Advancing the Bioeconomy in OHIO: A Strategic Approach for Regional Rural Economic Development

(Final, July 30, 2025)

INTRODUCTION

The ATIP Foundation, affiliated with the US Department of Agriculture, is engaged in Advancing the Bioeconomy in Ohio. We are doing so on a regional basis, utilizing a replicable model developed by the Foundation, premised on the industry-cluster model developed by Michael Porter at Harvard University in the mid-1980s. Our Model is further premised on input gleaned from eight national forums hosted by the Foundation in 2016– 2017, in partnership with the federal Biomass Research & Development (BR&D)1 Board, co-chaired by the US Departments of Agriculture & Energy.

A primary aspect of our Model is to establish and maintain a "GIS Database" that identifies (1) all biomass feed stocks in the region that could be used for conversion to Energy and/or Co-Products; (2) analyze the data to identify potential demonstration sites, where a combination of feed stocks is sufficient for the conversion technologies; (3) identify community leaders and organizations that will work with ATIP to serve as a Regional Advisory Council; (4) draft and finalize a strategic plan for the establishment of the Bioeconomy, as a sustainable, viable "industry cluster"; (5) support its implementation and the facilitation of demonstration projects; and (6) establish within the Advisory Council a working group, to coordinate communication and education of stakeholders.

This document serves as the final version of a "Strategic Plan" for Advancing the Bioeconomy in Ohio, inclusive of inputs received from our engagement with local, regional and state leaders from six sectors we identify as primary stakeholders. They include (1) economic and workforce development; (2) academia; (3) municipal, county, regional and state, elected and appointed officials; (4) financial services industry; (5) business and industry; and (6) the supply chain, from biomass source to end users.

The Foundation, in a manner of speaking, is "preparing the soil for the successful planting and eventual harvest of a crop."

ESTABLISH INDUSTRY CLUSTERS

Although we often 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 cite their creation of jobs through "industry recruitment," which does not represent the development of a "sustainable economy" or a "sustainable industry cluster."

BACKGROUND

The ATIP Foundation was established in 2011 at the request of Dr. Catherine Woteki, then Chief Scientist and Undersecretary of USDA for Research Education and Extension, bringing together nine nonprofit organizations, designated as USDA Federal Partnership Intermediaries. In 2016, the Biomass Research and Development Board (BR&D) Board; comprised of 7 federal agencies (Environmental Protection Agency, U.S. Department of Agriculture, U.S. Department of Energy, U.S. Department of the Interior, U.S. Department of

Defense, U.S. Department of Transportation, the National Science Foundation, and the Office of the White House) engaged the ATIP Foundation to develop and co-host a series of five by invitation-only regional Bioeconomy Forums These were conducted in Atlanta, GA; Mineral Wells, TX; Seattle, WA; Orono, ME; and Wooster, OH. Their purpose was to garner input from a broad range of stakeholders on the "Challenges & Opportunities in Advancing the Bioeconomy." A final report on the findings was submitted to the BR&D Board in December 2016 and was revised and finalized in February 2017 and distributed to all attendees of the forums. These reports are also available on the Foundation website.

The ATIP Foundation was a named collaborator on a USDA National Institute for Food and Agriculture (USDA NIFA) grant issued in 2012. This 5-year research grant involved 22 ARS scientists and their Land Grant university partners. The role of the Foundation was reserved for the final year of the grant. During 2017, the ATIP Foundation orchestrated three regional invitation- only forums (Richland, WA; Fargo, ND; Wichita, KS) to seek stakeholder input on the challenges and opportunities for adoption and commercialization of research results on converting oilseeds to hydrotreated renewable jet fuel. The purpose was to determine a path forward that would support broad scale development of a sustainable alternative fuel industry; the ultimate goal being to promote rural economic development resulting in job opportunities along the supply chain from crop to jet fuel. The final report was issued December 18, 2017 to all attendees of the three forums, as well as to project managers at USDA NIFA. The final report, as well as all participants' comments (non-attribute) are available on the Foundation website.

In 2018, ATIP was asked to establish a replicable model for the development of the bioeconomy as a viable industry cluster by the Office of the Secretary at USDA, funded through a formal USDA partnership agreement.

The initial demonstration project was launched in November 2018, in a rural area of Texas, primarily focused on converting manure from dairies into energy and chemical compounds.

The success of that project led ATIP to establish its replicable model in 2019 in the San Joaquin Valley in California, as well as in Northwest Ohio.

In 2022, the ATIP Foundation launched its Model in Southwest Virginia. Copies of reports on all of ATIP's projects are available on the Foundation website.

