

# **Biochar Development and Utilization in North Texas: Building a Sustainable, Replicable, Scalable Partnership Model for Wealth Generation in Rural Communities**

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This Concept Paper represents the premise for the establishment of a sustainable, scalable, replicable model, encompassing (1) federal agencies, (2) academia, (3) agricultural related enterprises, (4) state and local government, (5) workforce and economic development entities, and (6) the investment community, focused on job creation and economic development, utilizing agricultural research and marketing assessments to develop, produce, and utilize biochar in a 16-county area of North Texas.

## **I. Background**

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In 2016 and 2017, the ATIP Foundation was engaged in two national/regional initiatives related to the Bioeconomy, conducted under agreements with the US Department of Agriculture (USDA) and the Department of Energy (DOE). First, five “Regional Bioeconomy forums,” convened in 2016, focused on “Addressing the Challenges & Opportunities of Advancing the Billion Ton Bioeconomy.” Second, three “Biojet Fuel Forums” were convened in 2017 that focused on “Accelerated Commercial Development of Hydrotreated Renewable Jet Fuel from Redesigned Oilseed Feedstocks Supply Chains”. (Note: Documents available upon request)

These eight forums sought stakeholder input on the challenges and opportunities for adoption and commercialization of federal research results, focused on the bioeconomy. The underlying purpose of both forum series was to determine a path forward that would support broad scale development of sustainable bioeconomy industries. The ultimate goal was to promote rural economic development, resulting in job opportunities along the supply chain, from crop to product production to consumer.

Forum participants recognized that the US federal lab system is extensive, and well-equipped to pursue research critical to their respective agency’s mission. The research outcomes often result in innovations that are also suitable for adoption and commercialization by business & industry. The federal system, however, often is not highly adept at translating federal research outcomes in ways that readily enable commercialization that leads to job creation and economic development.

This concept proposal is based, in part, on the results of the two described initiatives of the ATIP Foundation. As an outcome of the forum series, attendees recognized the need to focus on the development of a model that would serve as a blue print for the comprehensive integration of six primary sectors critical to regional economic development; (1) local, county & state governments; (2) workforce & economic development organizations; (3) academic institutions; (4) financial/services; (5) business & industry; and (6) the supply chain, from biomass producer to end users of products.

The model is aligned with and addresses the current focus and priorities of USDA, relative to the vision articulated by the Biomass Research & Development Board, published in their “Federal

Activities Report on the Bioeconomy,” released in February 2016, at the Advanced Bioeconomy Leadership Conference in Washington, DC.

The forums’ fundamental premise: that economic development is the creation of wealth in which community benefits are realized. It is fundamentally driven by the conversion of materials into consumable products, such as oilseeds to jet fuel, while creating jobs and economic opportunities through each step in the conversion process. It must also be supported by an infrastructure to ensure the capacity to move people, products and information in a rapid, effective, efficient manner.

***Therefore, the fundamental premise of our model is to demonstrate how the informed integration of our proposed six stakeholder sectors can serve as a catalyst for a strategic approach that will translate federal and academic research outcomes into rural wealth creation, thereby fostering the bioeconomy.***

## **II. Biochar**

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Biochar is a solid material derived from thermochemical conversion of biomass in an oxygen-limited environment. The International Biochar Initiative (<http://www.biochar-international.org>) has highlighted the many and broad benefits of producing and using biochar, including enhancement of soil fertility for crop and agroforestry productivity; enhancing degraded or marginal soils; helping remediate global climate change by safely and effectively drawing down greenhouse gas (GHG) emissions in stable soil sinks and alleviating emissions from decomposing urban and rural wastes; maintaining agriculture production with fewer fertilizer inputs while also recycling wastes and remediating soils; and enhancing water quality by reducing leaching.

