Statement of John Pierce
Vice President - Technology
DuPont Applied BioSciences
before the
Committee on Science and Technology
U.S. House of Representatives
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Good morning Chairman Gordon, Ranking Member Hall and members of the committee. My name is John Pierce, and I am the Vice President of Technology for DuPont's Advanced Biosciences efforts. I am pleased to be here today to share DuPont's perspectives on the Energy Department's Advanced Research Projects Agency. My personal perspective is informed by my work over the last ten years leading DuPont's R&D efforts in the area of industrial biotechnology that has yielded technologies like our Sorona biopolymer, for which DuPont received the President Green Chemistry Award, and the high performance biofuel biobutanol.

DuPont has long been an innovation company, from the development of polymer chemistry in the 1930s and 1940s, the development of synthetic refrigerants to replace hazardous materials in refrigeration, specialty fibers like bullet resistant Kevlar and fire resistant Nomex through our current biotechnology and nanotechnology work. We currently employ almost two thousand PhDs, and conduct major R&D operations in multiple countries, including the US, Europe, China, and India. We have active joint programs with many Universities and National Labs as well. More than 35% of our revenues in recent years derive from new products driven by a very structured and targeted global innovation program with spending of about $1.4 billion each year.

We have frequently collaborated with the US Government in our efforts over the years, whether through collaboration with the National Labs or competing for matching grant funding to advance technologies serving national interests. Our scientists also contribute through various external engagements with Universities, the National Academies, and federal agencies. Our former CEO and Chairman Chad Holliday was a co-author of the seminal National Academies report Rising above the Gathering Storm, which originated the idea of an ARPA organization for energy.

The development of sustainable energy solutions is certainly an area in which DuPont is already focusing much of our innovation. We are working on energy saving technologies such as biomaterials, high efficiency lighting, transportation efficiency and advanced materials for building efficiency and energy storage. We are also active in low carbon energy generation and storage technologies that include advanced biofuels, solar, wind power and fuel cells, advanced batteries and environmentally friendly improvements to current energy supply technologies.

For example, we are very engaged in advancing sustainable transportation solutions, including through biotechnology. We have developed technologies to produce advanced

polymers from sugar that are going into automotive applications, and are deeply engaged in advancing biofuels on three separate fronts. Our seed company Pioneer is steadily expanding the productivity of grains used to produce first generation biofuels and sells varieties that specifically enhance biofuels production per acre. We have developed a technology to produce ethanol from cellulosic feedstocks such as switchgrass. I am happy to report, Mr. Chairman, that our biomaterials plant in Louden, TN is doing very well and on the 29th of this month we will hold a grand opening for our cellulosic ethanol pilot plant in Vonore, TN- a technology and facility that was significantly enabled by DOE partnerships. We have also worked with BP to develop the advanced biofuel biobutanol, which has high energy density and is compatible with existing autos and fueling infrastructure.

So let me turn my attention specifically to ARPA-E. Our perspective here is informed by our role as a market driven science company. Our R&D portfolio and the prioritization of funding is driven by customer or market needs, specific product opportunities, and the prospect of returns for our shareholders, rather than more "blue sky" kinds of exploration. That is our appropriate role in the innovation economy. However, as you might imagine, the scientists in DuPont generate some pretty interesting concepts that don't get into our innovation pipeline because we need to prudently manage the risk of investing in very early stage technologies with uncertain market opportunities. This pragmatic approach to R&D funding prioritization is an economic necessity for the private sector. While it serves near to mid term market needs quite well, it does not provide for the development of transformational technology options with broad societal relevance. This is a gap that government funding can most effectively fill. ARPA-E serves a valuable role in focusing that government effort on the critical area of energy.

An entity like ARPA-E can act as a powerful launching pad for early pre-market concepts to be evaluated and pursued. Cost sharing with ARPA-E can sufficiently reduce the risk to enable companies like DuPont to commit R&D resources to more transformational technology efforts, in collaboration with the government and other partners. This capability complements and enhances the incredibly valuable and robust US academic research enterprise that already receives substantial funding through a variety of government programs, and provides a necessary bridge across the "valley of death" between scientific discovery and commercial practice.

Such efforts also need to be part of a web of programs that help new ideas get from initial concept demonstration through to commercial demonstration if the US is going to retain and expand its leadership role in critical technologies – and provide the high paying manufacturing jobs such leadership provides. There is a growing concern that the US is losing its manufacturing edge, which is a critical part of our innovation engine. We in the US are at the leading edge of biopharma, biomedical devices, and will soon lead in bioprocessing for small molecules. We have created that edge and maintained it thus far by keeping the manufacturing here. Government investment in the early phases of research – as in ARPA-E – as well as the development phase for building pilot plants and demonstration units for those areas of technology that are truly transformational will help

us hold our edge.

It is particularly important that the US find ways to expand and accelerate research, development and deployment of low carbon solutions in energy production and use. The cost, security implications and environmental ramifications of our current energy trajectory is clearly unsustainable, and the response to this challenge will be a significant area of economic activity and global competition in the coming years in which the US must not fall behind.

While it is premature to draw detailed conclusions regarding the functioning of ARPA-E given its relative newness, we can offer some observations based on our experience in responding to their first solicitations and being selected for a matching grant.