See http://atipfoundation.com/activities-partnerships /for full descriptions of all Foundation activities, and links to all presentations at forums, regional and final reports.

These activities have shaped the Foundation's approach to job and wealth creation, and economic development.

PREMISE

Our economic development model is clearly focused on job creation, premised on the basic principles of regional economic development, as well as the industry cluster model developed by Michael Porter at Harvard University in the mid-1980s.

There are four (4) Primary Components of our Job Creation Model.

1. **ECONOMIC DEVELOPMENT FUNDAMENTALS**

First, understanding that there are only three (3) fundamental things happening within an economic region.

- WEALTH GENERATION, generated by primary companies who produce the products of the industry cluster. As one example, an automotive assembly plant produces cars and trucks that are sold for more than the cost of producing them, thereby generating wealth.

- WEALTH RECIRCULATION, through the taxes paid to municipal and county government; through the wages paid to individuals living within the region, and to the suppliers a service provider that provide business services, parts, components, office supplies, insurance, and all of the consumables the primary wealth generating company needs to produce its product. The focus is to ensure that the majority of those business services are procured from companies within the same economic region, thereby continuously recirculating the wealth generated.

- WEALTH MIGRATION, caused by the primary wealth generating companies purchasing most of the goods, services, supplies, and consumables needed from suppliers and service providers external from the economic region.

  Therefore, it should be clearly understood that job creation does NOT generate wealth; but wealth generation DOES create jobs.

2. JOB CREATION DRIVEN BY WEALTH GENERATION

Second, understanding there are only three (3) fundamental ways to create jobs within an economic region.

- START UP COMPANIES WITHIN THE REGION create jobs, given that a new company must hire a staff comprised of skilled, competent, knowledgeable individuals who have the capability to do the types of jobs that particular company needs in order to succeed.

- EXPANDING EXISTING COMPANIES WITHIN THE REGION by providing assistance to enable them to expand creates jobs, because as a company grows, it needs to continually expand its staff in order to keep up with the growth.

- RECRUITMENT OF NEW COMPANIES INTO THE REGION or convincing them to expand into a new economic region is the third way you create jobs. Generally, the success of recruitment is dependent upon demonstrating to the company that everything they need to succeed is available within the region. Therefore, the ability to create jobs is dependent upon the ability to (1) support startup companies, (2) support the growth of existing companies, and/or (3) recruit new companies to come into the region and establish business operations.

3. ESTABLISHING & EXPANDING INDUSTRY CLUSTERS

Third, understanding there are five (5) economic foundations that must be present or established within an economic region, that all industry clusters, and the companies that comprise them are dependent upon.

- **ACCESS TO A SKILLED, TRAINED, COMPETENT WORKFORCE** is critical to start new companies, expand existing companies, or recruit new companies into a region, meaning training

and educational programs must be in place that can train and educate the skilled workforce needed. As examples, the manufacturing and assembly industry cluster requires individuals who can operate robotic systems and assembly lines; while the healthcare industry sector requires skilled medical technicians, nurses, and other types of healthcare professionals. This also means that the publicly funded workforce system, public education, and community college systems must be engaged, providing the training that aligns with the industry clusters workforce needs.

- **ACCESS TO TECHNOLOGY** is a critical need of all industry clusters, as they require access to the types of technologies critical to their specific operations. This means that access to both academic & federal research is a factor.
- **ACCESS TO CAPITAL** is vital to all industry clusters that need access to capital and capital markets. This also means that the financial services sector must be engaged, educated, and knowledgeable about a particular industry sector, if they're going to make investments in the growth of that sector.
- **ACCESS TO INFRASTRUCTURE** is vital, since all companies, regardless of their industry clusters, move people, products, and/or information from point A to point B on a daily basis. Airlines move people. Manufacturers move products. Telecommunications move information. In essence, the infrastructure needed to support the "supply chain" we discuss, but don't always understand. Therefore, adequate transportation infrastructure, to include access to roads, interstate highway systems, railways, airports, fiber optic cable connectivity, gas transmission lines, the electric grid, and all other forms of infrastructure become vital to the success of that clusters growth within a region. This also means that both elected and appointed officials at all levels, and business & industry in general must be informed, educated, and knowledgeable about a particular industry cluster, if they are to support the funding, growth and maintenance of the necessary infrastructure.
- **SUPPORTIVE PUBLIC POLICY** is a vital foundation, as all industry clusters are sensitive to the need for public policies that are supportive of their particular industry's needs. As an example, industry clusters that are dependent upon expensive equipment are sensitive to high property tax rates.
- Therefore, it is critical that elected and appointed officials at municipal, county, and state levels are all informed, educated and supportive the public policy issues that impact a particular industry cluster, particularly if it is being newly established within a region.