Thought leaders in these various sectors in North Texas recognized that there are many candidate biochar feedstocks in the region. There is also a wealth of research information from ongoing USDA National Institute for Food and Agriculture (NIFA) projects elsewhere in the U.S., specifically at Iowa State University (<https://nifa.usda.gov/cenusa-bioenergy>), and Colorado State University (<https://nifa.usda.gov/bioenergy-alliance-network-rockies-bar>). Research from the USDA Agricultural Research Service (ARS) focuses on efforts in co-generating biochar from biofuel production in Pennsylvania (Eastern Regional Research Center) and Louisiana (Southern Regional Research Center). Also, there are ongoing efforts by USDA Forest Service (in partnership with ARS and NIFA projects) utilizing dead trees to produce biochar and return it to the forest floor. ***Thus, the ATIP Foundation will work with USDA and other federal agencies to establish and work with a regional project steering committee consisting of the various stakeholder sectors represented in North Texas. Their role, facilitated by the ATIP Foundation, will be to develop paths forward to develop a biochar industry in the region.***

### III. PROJECT THEMES

The ATIP Foundation will be guided by six significant, relevant, overarching themes that were universally expressed and supported by participants in all eight forums, relative to specific issues and recommendations to be addressed by the broad stakeholder community.

The six themes are as follows:

**1. Finance:** stated as the ability to successfully finance the growth of the bioeconomy, focused on (1) public funding and (2) general access to capital. Regarding public funding, availability of government loan guarantees was cited, based on the lack of public knowledge, awareness, or understanding of the process required. Also, federal agencies should consider funding more small-scale demonstration projects, rather than fewer large scale ones; incentivizing public private partnerships; and providing a level playing field for bioenergy investments and allocations, comparable to those of fossil fuel and nuclear energy.

Regarding general access to capital, the high risks perceived by private sector investors was based on inconsistency in federal incentives, the general lack of off-take agreements, and broadly stated, a lack of understanding of the bioeconomy.

**2. Public Education & Awareness:** stated as the need for clear, understandable definitions for the "bioeconomy" and "sustainability"; and a robust, orchestrated public educational awareness campaign, inclusive of thoughtful articulation of the value proposition of the bioeconomy, and "Case for Support", relative to why it makes both business and economic sense.

**3. Public Policy:** stated as the need to create a level playing field for the bioeconomy, with long term, stable government incentives and tax credits that are competitive and comparative with other energy programs. Also, regulatory requirements and controls, in general, and in particular by EPA, are viewed as overly burdensome, especially to small & medium sized businesses.

**4. Supply Chain:** stated as the need to ensure the supply chain logistics/capacity/capabilities are in place, to support the movement of biomaterial from the source to final production/processing facilities, and then to market. As a specific example, one recommendation was that more biomass accumulators (biomass depots) are needed to reduce distance from farm/forest to processing facilities. This also reduces cost, and aligns with the recommendation to fund more small models/projects rather than fewer large models/projects.

**5. Workforce:** stated as the need to engage the US Departments of Education & Labor, to ensure the publicly funded workforce system is aware of and focused on the development of the workforce needed to support the growth of the bioeconomy. Recommendations include building the talent pipeline; addressing the lack of technical training; the need to create early awareness of opportunities by the 8th grade; and addressing the lack of training opportunities and options in rural areas.

**6. Federal Resources:** stated as a general lack of public awareness, and a request for federal support of regional collaboration. In terms of awareness, there was a general lack of knowledge of the research and resources available through and from the federal agencies. Outside of academia, most participants were unaware of patent license agreements (PLAs), cooperative research and development agreements (CRADAs), the scope of federal research, and technical assistance and support, such as loan guarantees.

In terms of collaboration, participants stressed the need for economic growth to be seen, perceived and approached on a regional basis, since, generally speaking, regional economies do not follow geographic or political boundaries. They viewed federal agency collaboration at a regional level, in partnership with academia, the private sector, and the broader stakeholder community, as a critical component necessary to grow the bioeconomy.

#### **IV. ECONOMIC DEVELOPMENT**

Although we constantly talk about economic development and growing the economy, there is little discussion and/or understanding of "who does what by when" in order to achieve the goal of economic development. Cities and states frequently site their creation of jobs through "industry recruitment," which does not represent the development of a "sustainable economy."

The fundamental premise for the growth of a sustainable economy is the creation, development and growth of the industry sectors that are wealth generators. This requires an understanding that only three fundamental events happen in an economic region; (1) wealth is generated; (2) wealth is recirculated within the same region; or (3) wealth generated within the region migrates to other economic regions.