First, for the level of staffing they currently have we feel they did an impressive job of sorting through an incredible number of initial concepts submitted to them. Second, the breadth of topics selected for the first grants is a positive sign, suggesting an appropriate range of thinking and perspective. Third, they also selected a wide range of recipients, including Universities, start ups and established companies such as ours. This inclusiveness is important as it provides access to a wide range of expertise, including knowledge communities that the commercial world looks to for its technology pipeline, but also includes entities whose engagement is necessary to make the transition from technology concept to robust manufacturing methods to commercial production and stable jobs.

For example, our project that was selected for ARPA-E funding leverages our significant prior biofuels R&D investments that I described earlier. It allows us to explore a new and promising area that, while attractive, we would not have funded on our own until well in the future as we allocate resources to nearer term technology applications.

This funding will allow us to expand the potential of our biobutanol technology to new and promising feedstocks. Under the grant DuPont is partnering with a start-up company, Bio Architecture Lab of Washington State, that has close ties with the University of Washington. We are working to develop approaches to employing kelp, that is - seaweed, as an alternate feedstock for the production of biobutanol. This also illustrates how ARPA can help to facilitate collaborations amongst different kinds of players in the innovation pipeline, in this case an established firm and a technology startup.

Given DuPont's significant pre-existing investment in technologies for sustainable energy, ARPA's ability to provide a Technology Investment Agreement (TIA) as the basis for our project made it easier for DuPont to participate in the first solicitation. TIAs provide approaches to patent rights and other government terms that make it easier for commercial entities to partner with the Government and integrate new projects into their existing R&D portfolio than is allowed by the more restrictive terms of alternative funding models. Unlike contract research entities, commercial firms do research with an eye to products and services, continually seek synergies across their research programs,

and need the ability to see their way to future opportunities in a way that allows the seamless integration of self-funded and government funded capabilities. A TIA can greatly reduce administrative complexity and thereby facilitate effective collaboration between business and government. We would encourage the continued use of this instrument in solicitations in the future.

Finally, DuPont has been very impressed by the level of engagement and responsiveness by ARPA-E staff, and the commitment and enthusiasm that they have demonstrated. When agency staff responds to a question within two hours it is pleasant. When that question was submitted at 8:00 pm and responded to by 10:00 it is a pleasant surprise.

Going forward we would like to suggest a few considerations as ARPA-E is built out. We believe it is important for the program to have clear and transparent processes for identifying the grand challenges that merit funding; establishing priorities, systematically engaging the appropriate communities of knowledge at an early stage, and announcing focused funding opportunities in areas where sufficient scientific evidence exists to justify such investments. Establishing external advisory panels can help ensure that a breadth of perspectives is brought to bear in developing the ARPA agenda. It may also be helpful for ARPA-E to have regular funding cycles in critical areas where the science is evolving rapidly—for example, every three years ARPA could invest in advanced transportation energy technologies. This would allow researchers in this sector sufficient lead time to anticipate funding and assemble ideas and collaborations to develop the most competitive proposals. Clearly, the effective execution of ARPA-E's mission requires the rapid addition of qualified program resources, and I hope that we will see the appointment of many more professionals in the near future, as well as sustained Congressional funding.

In closing, thank you for the opportunity to share our views with you today. We think DOE has done a solid job of setting this new organization up, but it is clearly in it early days, with opportunities to strengthen the organization and refine its mission as it grows. We appreciate the focus this Committee has brought to this important subject, and look forward to working with you as ARPA progresses.

Meet the Executives

John Pierce

Vice President - DuPont Applied BioSciences - Technology

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John Pierce is vice president for DuPont Applied BioSciences - Technology, with responsibility for DuPont's biotechnology research and development efforts in the production of fuels, chemicals, and materials.

Dr. Pierce began his career at DuPont in 1982 as a research scientist in Central Research & Development (CR&D). He moved to Agricultural Products in 1988 and held research management positions in agricultural biotechnology and subsequently in crop protection chemical discovery. In 1994 he became director of Chemical and Biological Sciences in CR&D, where DuPont's current focus on industrial biotechnology began to take shape.

From 1996-1998, Dr. Pierce was planning manager for Agricultural Products' Europe, Middle East, and Africa in Paris, France. Upon returning to Wilmington, he worked to integrate the agricultural biotechnology research efforts of DuPont and its subsidiary Pioneer Hi-Bred International. He first served as director of Genetic Resources and subsequently as director of Strategic Resources and Planning for DuPont Crop Genetics Research. In 2001, Dr. Pierce returned to CR&D as director of Biochemical Sciences and Engineering and was named to his current position in June 2006.

Dr. Pierce has been intimately involved in the evolution of DuPont's positions with respect to commercialization and acceptance of biotechnology products. He was a founding board member of the Society of Biological Engineering and currently serves on the Management Board of the BioEnergy Science Center at Oak Ridge and on the Scientific Advisory Board of the Great Lakes Bioenergy Research Center- two DOE sponsored consortia developing biofuels from renewable resources.

Prior to joining DuPont, Dr. Pierce held postdoctoral positions at Cornell University and the University of Wisconsin. He holds a bachelor of science degree in biochemistry from Penn State and a PhD degree in biochemistry from Michigan State University.

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