4. ALIGNMENT & INTEGRATION OF STAKEHOLDERS

Fourth, understanding that to effectively establish, build, and maintain the five economic foundations needed by all industry clusters, our model engages the six key stakeholder sectors that are critical to those five economic foundations, by informing and educating them about the potential of the industry sector, and about the role they must play to support the Cluster.

They include:

WORKFORCE & ECONOMIC DEVELOPMENT, as the resources and capabilities to train and

educate the workforce needed is dependent upon public education, community colleges, universities, and local workforce boards. Therefore, we work with them to ensure that they are providing the specific training and education needed to support a particular industry cluster's workforce requirement.

ACADEMIA, the technological know-how and resources needed by industry can be supplied, to a significant extent, by university research programs, as well as federal research. Therefore, we work with universities to assist them in understanding a particular industry cluster; the resources the federal lab system can provide; and link them with companies within the industry cluster to establish joint and directed research projects in support of the cluster.

FINANCIAL SERVICES provide the financial support necessary to an industry cluster, inclusive of investment, capital, loans, lines of credit, etc. is supplied by the financial services sector. Therefore, we work directly with the financial services industry to assist their understanding of the opportunities to invest in these companies, including knowledge about USDA's capabilities as a government guaranteed lender.

BUSINESS & INDUSTRY is the source of the suppliers and service providers needed by companies within the cluster. Therefore, we work directly with all businesses, primarily through the organizations that represent them (i.e. Chambers of Commerce and Industry & Trade Associations) to provide the knowledge and connectivity needed to assist them in becoming suppliers and service providers to leading companies within the industry clusters.

ELECTED & APPOINTED OFFICIALS primarily finance and build both the infrastructure needed, and public policies established by elected and appointed officials at city, county, and state levels. Therefore, we work directly with city, county, and state governments to ensure they are both informed and educated about the needs of these industry sectors, and the economic potential they represent for the cities, counties, and states.

SUPPLY CHAIN FROM BIOMASS SOURCE TO END USER is something discussed on a daily basis, yet still not clearly understood by the general public. Therefore, we engage all components of the supply chain, from the sources of biomass in the fields through the logistics needed to move the biomass to conversion facilities, through the markets necessary to buy and utilize the products of biomass conversion, to the general community to create awareness in order to buy those products.

PRIMARY ELEMENTS

The model is guided by six significant, relevant, overarching elements that were universally expressed and supported by participants in all eight national forums ATIP, in partnership with the BR&D Board, conducted in 2016 – 2017, relative to specific issues and recommendations to be addressed by the broad stakeholder community.

The six elements 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, forum participants suggested that federal agencies should consider funding more small-scale demonstration projects, rather than fewer largescale 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 biomass material from the source of harvest 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 (by the 8th grade) of opportunities; 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.

ENGAGING THE PRIMARY STAKEHOLDERS

The eight forums conducted in 2016–2017 provided evidence that six critical stakeholder groups must be engaged to ensure success in utilizing federal research outcomes to stimulate economic growth and development. Leadership for each of those six sectors was identified and briefed by the ATIP Foundation prior to the launch of Advancing the Bioeconomy in Ohio.

Those stakeholders continue to provide the leadership to ensure the model actively engages thought and opinion leaders in each of the six sectors.

This section describes the Sector Stakeholders we have engaged in Ohio, who have assisted us in documenting the roles each sector must play, for this to become a replicable model for regional economic development.

1. **Workforce & Economic Development**
State leadership is provided by the Center For Innovative Food Technology (CIFT), and the US Department of Agriculture, Ohio Office of Rural Development.

2. **Academia**
State leadership is provided by Ohio State University, who hosted one of our forums in 2016.

3. **Government**
Leadership for Municipal, County, Regional and State Elected & Appointed Officials is primarily led by the City & County officials in the counties of our targeted region.

4. **Financial Services**
Leadership for the Investment Community is primarily led by the primary banking institution in the region.

5. **Business & Industry**
Leadership for Business & Industry is primarily led by the America Dairy Association.

6. **Supply Chain**
We have engaged the Ohio Departments of Agriculture and Forestry in identifying sources of Biomass, and our Economic Development Corporations to engage local supply chain components.

UTILIZING FEDERAL RESOURCES

A primary component of our plan is to engage federal agencies in the process, and to create the awareness, knowledge, and capabilities of local communities and organizations to take advantage of their federal resources. Those resources include, but are certainly not limited to, research outcomes, market assessment, and federal patented technology discoveries, as well as funding.

