that universities can play a critical role in this effort , especially in a time of increasing budget constraints, and request that DOE capitalize on our expertise in basic energy research by establishing a formal initiative to work with universities to advance the broader goals of DOE's energy technology programs.

The Department has shown signs of better engaging the university community with its modest innovation ecosystems initiative which sought new ideas to promote the commercialization of new energy technologies. This initiative should be greatly expanded. Universities are already actively engaged in successful collaborative efforts of this nature with other federal agencies that could serve as models for such collaborations with DOE.

At the Department of Commerce, University of Michigan President Mary Sue Coleman is leading an advisory council to review how the university community and federal laboratories can better contribute to the Administration's goal of increasing the translation of federally funded basic research to help establish more startup companies in the U.S. and promote economic growth.

In a recent letter (attached) to Secretary of Commerce Gary Locke, President Coleman and her academic colleagues outlined the contributions that the nation's colleges and universities are making to innovation. A similar advisory council could be named for DOE to actively work with the academic community to define those points in the energy innovation pipeline where universities can have the greatest impact in furthering the connections between basic research, applied research, demonstration, and deployment.

The contributions identified by President Coleman and the Department of Commerce advisory council listed below are consistent with many of the goals outlined by Secretary of Energy Chu. They include:

- Promoting student innovation and entrepreneurship;
- Encouraging faculty innovation and entrepreneurship;
- Actively supporting the university technology transfer function;
- Facilitating university-industry collaboration;
- Engaging with regional and local economic development efforts; and
- Recognizing exemplary economic engagement.

The National Aeronautics and Space Administration (NASA) has also revamped its technology development program to include an increased emphasis on partnerships with academia and industry to reinvigorate NASA as a cutting-edge agency. Like DOE, NASA is mission driven and is seeking a new generation of young scientists to carry on the legacy of the agency.

The NASA approach to innovation in particular could also be considered as a model by DOE to more actively engage universities and to make the broader connection between basic research and applied research and eventual commercialization of new technologies. The NASA Space Technology Development approach that could engage the talent of the nation's universities in the energy technology enterprise would include:

- Early Stage Innovation – In this program, academia, industry, and the federal government focus on visions of the future to take the long-term view of technology challenges and potential goals.
- One thrust in this program – NIAC – would capture university talent and expertise. NIAC is the NASA Innovative Advanced Concepts Program. A DOE program modeled on NIAC would challenge students and faculty to develop innovative concepts for new energy systems technologies. It would also cultivate connections for students as potential DOE employees in its national laboratories or at headquarters.
- Game-changing Technology – This step tests the feasibility of novel, early stage ideas with the potential to make revolutionary leaps forward in developing new technologies. ARPA-E performs this function for DOE, but there is a recognized gap between the great idea and the willingness of industry to take on the commercialization of that new technology.
- An interim step of carrying out a proof-of-concept or pilot demonstration is a role that universities might easily fulfill. In fact, this approach was recognized in the Administration's recent announcement by DOE, the Department of Commerce, and others, of the i6 Green Challenge to Promote Clean Energy Innovation and Economic Growth. This initiative would establish Proof of Concept Centers to support the entrepreneurship process for innovation in energy, including renewable energy, energy efficiency, and green building technologies.
- Many universities have expertise in advanced manufacturing and in logistics that can address some of the major challenges in commercializing new energy technologies.

UVA advocates strategic and collaborative university research and innovation initiatives in energy between NSF, the Department of Defense, the Department of Agriculture, the Department of Commerce, the Department of Transportation and DOE in order to integrate largely uncoordinated resources across these agencies and Departments, for the purpose of defining and supporting "Grand Challenge", complex systems approaches to address the Nation's energy generation and conservation issues, as well as their effects on water and air quality, as well as public health and economic prosperity.

We hope that DOE, in searching for the most efficient means of accelerating the development of advanced energy technologies in the U.S., will use the university community as a resource in bridging the gap between federally funded basic research and the development and commercialization of new energy technologies. There are strategic points in the innovation pipeline that universities are uniquely

positioned to fill with the added benefit of training the next generation of scientists and engineers so urgently needed by federal science agencies within the next ten years.