As an example, an assembly facility that builds cars generates wealth, as the final product sells for more than the cost of production. But where does the wealth go? A portion recirculates in the region through the salaries and wages paid. But the company also purchases parts, components, supplies and services from literally hundreds of companies we will call "suppliers & service providers". To the extent they are in the region, that wealth also recirculates. To the extent they are not, the wealth is migrating immediately. Therefore, development of the "supplier/service provider network" critical to that particular industry sector is critical to the development of a sustainable economy.

Next, all sectors are dependent upon five key "economic foundations" if the sector is to become sustainable. They are:

**1. Regulatory Structure:** municipal, county, state and federal regulations all play a role, based on whether they support or inhibit the growth of a sector. In an economic region, municipal, county and state regulations must be assessed in terms of their impact on a targeted industry sector. This requires the support of local and state governments.

**2. Infrastructure:** all economic activities are based on the ability to move people, product, and information into and out of a specific region in a rapid, cost effective & efficient manner. Therefore, assessing the region's infrastructure is a critical component. This requires the support of local and state governments.

**3. Access to Capital:** all sectors require ready access to capital sources germane to their sector. Therefore, an assessment of a region's access to capital that is supportive of the targeted industry sector is important. This requires the participation of the financial services sector.

**4. Access to Technology:** every sector has a need for technology and the research supporting the technology. This is a critical role for both the federal lab system and academia, relative to creating market awareness of the research and translating the research in ways that enable the financial sectors' ability to assess risk and therefore provide the necessary capital, and industry's ability to understand it in order to take it to market.

**5. Access to a Trained Workforce:** every sector has a need for a workforce with the specific competencies, skills, training and knowledge critical to the industry sector. This requires the alignment of public education, higher education, and the publicly-funded workforce system to support the demand arising from occupational sectors of business and industry.

## V. PROJECT STRUCTURE

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### A. Regional Steering Committee

The ATIP Foundation has established a Regional Steering Committee, comprised of stakeholders representing the six sectors identified. The Steering Committee's role/purpose includes providing (1) thought leadership; (2) the support needed to create the educational awareness necessary to the stakeholders' understanding; (3) the assessment of the status of the region's supplier/service provider network; (4) the assessment of the five "economic foundations;" and (5) the catalyst for research translation.

### B. International Leadership

Johannes Lehmann, founder of the International Biochar Initiative (IBI) will serve as a special adviser and a member of our steering committee. From a thought leadership perspective, he has encouraged our initiative relative to the regional anchor aspect, our holistic view, and our interest in economic measure and well-being of the region, ensuring the project becomes economically viable.

He will engage the IBI science committee to provide an independent review of the effort, and will publish their findings in a full report, once the project is complete. His members will also provide scientific expertise in meetings via telephone and video conference.

**C. Administrative Leadership:**

The primary administrative leadership will be provided by the ATIP Foundation, working with the City of Mineral Wells, Texas, and the Mineral Wells Chamber of Commerce. Both the City and Chamber have adopted “advancing the bioeconomy” as one of their economic development strategies, and previously hosted one of our five regional bioeconomy forums in 2016.

**D. City/County/Sector**

Mineral Wells also will reach out to the Mayors and Chambers in the region to engage in the project. This brings local governments, economic development, and business & industry to the table.

**E. Workforce & Education Sector Leadership:**

Regional support will be provided and led by the North Central Texas Workforce Board, that has adopted the "Agribusiness" sector as one of their targeted industry sectors, and by the Texas Education Agencies Region 11 Educational Service Center. Both serve the 16 county region the Foundation has targeted, with Mineral Wells located near the geographic center.

This brings both education & workforce development to the table.

**F. Academic Sector Leadership:**

Academic support will be provided and led by Tarleton State University, an affiliate of Texas A&M, that serves the area and is conducting significant research in Biochar. This brings the academic research component to the table.

**G. Financial Sector Leadership:**

The Financial Services Sector will be led by Mutual of Omaha Bank, whose corporate office is in north Texas. They also were one of the more active participants in our previous forum series.