This section describes the federal agencies, with whom we have relationships, that have resources available to support our work. Please note that the US Department of Agriculture has an International Division, with offices and staff located around the globe. Their primary purpose is to assist other countries in developing their food supplies. This includes the growth of the bioeconomy.

DEPARTMENT OF AGRICULTURE (USDA)

USDA is and has been our primary partner since ATIP was incorporated in 2011, at the request of Catherine Woteki, then Undersecretary and Chief Scientist at USDA. USDA is second only to Department of Defense in size

and programs. USDA's 29 agencies and offices are grouped within eight Mission Areas (https://www.usda.gov/our-agency/about-usda/mission-areas) as follows. We provide a brief description of some of those agencies, especially those with whom we regularly engage or are highly relevant to our current initiative, and we encourage you to look at the specific agency websites accessible at https://www.usda.gov/our-agency/agencies.

1. ***Farm Production and Conservation***
    a. **Farm Service Agency** (FSA; https://www.fsa.usda.gov/)

The Farm Service Agency implements agricultural policy, administers credit and loan programs, and manages conservation, commodity, disaster and farm marketing programs through a national network of offices.

    b. **Natural Resources Conservation Service** (NRCS; https://www.nrcs.usda.gov/)

NRCS provides leadership in a partnership effort to help people conserve, maintain and improve our natural resources and environment.

    c. **Risk Management Agency** (RMA; http://www.rma.usda.gov/)

RMA helps to ensure that farmers have the financial tools necessary to manage their agricultural risks. RMA provides coverage through the Federal Crop Insurance Corporation, which promotes national welfare by improving the economic stability of agriculture.

2. ***Food, Nutrition and Consumer Services***
    a. **Food and Nutrition Service** (FNS; https://www.fns.usda.gov/)

Our mission is to increase food security and reduce hunger by providing children and low-income people access to food, a healthful diet and nutrition education in a way that supports American agriculture and inspires public confidence.

3. ***Food Safety***

Food Safety ensures that the Nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and properly labeled, and packaged. This mission area also plays a key role in the President's Council on Food Safety and has been instrumental in coordinating a national food safety strategic plan among various partner agencies including the Department of Health and Human Services and the Environmental Protection Agency.

    a. **Food Safety and Inspection Service** (FSIS; https://www.fsis.usda.gov/)

FSIS Mission Statement: Protecting the public's health by ensuring the safety of meat, poultry, and processed egg products. FSIS Vision Statement: Everyone's food is safe.

4. ***Marketing and Regulatory Programs***

Marketing and Regulatory Programs facilitate domestic and international marketing of U.S. agricultural products and ensures the health and care of animals and plants. MRP agencies are active participants in setting national and international standards.

a. **Agricultural Marketing Service** (AMS; (https://www.ams.usda.gov/)

AMS facilitates the strategic marketing of agricultural products in domestic and international markets while ensuring fair trading practices and promoting a competitive and efficient marketplace. AMS constantly works to develop new marketing services to increase customer satisfaction.

b. **Animal and Plant Health Inspection Service** (APHIS; https://www.aphis.usda.gov/aphis/home)

The Animal and Plant Health Inspection Service is a multi-faceted Agency with a broad mission area that includes protecting and promoting U.S. agricultural health, regulating genetically engineered organisms, administering the Animal Welfare Act and carrying out wildlife damage management activities. These efforts support the overall mission of USDA, which is to protect and promote food, agriculture, natural resources and related issues.

5. ***Natural Resources and Environment***

a. **Forest Service** (FS; https://www.fs.usda.gov./)

FS sustains the health, diversity and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.

6. ***Research, Education and Economics Dedicated to the creation of a safe, sustainable, competitive U.S. food and fiber system, as well as strong communities, families, and youth through integrated research, analysis, and education.***

a. **Agricultural Research Service** (ARS; https://www.ars.usda.gov/)

ARS is USDA's principal in-house (intramural) research agency. Their job is finding solutions to agricultural problems that affect Americans every day from field to table. Here are a few numbers to illustrate the scope of ARS:

- 660 research projects within 15 National Programs
- 2,000 scientists and post docs
- 6,000 other employees
- 90+ research locations, including overseas laboratories
- $1.4 billion fiscal year budget

