

STATEMENT OF KEVIN JARRELL
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BEFORE THE COMMITTEE ON AGRICULTURE, NUTRITION & FORESTRY
UNITED STATES SENATE
JULY 14, 2011
CREATING JOBS IN RURAL AMERICA

Chairman Stabenow, Ranking Member Roberts and members of the committee, I appreciate the opportunity to submit this written statement for the record to offer Modular Genetics's perspective on the potential for the United States to establish a leadership position in sustainable chemistry.

The United States needs to make a clear and open commitment to become the number one country for the invention and commercialization of renewable chemicals. This is one of the most significant opportunities of our time, and we must move forward immediately and aggressively.

Sustainable chemistry produces chemicals from renewable raw materials using environmentally friendly processes that not only conserve energy and water but also have a low carbon footprint. The primary technology-driver for sustainable chemistry is biotechnology and the main input is plant-derived agricultural materials. Importantly, sustainable chemistry allows U. S. companies to replace raw materials derived from foreign oil with agricultural materials produced domestically.

Why does sustainable chemistry make sense for America? We live in a competitive world. U.S. companies can create rewarding high-paying jobs for Americans, if government supports new industries in which the U.S. can maintain a leadership position. Sustainable chemistry is a sector where U.S. companies are positioned to lead because it combines three areas of U.S. strength: biotechnology, agriculture and chemicals. First, the U.S. has been and continues to be a world leader in biotechnology-its companies and research institutions excel in the core capabilities required by this industry: protein engineering, metabolic engineering and synthetic biology. Second, the American farmer has an unparalleled ability to produce the raw material needed by this industry. Finally, the U.S. has the world's largest national chemical industry. Ten cents of every U.S. export dollar is derived from chemical sales. The value of America's share of the global chemical market is \$690 billion (19% of the \$3.7 trillion dollar global market). The chemical industry directly employs 860,000 people in the U.S., and indirectly supports the employment of another 4,795,500 people.

Why switch from "traditional chemistry" to "sustainable chemistry"? Although the U.S. chemical industry remains successful, several forces have reshaped the global chemical industry over the past decade. Among these is growth of the industry in the Middle East and Asia. Consider, for example, Dow Chemical's decision to exit the commodity chemical business in 2007. According to Dow's CEO, Andrew Liveris: "Petrochemicals will be looked at from the point of view of low-cost feed stocks; given the likelihood that energy and feedstock costs will remain high by historical standards, there is every reason to believe that productive assets will continue to gravitate to regions that offer advantaged feed stocks, namely, the Mideast and Asia." Over the past decade, U.S. direct employment in the chemical sector has decreased from 992,000 to 860,000 employees. Regarding exports, the U.S. enjoyed a trade surplus of \$13.4 billion in 1998, but by 2008 the sector suffered a trade deficit of -\$2.7 billion. We believe that the U.S. can reverse these trends by capitalizing on its core strengths in biotechnology, agriculture and chemical manufacturing. While the traditional U. S. chemical industry is shrinking, several independent groups have estimated that the global sustainable chemistry industry will grow to \$1 trillion dollars. This

creates a significant opportunity for job growth and export growth because the current global sustainable chemistry industry is only about 7% of its projected future size. If U.S. companies can capture 19% of this new \$1 trillion market, (by analogy to the traditional chemical industry) we project that the U.S. will create about 237,000 direct U.S. jobs in the sustainable chemistry sector, while shifting the balance of trade in the chemical sector to a trade surplus.

Our company in particular, Modular Genetic, Inc. (Modular) has developed engineered microorganisms that convert underutilized agricultural residue (such as soybean hulls grown in Iowa) into a high value specialty chemical (a surfactant) that can be used as a primary ingredient in personal care products such as body washes and shampoos. Our product is produced from renewable raw material using a low-energy fermentation process, and the chemical is purified using a "green" purification process that involves the use of only energy and water. Significantly, this product can directly replace chemicals that are manufactured from petroleum, or from seed oils, such as palm or coconut oil, that are grown overseas and imported into the U.S. This particular chemical is only one of about 50,000 new chemicals that will be invented and manufactured as the sustainable chemistry revolution moves ahead. This revolution is underway, and it will not stop. Our challenge, and our opportunity, is to implement policy that ensures that the products and technology invented here in the U.S. are commercialized domestically so that jobs and economic value are created here.

I was raised in Ohio and attended The Ohio State University. So, I will share with you my image of the United States with regard to its current position in sustainable chemistry. Each of us has known that individual with all of the attributes and skill required to become the star quarterback. We also know that in some cases that potential is realized and in other cases it is not. I am optimistic that we will all look back on this day as the day that we made the commitment to realize our potential and to secure the benefits that derive from winning this particular competition.