



Arkansas Clean Technology Primer

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EXECUTIVE SUMMARY

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*“A focus on **clean technology** can be an opportunity for Arkansas to create jobs, improve global competitiveness, keep energy dollars in the state and strengthen rural communities.”*



Executive Summary

In these challenging economic times, states need to identify opportunities where competitive advantages exist and where jobs will be created. No one cluster can provide economic security to any state and today's dynamic economic transition can be punitive or can offer opportunity. Arkansas's diverse geography and population will be best served with a comprehensive economic development plan that recognizes strengths, anticipates future opportunity and uses every means available to nurture jobs.

One growing opportunity is in the clean technology sector. This is a diverse industry ranging from scientists who develop better biofuels to manufacturers producing wind turbines to technicians installing energy efficient heating and cooling equipment.

Clean technology creates an opportunity for Arkansas in four ways:

- **Improves global competitiveness** – Energy costs are one of the three primary factors of global manufacturing competitiveness.¹ Using less energy improves a company's bottom line.
- **Keeps energy dollars in the state** – More than a \$1 billion a year leaves Arkansas's economy to pay for out-of-state energy sources.² Developing and implementing new technologies that allow commercial and residential consumers to use less energy or to consume energy from local resources keeps energy dollars from leaving the Arkansas economy.
- **Creates jobs** – Between 2008 and 2010, Arkansas lost nearly 40,000, or 3.3 percent, of its jobs.³ These job losses signal an opportunity for Arkansas to evaluate the state's strengths and assets in new sectors, such as clean technology.
- **Strengthens rural communities** – With rural poverty rates hitting 21 percent in 2010, the clean technology economy provides a much-needed opportunity for rural communities.⁴ These opportunities include feedstock production for bio-based power, fuels and consumer products as well as manufacturing bio-based products and components for the wind and solar industries.

The *Arkansas Clean Technology Primer* identifies the clean technology assets already in place in Arkansas. These assets include research institutions, workforce development programs, public and private economic development efforts and the existing companies that make up Arkansas's clean technology economy. With these assets as a foundation, Arkansas can build its potential as a national leader in clean technology.

Arkansas's Clean Technology Economy

The clean technology economy consists of the creation, implementation and distribution of technologies related to diversifying energy sources, pollution mitigation and reducing greenhouse gas emissions. To characterize this economy in Arkansas, research was conducted on the types of clean technology companies and the number of jobs present.

Clean Technology Jobs. To estimate the number of Arkansas's clean technology jobs and identify job trends, three national clean technology reports were analyzed: The Brookings Institution's *Sizing the Clean Economy*, Pew Center on the States' *The Clean Energy Economy*, and U.S. Conference of Mayors' *Current & Potential Green Jobs in the U.S. Economy* (Table 1).⁵ In reviewing these reports, the following observations were made:

Table 1
Clean Technology Job Estimates for Arkansas

Study	Jobs	Data Date
The Brookings Institution – All Sectors	32,450	2010
The Brookings Institution – Renewable Energy & Energy Efficiency Sectors	10,513	2010
Pew Center on the States	4,597	2007
U.S. Conference of Mayors	3,738	2006

- **Arkansas's clean technology economy is growing faster than the rate of all jobs combined.** Brookings data indicates that the clean technology economy grew by 16 percent between 2003 and 2010, while Pew found it grew by 7.8 percent between 1998 and 2007. Arkansas had an overall decline in jobs of 2 percent between 2001 and 2010.
- **Manufacturing and bio-based products are two of the fastest-growing clean technology segments in Arkansas.** According to Brookings, Arkansas was ranked third in the growth of Green Consumer Products jobs from 2003 to 2010, with a growth rate of 20 percent and accounting for

over 4,000 jobs. Brookings also ranked Arkansas seventh in the country for growth in the Sustainable Forestry Products segment and 9th in the country for growth in the Biofuels/Biomass segment. The Sustainable Forestry Products segment grew by 6 percent (937 jobs) and Biofuels/Biomass grew by 23 percent (329 jobs) between 2003 and 2010.