Note on relevant Foundation expertise. Dr. Rick Brenner, Director of the ATIP Foundation (2013- present), served as a scientist and Research Leader in USDA Agricultural Research Service (ARS) (1982-2001), and as the Assistant Administrator for Technology Transfer (2004 – 2012), representing the Secretary of Agriculture on issues pertaining to management of intellectual property arising from USDA research, and with delegated authority for licensing inventions developed through intramural research from any of the 17 USDA agencies. He was the Agency Representative to the Federal Laboratory Consortium for Technology Transfer for USDA, the Interagency Working Group for Technology Transfer convened by the Department of Commerce, and also represented USDA on the White House (WH) Innovation and Entrepreneurship working group, the WH Startup America task force, and the WH Task Force for Advancing Regional Innovation Clusters.

b. **Economic Research Service** (ERS; www.ers.usda.gov/about-ers)

The mission of USDA's Economic Research Service is to anticipate trends and emerging issues in agriculture, food, the environment, and rural America and to conduct high-quality, objective economic research to inform and enhance public and private decision making. ERS shapes its research program and products to serve those who routinely make or influence public policy and program decisions. Key clientele includes White House and USDA policy officials; the U.S. Congress; program administrators/managers; other Federal agencies; State and local government officials; and organizations, including farm and industry groups. ERS research provides context for and informs the decisions that affect the agricultural sector, which in turn benefits everyone with efficient stewardship of our agricultural resources and the economic prosperity of the sector.

c. **National Agricultural Statistics Service** (NASS; https://www.nass.usda.gov/index.php)

The USDA's National Agricultural Statistics Service (NASS) conducts hundreds of surveys every year and prepares reports covering virtually every aspect of U.S. agriculture. Production and supplies of food and fiber, prices paid and received by farmers, farm labor and wages, farm finances, chemical use, and changes in the demographics of U.S. producers are only a few examples.

NASS is committed to providing timely, accurate, and useful statistics in service to U.S. agriculture. To uphold our continuing commitment, NASS will:

- Report the facts on American agriculture, facts needed by people working in and depending upon U.S. agriculture.
- Provide objective and unbiased statistics on a pre-announced schedule that is fair and impartial to all market participants.
- Conduct the Census of Agriculture every five years, providing the only source of consistent, comparable, and detailed agricultural data for every county in America.
- Serve the needs of our data users and customers at a local level through our network of State field offices and our cooperative relationship with universities and State Departments of Agriculture.
- Safeguard the privacy of farmers, ranchers, and other data providers, with a guarantee that confidentiality and data security continue to be our top priorities.

d. **National Institute of Food and Agriculture** (NIFA; https://nifa.usda.gov/)

NIFA's mission is to invest in and advance agricultural research, education, and extension to solve societal challenges. NIFA's investments in transformative science directly support the long-term prosperity and global preeminence of U.S. agriculture. NIFA is the principal extramural research agency working principally through competitive grants to Land Grant institutions (1862 Land-grant institutions), Historically Black Colleges and Universities (HBCU; 1890 Land-grant institutions), Native American tribally controlled colleges and universities (1994 Land-grant institutions) and other federal agencies conducting activities in the agriculture sector. NIFA collaborates with leading scientists, policymakers, experts, and educators in organizations throughout the world to find innovative solutions to the most pressing local and global problems. Some of their website-stated activities:

- Scientific progress made through discovery and application;
- Advances the competitiveness of American agriculture;
- Bolsters the U.S. economy;

- Enhances the safety of the nation's food supply;
- Improves the nutrition and well-being of American citizens;
- Sustains natural resources and the environment;
- Builds energy independence.

7. Rural Development (RD; https://www.rd.usda.gov/)

RD helps rural areas to develop and grow by offering Federal assistance that improves quality of life. RD targets communities in need and then empowers them with financial and technical resources.

a. **Rural Business-Cooperative Service** (RBS; https://www.rd.usda.gov/about-rd/agencies/rural-business-cooperative-service)

RBS offers programs to help businesses grow as well as job training for people living in rural areas. These programs help provide the capital, training, education and entrepreneurial skills that can help people living in rural areas start and grow businesses or find jobs in agricultural markets and in the bio-based economy. According to their website, "[their] programs help provide the capital, training, education and entrepreneurial skills that can help those living in rural areas start and grow businesses or find jobs in agricultural markets and
in the bio-based economy. USDA and our public and private partners are connecting rural residents to the global economy by:

- Supporting business growth and development.
- Assisting with creating wealth and supporting rural America.
- Improving the effectiveness of programs serving cooperatives
- Creating and keeping jobs through recreation as well as restoring, conserving and managing rural America's natural resources.
- Bringing fast internet to more homes and businesses.

b. Rural Utilities Service (RUS; https://www.rd.usda.gov/about-rd/agencies/rural-utilities-service)

