First of all thank you Senator for the opportunity to speak with you here today. The creation of long term sustainable jobs in rural America is something I consider to be a personal mission in life and I have found this to be by far the most rewarding aspect of my own career. As a much younger scientist I came to the US from Scotland 27 years ago to work at MIT in Cambridge Mass. One thing led to another and I was very fortunate to help found a new company with two of my MIT colleagues. The company Metabolix will celebrate its 20th anniversary in June of next year. This company was formed with what was then a revolutionary vision and mission: "to use the emerging tools of genetic engineering to create a new chemicals and materials industry based on renewable agricultural resources." This concept stemmed from a basic science project funded by the Office of Naval Research. At the time, the terms 'industrial biotechnology and "synthetic biology" had not been conceived, oil prices were under $20/bbl. We were effectively pioneering what is known today as the biobased products and bio-chemicals industry.

In thinking about what message I wanted to convey in today's hearings, I came up with three with respect to jobs in rural areas:

1) Biobased products and chemicals have the potential to revitalize US based manufacturing and create large numbers of sustainable jobs in rural areas.

2) Continued government investment in Industrial Biotechnology Innovation and Research and Development for adding value to agricultural feedstocks is also crucial to long term sustainable job creation in rural areas.

3) The Government can facilitate deployment of this emerging industry in the US based on locally developed technology by creating demand pull through both policy and its purchasing power

To get back to my story, with the help of a few visionary investors, we worked on the technology in our labs in Cambridge often with Federal support in the form of grants as the Biopharmaceutical industry literally exploded into life around us. Cambridge is virtually unrecognizable today compared to when I arrived in the US. Today, our first production plant with a capacity of a 50,000 tons per year of a new bioplastic is in operation with our partner Archer Daniels Midland (ADM) in Clinton Iowa. The Clinton polymer plant has over 100 employees, with future expansion plans to quadruple this facility. I believe there were over 500 construction workers at the peak of plant construction.

Why Clinton Iowa, frankly there's not too much corn for feedstock in Massachusetts and ADM operates a very large corn wet mill in Clinton with enough infrastructure and sugar to supply the future expanded plant. This speaks to a fundamental advantage of rural areas in the emerging bioeconomy which is the

ability to supply renewable feedstocks for new production facilities based on technological innovation. Jobs move to the center of competitive advantage. The ADM Polymer employees in Clinton are a well trained, capable and very hard working team with a can-do attitude so typical of rural America in addition to having the feedstocks available for this new industry.

A compelling feature of biobased products is the downstream job multiplier effect. Based on this new bioplastic we have rejuvenated the plastics industry in Massachusetts, with our Telles Bioplastics Center and headquarters located in the revitalising industrial city of Lowell. Telles is the name of our joint venture with ADM. In a converted textile mill, we have 50 plastics scientists, engineers and commercial staff working on processing, applications development and sales of Mirel Bioplastics. These jobs are further multiplied by end-users or converters of the Mirel Bioplastic into products like bags, agricultural mulch film, and consumer goods like pens, flatware etc. Globally bioplastics are growing rapidly at over 20% per year with an almost unlimited potential.

The chemicals and plastics industries currently account for around 10% of all petroleum used with the global production of plastics last year being around 540 billion lbs with a net value around $ 400 billion. Simply put, replacing a barrel of

oil to make higher value added biobased products and chemicals is as effective at reducing dependence on imported oil as biofuels.

The technical innovation developed in the US to make bioproducts is an opportunity for US to recapture its once dominant position in the plastics and chemicals markets. At its peak in the 1950s, the industry was responsible for over 5 million U.S. jobs and a $20 billion positive trade balance for the United States. Jobs associated with the industry were typically among the highest paid in U.S. manufacturing. Over the last two decades, competitive advantage for chemicals and plastics manufacturing has shifted towards the Middle East (feedstocks) and Asia (growth and low cost labor) as has the industry. U.S. employment in the sector has dropped over the last decade and is projected to shrink further as capital investment for the petroleum-based industry has essentially shifted away from the United States.

Biobased chemicals and plastics represent a historic opportunity to reverse these trends through the creation of a new generation of renewable, sustainable products developed and produced in the United States. The United States and in particular rural America has substantial competitive advantages in available arable land and advanced agriculture and infrastructure. We can couple this with the leading innovative industrial biotechnology sector, an outstanding labor force and excellence in manufacturing. In addition we have the potential to use the existing

chemicals and materials infrastructure from the current chemicals and plastics markets. We basically have the makings of a powerful biobased products industry to revitalize manufacturing in this country. Even in its current early stages, the biobased products industry accounts for over several thousand direct jobs, and is likely responsible for over tens of thousands of jobs economy wide. Achieving the industry's full potential could create tens of thousands of high-paying green jobs in the United States within the next five years, the majority in rural areas.

As I stated earlier, Federal funding of innovative research and development is also crucial to maintaining and building on our advantages. The technology behind the success of the Mirel Bioplastics and the two other commercial platforms being developed by Metabolix was based in part on research funds from the federal government. Using only the bioplastics case, Metabolix translated less than $5 million in Federal support into what is now over $300 million in private investment based on the business merits .

Economic development impacts will include the creation of high-valued green jobs, an improved trade balance, the reduction of greenhouse gas (GHG) emissions and enhanced energy security through reduction of dependence on imported foreign oil. To foster growth of the biobased products sector in the

United States, federal policy should provide strong support for research, development and demand for innovative biobased products.