- **Currently, a large number of clean technology jobs in Arkansas reside in areas related to waste management and recycling.** In the Brookings and Pew reports, the categories consisting of waste management and recycling accounted for 30-60 percent of the clean technology jobs. Due to this segment's maturity, it is true in most states that the largest number of jobs falls in this category.

Clean Technology Companies. In addition to job estimates, mapping employers is also important for identifying where, in which sectors and to what extent Arkansas is active in the clean technology economy. Seventy-eight clean technology companies are mapped in Figure 1. The primary sectors represented are bioproducts, energy efficiency, green building, solar and wind.

- **Wind Manufacturing** – While there are no large-scale wind installations in Arkansas, the wind manufacturing sector has continued to grow over the last five years. Key companies in this sector include international companies, such as Nordex and Mitsubishi in Jonesboro and Fort Smith, that build wind turbines. In addition, the state is home to local companies, such as Greenway Wind based in Jonesboro, a full-service small wind company.

City	Company Name	Sector
Arkadelphia	Danfoss	Energy Efficiency
Batesville	FutureFuel	Bioproducts
Bentonville	Sun Coast Energy Systems	Energy Efficiency
Cherokee Village	Solargy Services LLC	Solar
Conway	Nabholz Construction	Green Building
Dardanelle	IntenCity Lighting	Energy Efficiency
Fayetteville	Arkansas Power Electronics International	Smart Grid
	BioEnergy Systems	Bioproducts
	BlueInGreen	Water
	CaseStack	Energy Efficiency
	CGP Cogeneration Custom Construction Co.	Green Building
	Coenco	Energy Efficiency
	E3Regenesis	Energy Efficiency
	Fibrowatt	Bioproducts
	Home Energy Consultants	Energy Efficiency
	Ineos Bio	Bioproducts
	LGW Inc.	Energy Efficiency
	NextGen Illumination	Energy Efficiency
	Powers Energy of America	Bioproducts
	Swiftwater Development	Green Building
	Trem/Wel Energy	Energy Efficiency
Fort Smith	Baldor Electric Co.	Energy Efficiency
	Cobblestone Homes	Green Building
	EnviroGuard Technologies	Energy Efficiency
	Mitsubishi Power Systems America	Wind
	Rheem Manufacturing Co.	Energy Efficiency
	Solar Shield Inc	Energy Efficiency
	Weather-barr	Energy Efficiency
Hot Springs	GTS Inc.	Energy Efficiency
	Liberty Solar Solutions LLC	Solar
	PRM Energy Systems Inc.	Bioproducts
Jonesboro	Greenway Wind	Wind
	Infinite Enzymes	Bioproducts
	Nice-Pak	Bioproducts
	Nordex USA Inc.	Wind
Kingston	Rocky Grove Sun Co.	Solar
Little Rock	Blanz Engineering & Environmental Solutions	Energy Efficiency
	CLEARresult	Energy Efficiency
	Curtis H. Stout Inc.	Energy Efficiency
	Energy Systems Group	Energy Efficiency
	HERS Inc. (Home Energy Raters)	Energy Efficiency
	Histecon Associates	Energy Efficiency
	LM Wind Power	Wind
	L'Oreal USA	Bioproducts
	MESA Landscape Architects	Green Building