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Dear Secretary Locke:

As the leaders of America's leading research universities, we are grateful for the commitment demonstrated by this administration to the research conducted by our students and faculty. At a time of significant budgetary challenges, we appreciate this administration's recognition of the continued need to invest in research and education through its support of strong budgets for the National Science Foundation, the National Institutes of Health, the Department of Energy's Office of Science, the Department of Commerce's National Institute of Standards and Technology, the Department of Defense Research and Engineering Organizations, and other such agencies.

Fueled by federal funding and encouraged by enlightened federal policies such as the Bayh-Dole Act of 1980, America's colleges and universities spur economic growth and prepare the next generation of scientists, engineers and entrepreneurs. Breakthroughs from university-based research have led to entirely new industries in sectors such as information technology, biotechnology, clean energy, and nanotechnology. Universities participate in regional innovation clusters, partner with existing companies to commercialize federally-funded research, nurture startups, attract and motivate commercialization talent, and educate and train a world-class workforce.

Already engaged in many activities that promote innovation, entrepreneurship, and the commercialization of research results, we are committed to working even more closely with industry, private foundations, venture capitalists and local, state and federal governments to enhance our efforts. These organizations, too, have significant roles to play in improving the technology commercialization processes, encouraging entrepreneurship, and instituting policies and programs that support regional economic development.

In pursuit of these shared goals, many of our universities are actively building campus-wide innovation ecosystems and expanding them into regional and national networks. But as we move forward, we also will employ new strategies, enhance existing activities, and expand our efforts in several areas.

Promoting Student Innovation and Entrepreneurship

Many campuses already offer courses aimed at teaching entrepreneurship, provide new opportunities for experiential learning, run student business plan competitions, support student clubs, and sponsor programs that put multidisciplinary student teams to work solving real world challenges. To promote student innovation and entrepreneurship further, we will:

- Build upon and expand these activities.
- Create new programs and grow existing activities on our campuses to encourage undergraduates, graduate students, and post-doctoral students to pursue careers as innovators and entrepreneurs.
- Develop new cross-college, cross-disciplinary programs that connect business with science, math, technology and engineering fields.

- Extend these programs to reach young people in underserved and low-income areas by involving community colleges in consortia for training and mentoring in innovation and entrepreneurial activities.

Encouraging faculty innovation and entrepreneurship

Financial incentives, faculty industry sabbatical leaves, campus prizes and other forms of recognition encourage faculty innovation and entrepreneurship. To promote these ideals further, we will:

- Expand efforts to encourage, recognize and reward faculty interest in research commercialization by providing incentives and encouraging engagements with industry, entrepreneurs and venture partners.
- Create or expand programs that connect faculty and students to the resources they need: industry partners, entrepreneurial mentors, translational research and "proof-of-concept" funds, accelerator facilities and venture creation services.
- Encourage streamlining and reduction in reporting and compliance requirements, which would allow faculty to increase time spent on proposal writing and research.

We also call upon the federal government to refrain from enacting policies, such as overly stringent regulations on conflict of interest, that discourage our faculty from working with industry or developing innovative technologies.

Actively supporting the university technology transfer function

Moving an idea effectively across the "valley of death" requires critical programs that include funding for proof of concept research and new mechanisms within the existing grant process that help defray the costs and risks. To actively support the university technology transfer function we will:

- Work to further reduce barriers to technology transfer to accelerate the rate at which ideas move from the lab to the marketplace. Central to this effort will be to ensure that our technology transfer offices are adequately staffed with skilled professionals who are provided with the resources to effectively and efficiently perform their jobs.
- Publicly promote the importance of technology transfer, to encourage participation by our researchers and encourage engagements with potential partners.
- Establish policies to encourage technology transfer offices to strive to maximize the societal and economic development benefits of discoveries, rather than maximizing revenues.