USDA's Rural Utilities Service (RUS) provides much-needed infrastructure or infrastructure improvements to rural communities. These include water and waste treatment, electric power and telecommunications services. All of these services help to expand economic opportunities and improve the quality of life for rural residents.

c. **Rural Housing Service (RHS;** https://www.rd.usda.gov/about-rd/agencies/rural-housing-service)

USDA's Rural Housing Service offers a variety of programs to build or improve housing and essential community facilities in rural areas. We offer loans, grants and loan guarantees for single and multi-family housing, childcare centers, fire and police stations, hospitals, libraries, nursing homes, schools, first responder vehicles and equipment, housing for farm laborers and much more. We also provide technical assistance loans and grants in partnership with non-profit organizations, Indian tribes, state and federal government agencies, and local communities.

Note on relevant Foundation expertise. Todd Campbell of Clean Economy Works LLC, who serves Of Counsel to the ATIP Foundation, formerly served as Chief of Staff for the mission area and Senior Advisor to the

Secretary of Agriculture Office for energy and bioeconomy issues at the U.S. Department of Agriculture and has deep knowledge of surrounding regulatory issues and the financial and technical assistance programs available to assist in industry development.

8. ***Trade and Foreign Agricultural Affairs***
   a. **Foreign Agricultural Service** (FAS; https://www.fas.usda.gov/)

FAS works to improve foreign market access for U.S. products. This USDA agency operates programs designed to build new markets and improve the competitive position of U.S. agriculture in the global marketplace. In addition to its Washington, D.C. staff, FAS has a global network of 93 offices covering 171 countries. These offices are staffed by agricultural attachés and locally hired agricultural experts who are the eyes, ears, and voice for U.S. agriculture around the world. FAS staff identify problems, provide practical solutions, and work to advance opportunities for U.S. agriculture and support U.S. foreign policy around the globe.

9. ***Codex Alimentarius Commission (https://www.usda.gov/codex)***

The U.S. Codex Office (USCO), housed in USDA's Trade and Foreign Agricultural Affairs, acts as the national focal point for the U.S. Codex Program. Its mission is to engage stakeholders in the development and advancement of science-based food standards for the benefit of the United States and the worldwide community. USCO manages the planning, policy development, support, and coordination for U.S. involvement in Codex, and develops strategies to accomplish U.S. objectives. Established by the United Nations Food and Agriculture Organization (FAO) and the World Health Organization (WHO) in 1963, the Codex Alimentarius, or "Food Code," is the preeminent international food standards-setting body that protects the health of consumers and ensure fair practices in the food trade through the establishment of voluntary international standards, guidelines, and codes of practices. U.S. Codex Program.

The U.S. Codex Program is an interagency partnership that engages stakeholders in advancing science-based food standards to protect the health of consumers and ensure fair practices in the food trade.

Several federal agencies participate in the U.S. Codex Program through providing senior staff and executive delegates to represent the United States on many Codex committees, and the United States also chairs some committees. These Delegates to Codex committees (PDF, 352 KB) are primarily employed by regulatory agencies that set U.S. domestic food standards. Other U.S. agency officials participate in vital policy, coordination, and information dissemination activities relevant to their agency missions and interests.

DEPARTMENT OF ENERGY (DOE) https://www.energy.gov/technologycommercialization/office-technology-commercialization
DOE is Co-Chair of the Biomass Research & Development Board (RB&D). They were also involved in the five national forums ATIP convened in 2016, and the three national forums ATIP convened in 2017.

Anthony Pugliese is the Chief Commercialization Officer and Director, Office of Technology Commercialization of the US Department of Energy.

Essentially, he leads DOE efforts to accelerate commercialization of innovative energy technologies, strengthen public – private partnerships, and enhance technology transfer from DOE's national labs.

DOE also represents a potential source of funds, particularly relevant to your energy production.

ENVIORNMENTAL PROTECTION AGENCY (EPA) https://www.epa.gov

The Environmental Protection Agency is one of the seven members of the Federal Biomass Research & Development Board (BR&D). They are a critical partner in terms of issues related to support environmental issues and permits with business prospects.

DEPARTMENT OF LABOR (DOL) https://www.dol.gov

Note on relevant Foundation expertise. Wes Jurey, President & CEO of the ATIP Foundation, has worked closely with DOL since 1990, having served on a number of DOL Boards, Councils, and Commissions. He also served as Chairman of the Texas Workforce System from 2008-2017. As our business prospects expand, DOL has significant resources at the federal, state and local levels to assist local workforce needs, inclusive of new hires and incumbent workers.