City	Company Name	Sector
	Polymer Composites (owned by ETW International)	Wind
	Rooftop Wind Power	Wind
	Solar Source Consulting	Solar
	Stellar Sun Shop	Solar
	Viridian (Eco Intergration)	Green Building
Marion	Southern Soy Scents	Bioproducts
Marshall	Tradewind Energy	Wind
Mena	Nidec-Motor Corp. (previously Emerson Motor Co.)	Energy Efficiency
Mountain Home	BPSi Foam Insulators	Energy Efficiency
North Little Rock	Energy Master Home	Energy Efficiency
Osceola	Beckmann-Volmer	Wind
Pea Ridge	O Y Not Solar	Solar
Ponca	Green Energy Products	Wind
Rogers	Derry Berrigan Lighting Design	Energy Efficiency
	Luma Vue	Energy Efficiency
	Silicon Solar Solutions	Solar
	Stitt Energy Systems Inc.	Green Building
	Winds of Change	Wind
Russellville	Dow Chemical	Energy Efficiency
	H5 Energy (previously Energy Design Systems)	Energy Efficiency
Sheridan	CENTRIA	Green Building
Siloam Springs	Appro-Tec Renewable Energy	Solar
Springdale	BioBased Technologies	Bioproducts
	EcoPotential	Green Building
	Paschal Heat, Air, and Geothermal	Energy Efficiency
	Sun City Solar Commercial Energy	Solar
	Trane Arkansas	Energy Efficiency
St. Paul	Programming & Design Associates LLC	Energy Efficiency
Stuttgart	Lennox International	Energy Efficiency
Trumann	Ashley Lighting Inc.	Energy Efficiency
Van Buren	Arkansas Lamp Manufacturing	Energy Efficiency
West Little Rock	BioFoam Insulation of Arkansas	Bioproducts

- **Bioproducts** – The bioproducts category includes companies that are involved in the creation and deployment of power, transportation fuel and consumer products made from biomass (plant and organic materials). Bioproducts firms in Arkansas produce a wide variety of products: FutureFuel in Batesville is producing biodiesel; PRM Energy Systems in Hot Springs designs and implements systems that use biomass to produce heat and electricity; and BioBased Technologies produces bio-based insulation.
- **Energy Efficiency** – Companies in the energy efficiency category are involved in the creation and deployment of products that reduce energy consumption. For example, NextGen Illumination in Fayetteville develops LED products and provides lighting solutions to reduce energy consumption while improving lighting options. Lennox International is another company that manufactures energy-efficient HVAC systems in Stuttgart.
- **Green Building** – Companies that design and construct buildings that use energy more efficiently and are built with renewable resources are in the green building category. MESA Landscape Architects, a member of the U.S. Green Building Council, develops sustainability options for clients, such as the best options to use water and light efficiently in landscape projects. Viridian is a consulting firm that has expertise in the design and development of LEED buildings, energy efficiency plans and energy modeling services.
- **Solar** – Most of the solar companies in Arkansas are involved in the installation and maintenance of solar energy systems, such as Liberty Solar Solutions in Hot Springs and Rocky Grove Sun Company in Kingston. One exception is Silicon Solar Solutions in Fayetteville. This startup firm is focused on using less silicon while at the same time producing more power.

Clean Technology Innovation Economy

Innovation assets are another key feature of the clean technology economy. These assets encourage innovation through funding, research, commercialization, and workforce development. It will be through innovation that Arkansas's clean technology economy will flourish. There were numerous assets identified in the following categories:

Clean Technology Research Centers. Research is often where innovation begins. Arkansas is home to a number of research centers with expertise in clean technologies. Two well-established areas of research are biomass and electric power transmission/battery technologies. In addition, new research capacity is being built in solar technology research.

- **Biomass & Bioproducts Research** – A number of research efforts in Arkansas occur in the biomass field. A primary hub of activity occurs at the Arkansas Center for Plant-Powered Production (P3). The center draws from researchers at Arkansas State University, University of Arkansas at Little Rock and University of Arkansas at Fayetteville to build on the state's strength in the agriculture and food industries. Recent research investments

focus on the interface of agriculture, the environment and medicine. The center also links research competitiveness with outreach and entrepreneurship to ensure knowledge-based economic development. In addition to P3, other research projects include work at Arkansas State University in the area of plant cell walls and biomass conversion and at the Arkansas Forest Resources Center's research on the sustainability of forest-based natural resources.