**H. Supply Chain Sector Leadership:**

We propose that the local USDA offices for Rural Development, the Agriculture Extension Service, and other relevant USDA agency components be actively engaged. This will serve to bring both growers and the early stages of the supply chain to the table.

**I. State Sector Leadership:**

The project will be supported at the State level by the Texas Workforce Commission, led by Labor Commissioner Julian Alvarez, and the Governor’s Office of Economic Development. This enables the Foundation to include a role for the state in the development of the model.

All stakeholders will be bound by a formal Memorandum of Agreement (MOA), committing them to work together on regional economic development strategies related to Biochar.

The Steering Committee will meet on a bi-monthly basis to ensure the project progresses in a timely manner.

## **VII. GOALS, OBJECTIVES**

This section describes the Foundation's proposed goals & objectives, relative to our project for the first twelve months.

### **A. IMPLEMENTATION GOALS:**

1. To demonstrate a methodology that will bring stakeholders together from our six identified sectors into a formal partnership for the purpose of translating federal research outcomes to the marketplace in a manner that supports wealth creation through the establishment of sustainable industry sectors in the bioeconomy, thereby stimulating job creation and economic development in rural America.

2. To demonstrate the role USDA, and perhaps other federal agencies, can play in the development of the model, relative to existing research and technical assistance programs.

### **B. SPECIAL OBJECTIVES**

1. To establish, in an identified 16 county rural region in Texas, the initial elements that will serve as the foundation for the emergence of an industry sector utilizing Biochar.

## **VIII. PRIMARY BENCHMARKS**

This section describes our benchmarks for the projects first nine months, assuming a November 1 start date; benchmarks in the final three months will be determined by the Steering Committee within the first 3 months.

### **November 2017**

- Confirm all primary partners and Steering Committee members;
- Provide Initial Biochar briefing documents

December 2017

- Conduct the initial Steering Committee meeting on December 15
- Confirm participation from stakeholders recruited in the 16 county region in all six sectors
- Launch outreach to recruit additional stakeholders

January 2018

- Organize into work groups for the purpose of conducting the initial assessments of the "supply chain" and the economic foundations.
- Develop the approach for the Educational Awareness Campaign.
- Provide briefing on federal and academic research on biochar

February 2018

- Conduct 2<sup>nd</sup> Steering Committee meeting;
- Launch the Educational Awareness Campaign
- Review initial progress on assessments

March 2018

- Report on assessments
- Report on Educational Awareness Campaign
- Provide report on regional & state research on Biochar

April 2018

- Conduct 3rd Steering Committee meeting
- Conduct Listening Sessions in primary Cities/Counties to disseminate information and solicit input

May 2018

- Report on outcomes of Listening Sessions

June 2018

- Conduct 4th Steering Committee Meeting
- Finalize all 6 assessments

July 2018

- Report on all assessments
- Define approach to resolve issues critical to each of the assessments

August 2018

- Conduct 5th Steering Committee Meeting

September 2018

- Review draft report

October 2018

- Finalize first year report

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**IX. SUMMATION**

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In terms of growing the industry sectors and optimizing the supply chains necessary to grow the bioeconomy in ways that enable and support opportunities in wealth generation and job creation, a lack of public education and awareness of the bioeconomy and the complexity of the supply chains are key issues that must be addressed in regions through activities of the six identified sector stakeholders.

Based on the input provided by participants at the eight forums ATIP facilitated under agreements with USDA, those knowledgeable about the current growth and future potential of the bioeconomy are both supportive and optimistic about the eventual success of developing sustainable industries from biomass.

There was general agreement, however, that success will be dependent upon four critical issues: (1) the development of diversified supply chains that are financially sustainable; (2) the support of the financial investment community; (3) consistent public policy; and (4) an extensive public education and awareness campaign.

The ATIP Foundation emphasizes the importance of engaging a broad group of stakeholders in each targeted region in support of the growth of the bioeconomy. We further emphasize the need for the development of a model that is sustainable, replicable, and scalable, that can be utilized in rural economic regions throughout the United States as a means to effectively engage the regional stakeholder community with the US Department of Agriculture, in support of translating USDA and academic research in ways that enable and result in wealth generation and rural economic development.