DEPARTMENT OF HOUSING & URBAN DEVELOPMENT (HUD) https://www.hud.gov

Wes has also worked closely with HUD since 1990, at the federal level and with their multi-state Regional Offices. HUD is the source of the Innovation Zones and is also the Agency that funds Economic Development Initiative (EDI) Grants.

ENGAGING OHIO STATE AGENCIES & ORGANIZATIONS

OHIO CENTER FOR INNOVATIVE FOOD TECHNOLOGIES

Rebecca Singer, President & CEO is a member of ATIPs Board and is a committed partner with ATIP to develop the "Advancing the Bioeconomy" model in Ohio.

USDA OHIO OFFICE OF RURAL DEVELOPMENT

Evan Kohler is the Business Specialist of the USDA office we work with.
Our development of our Model in Ohio, including our GIS Database, is partially funded by a USDA Rural Development Grant through the Ohio State Office.

STRATEGIC PLAN

The establishment of a "Statewide Campaign" to create awareness of and support for the Bioeconomy, is partially funded by the American Dairy Association Mideast.

CREATING REGIONAL CAPACITY

This section describes the specific work we are doing to establish regional capacity for the growth and sustainability of the Bioeconomy Sector, and to ensure the Region's Stakeholders are knowledgeable and supportive. Primary regional Stakeholders are led by the County Economic Development Corporations (EDCs) who in turn engage municipalities, county governments, and employer led organizations.

Regional Steering Committee

The Ohio 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;" (5) a catalyst for research translation; and (6) assistance in developing a shared data base of the applicable resources within the Region, to include biomass.
The Steering committee provides the thought leadership to encourage the establishment of a

sustainable industry cluster, focused on the Bioeconomy, within the region; a holistic view of "regional sustainable economic development," and an interest in the economic measure and well-being of the region, ensuring that any project becomes economically viable.

Administrative Leadership:

The ATIP Foundation provides the administrative leadership for the Model, working closely with the Economic Development Corporations (EDCs) as well as City & County Governments; education and workforce development; and producers and commodity groups, within the region.

The Regional Strategic Work Plan for the region, led by ATIP in partnership with the EDCs, consists of 5 primary tasks:

1. Identify, analyze, and compile information and data regarding biomass business opportunities (i.e. biomass feedstocks, suppliers & service providers, supply chain networks, providers, access to capital, workforce training, etc.)
2. Identify, train, and provide technical assistance to local economic development organizations
3. Assist in the creation of new rural businesses related to advancing the bioeconomy;
4. Conduct local community and multi-county economic development planning; and
5. Enhance the capabilities within economic regions of centers for training, technology and trade, regarding the bioeconomy.

ESTABLISHING & MAINTAINING RESOURCE SUPPORT

This section describes, in general terms, the resources that have been compiled by ATIP in each region. Those resources, including extensive data, are available to assist our regional partners and business prospects, in the establishment of business facilities within the states/regions we serve.
The Content includes:

Biomass Inventory:

We have compiled an extensive and comprehensive geospatial database (ArcGIS Pro) of various biomass feedstocks in OHIO. Some specific examples follow:

- For OH, Manure production for all concentrated animal feeding operations (CAFOs) and Animal Feeding Operations (AFOs) is calculated. These data are expressed in animals per farm (by type; beef, dairy, swine, laying hens, sheep, horses), dry tons of manure per year per farm, and most importantly Daily Tons per farm at 90% moisture. we developed or assigned NRCS coefficients for each animal type – and even physiological states of the animal (i.e., by sex, pre-reproductive, reproductive, milking state, nursing state) to calculate the quantities of nitrogen (N), phosphorus (P) and potassium (K) in excrement. This data can be used by ranchers and farmers to recover resources of the manure for subsequent use as fertilizer in their ag operations. We anticipate that biomass conversion companies will use these data to calculate the value of animal wastes they are commissioned to process and biorefined from

each CAFO operation.