We also encourage government and state governments, and business collaborators to

- Expand networking conferences and events to exchange best practices and attract talent and resources for commercialization activities.
- Assist in these efforts by subsidizing the costs of research commercialization.
- Create a new SBIR program that could be created focused on commercialization with Phase 0 awards to be used by universities to engage in prototyping, funding mentoring talent and supporting market-readiness initiatives.

- Establish federal tax credits that could be provided to industry to encourage businesses and venture partners to leverage university technologies and start-up venture opportunities.

Facilitating University-Industry Collaboration

To increase the presence of industries on campus, many of our institutions have established a "front door" or portals to enhance access to research expertise, intellectual property, and commercial opportunities. To facilitate university-industry collaboration, we will:

- Further support programs that facilitate sharing of labs, facilities, student-faculty teams, and other resources.
- Strengthen strategic investments in university-industry collaborations aimed at advancing technologies of mutual interest and renowned research programs, designed to enhance market-pull of research.
- Develop ways to incentivize and support industry R&D professionals to collaborate with universities.
- Encourage the development of accelerators and public-private partnerships on or within close proximity to campuses; and find ways to provide innovation services to new enterprises external to the university.

We also call on federal agencies to assist by

- Building entrepreneurship and innovation components into agency grants;
- Creating opportunities within federal agencies for high-risk innovative research;
- Allowing, as appropriate, commercial potential to be a part of grant proposals through the development of commercialization plans;
- Including the evaluation of market potential of new technologies as a milestone component in research;
- Facilitating the presence of industry on campus by creating an IRS exemption for university-industry collaborations built around university-owned intellectual property and conducted in university buildings;
- Promoting a DARPA-hybrid model of collaboration between small firms and universities; and
- Funding talent collaborations, especially for universities with less-developed innovation ecosystems.

Engaging with regional and local economic development efforts

Our universities will promote efforts to link regional and national stakeholders together in support of research and education critical to local businesses and industry by:

- Striving to expand existing university participation in national, regional and local economic development efforts.
- Fostering consortia of research universities and industries across regions.

- Working with the federal government and other stakeholders and professional associations to improve the coordination of the nation's venture accelerators, including development of a searchable database of all federally funded intellectual property.
- Working with local, regional, state and business leaders to promote access to assets such as research parks, accelerators, and laboratories to support regional industries, especially existing and small, young companies.
- Participating in developing and implementing economic strategies
- Partnering in community development and revitalization efforts.

Recognizing exemplary economic engagement

To accelerate achievement of the goals outlined in this letter, we call on the National Advisory Council on Innovation and Entrepreneurship and the Obama Administration to work with the higher education community to develop a national program to identify, recognize and celebrate exemplars of "economically engaged" universities. This program would:

- Raise awareness about the importance of higher education and economic engagement in driving regional and national economic growth
- Assist with the creation of organizational assessment tools and measurement criteria that capture the full range of our impact
- Educate higher education leaders about the practices of best-in-class institutions
- Recognize national role models and honor them with a Presidential Award for economic engagement.

Our universities, and the national associations that represent us, are committed to sharing best practices, and to identifying additional federal policies that will help to leverage investments made by government, and industry, in the research conducted at our institutions. Further, we will continue to use national forums, such the Association of University Technology Managers (AUTM), the University Industry Demonstration Partnership (UIDP) and the Commerce Department's National Advisory Council on Innovation and Entrepreneurship, to engage in an ongoing dialogue with industry, non-profit foundations and the government on how we can advance our shared objectives. We are also seeking ways to collectively implement recommendations made by the National Research Council in its October 2010 report, *Managing University Intellectual Property in the Public Interest*.

Although the specifics of our strategies will vary, reflecting the diverse missions and resources of our institutions, we pledge our universities to greater efforts to advance regional and national economic growth. We are dedicated to ensuring that the knowledge and technological breakthroughs developed

at our institutions are rapidly and broadly disseminated to advance the nation's social and economic interests.

Sincerely,

Mary Sue Coleman

President, University of Michigan

Michael Crow

President, Arizona State University

G.P. "Bud" Peterson

President, Georgia Institute of Technology

Holden Thorp

Chancellor, University of North Carolina at Chapel Hill