- EPA Food waste estimates were updated with March 2025 data. For our 11-county study area includes 9 correctional facilities, 230 educational institutions, 71 food manufacturers and processors, 308 food wholesale and retailers, 11 healthcare industries, 143 hospitality industry, 924 restaurants and food services. We expanded this database to encompass all of Ohio. Thus, we have in our GIS database the following state-wide layers of excess foods for all categories of facilities including restaurants and food services (12,434), food wholesale and retail (5,352), healthcare facilities (2,052), the hospitality industry (4,674), food manufacturers and processors (1,284), foodbanks pantries and soup kitchens (403), educational institutions (4,738), and correctional institutions (222). Anaerobic digesters We have also identified 76 anaerobic digesters statewide (from EPA and ODA data requests) with 17 in the NW counties including 11 at dairies and 1 at a poultry ranch.
- Municipal solid wastes data include landfills, biomass processing facilities (composters), and municipal wastewater sewage sludge (including amount of biosolids generated at each facility). In some cases, we have the fate of the sludge (i.e. transfer to another processing facility, direct to landfill, land application, etc.). These OH state wide datasets are extensive (5,155 entries), providing type of facility (composting, disposal, EMSW conversion, in-vessel digestion, and transfer/processing), and an extensive list of waste accepted for each of the facilities.

Infrastructure – Supply Chain:

Also georeferenced in each CAFO map is the infrastructure, including roads and streets, electric transmission lines, railways, and natural gas pipelines.

Suppliers, Service Providers:

This list (georeferenced) is critically important for identifying and contacting those businesses that either participate or can participate in advancing the bioeconomy. The lists include all local utility providers (gas, electric, wastewater, fiber, internet, phone); financial institutions and whether they participate in either SBA or USDA loan guarantee programs; waste haulers (ag residues, general wastes, sanitation), trucking and transport companies, workforce training institutions, elected city / county officials, and especially important --- all Economic Development organizations in each region. This database typically lists specific persons and phone numbers to contact for more information.

Workforce Development Resources

- Local Workforce Boards

  Can allocate funding specifically in support of employment needs, as well as those of suppliers and service providers. Significant funding is available to support new worker training as well as incumbent worker training.

- Independent School Districts

  We are engaging Independent School Districts to utilize Nationally Recognized Industry Certifications as the basis of the training they are providing in the areas of logistics, manufacturing,

and production, in their Career & Technical Education Programs.

- Community Colleges

We are encouraging Community Colleges to align their course offerings to support agribusiness workforce needs.

Public Policy

The ATIP Foundation, working with and through our Statewide Advisory Council, directly supported by the American Dairy Association Mideast, has establishing a campaign to create greater awareness of the benefits and value of the bio economy in Ohio

We have created a specific "Ohio website" presence populating within the website information, materials, documents, and other sources of information that can be utilized throughout the state, by organizations and individuals with an interest in promoting the expansion, knowledge, and awareness of the bioeconomy.

Capital

The ATIP Foundation has extensive contacts with the investment community (private sector) as well as a number of federal, state, and local resources of capital. Federal resources include close interactions with USDA Rural Development Business and Industry Loan Program (loan guarantee); Intermediary Relending Program; Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program (9003); Rural Energy for America Program / Renewable Energy & Energy Efficiency; Rural Business Development Enterprise and Opportunity Grants, and others. The Foundation also can provide specific information on the SBA Loan Guarantee programs across all states, including those that specialize in small, micro, and macro lending.

Technology

The ATIP Foundation has specialized experience in accessing technologies as well as in facilitating opportunities to jointly research and develop technologies through the federal laboratory system. Dr. Brenner served for over 10 years as the USDA Representative to the Federal Laboratory Consortium for Technology Transfer (https://federallabs.org/), and in that capacity, had one counterpart from each of the cabinet-level agencies in the Federal government. For example, Dr. Brenner had sole delegated authority from the Secretary of Agriculture to license any technology (patent) from any research agency of USDA. His counterparts had similar authority in their respective agencies (e.g., Department of Defense (DoD), Environmental Protection Agency (EPA), Department of Energy (DOE), Department of Transportation (DOT), Health and Human Services, (HHS), NASA, Department of Commerce (DOC), Department of the Interior (DOI). Currently, Dr. Brenner personally knows eight of these representatives. Thus, the ATIP Foundation can engage specific representatives in each federal department and agency to identify technologies (patents, plant varieties) available for licensing through Patent License Agreements (PLA) by private sector companies and nonprofit entities; these licenses may be non- exclusive (licensed by several companies), or exclusive (licensed to 1 company only for the term of the patent).

Similarly, the Foundation can serve as intermediary to companies in assisting them to enter into specific Cooperative Research and Development Agreements (CRADAs) in all federal agencies. CRADAs are a

unique way for corporations to access the 900+ federal laboratories across the U.S. CRADAs offer companies a way to jointly execute exclusive research projects aimed at creating new technologies (patentable inventions). In exchange for sharing part of the research costs, the corporation is guaranteed an exclusive license to any and all inventions arising from the joint research. CRADA policies to vary slightly among federal agencies, and the Foundation is positioned to navigate that, and to locate specific federal scientists to partner with corporations on addressable research problems.