- **Electric Power Transmission/Battery Technology** – Research investments surrounding electric power transmission and battery technology are growing in Arkansas. The National Center for Reliable Electric Power Transmission is located at the University of Arkansas at Fayetteville. The center's work includes research on smart grid technologies and chargers for hybrid electric vehicles. It won a \$4 million grant, with Arkansas Power Electronics International, to develop chargers that deliver high levels of power to batteries for plug-in hybrid electric cars.
- **Solar Technology Research** – In 2010, a \$20 million grant from the National Science Foundation and the Arkansas Science & Technology Authority helped create two solar technology research centers in Arkansas: the Generating Renewable Energy Efficient Nanoplasmonic Solar Cells Center (GREEN) and the Vertically Integrated Center for Transformative Energy Research (VICTER). The GREEN Center is focused on producing photovoltaic panels that use less silicon by increasing efficiency and creating new photovoltaic materials. VICTER's focus is to “develop new photovoltaic materials

which can be used to build electronic devices.” Research will also be done on the packaging of solar cells, creating cost-effective and durable solar panels, and developing efficient transmission to the grid.

Clean Technology Research Support Organizations.

In addition to research institutions, Arkansas also invests in organizations to promote and develop clean technology research in the state. Three examples include:

- **Arkansas Research Alliance**, which recruits university scholars with a track record of incubating and commercializing businesses from their research. Two clean technology recruitment areas for the alliance are nano-related materials and application and sustainable agriculture and bioenergy management.
- **Six research centers** located at the Arkansas Research & Technology Park, including a technology company incubator called GENESIS.
- **Arkansas Science & Technology Authority**, which manages the ASSET II program that includes entrepreneurial training, commercialization support and STEM education. The program has a focus on bio-based products, solar cell technology and new power electronics.

Clean Technology Venture Capital Funds

To turn research into viable businesses, seed and venture capital are often required. Four venture capital funds were identified in the state with interests in energy investments. The most active has been the Arkansas Science and

Technology Authority (ASTA) through its Seed Capital Investments. Nine of the 26 companies (35 percent) in which the fund has invested since 2006 are identified as clean technology companies.⁶ Of the \$4 million that Seed Capital Investments has invested, nearly \$1.5 million (37 percent) went to the nine clean technology companies.

Clean Technology Economic Development Organizations

Arkansas economic development organizations also support the clean technology economy. These organizations provide incentives, entrepreneurial support and educating business leaders on clean technology opportunities. For example, the Arkansas Economic Development Commission provides incentives for clean technology businesses to locate in Arkansas as well as incentives to support the growth of new businesses. And Innovate Arkansas provides support for new businesses through technology assessments, funding advice, and mentoring services.

Workforce Development

Clean technology companies need highly skilled and well-trained employees to grow. Arkansas has a number of programs to train Arkansas's workers for the clean technology industry. These programs are generally focused on training workers in the fields of clean technology manufacturing, energy efficiency, green building and bioenergy.

The Arkansas Association of Two-Year Colleges (AATYC) is a hub of activity for clean technology workforce development. AATYC is a private, nonprofit higher education membership organization that represents all 22 public two-year colleges in Arkansas. The association

facilitates the sharing of ideas, resources and opportunities among its members and advocates on behalf of members' students.

Public Policy Tools

Public policy plays an important role in the development of a state's clean technology economy, as do market-based transformations that encourage further adoption of clean tech products or services. Policy tools, such as economic development incentives and targeted loan and grant programs, can be used to support this emerging industry.

Arkansas has employed a number of public policy tools, such as grant programs, revolving loan funds and incentives, to attract and support the development of the clean technology economy.

Conclusion

In identifying the state's existing clean technology assets, the most assets were found in three clean technology segments:

- Manufacturing
- Bio-based products
- Energy efficiency

Clean Technology Manufacturing. Sixty percent of Arkansas's job losses between 2008 and 2010 were in the manufacturing sector, which lost nearly 24,000 jobs.⁷ In the midst of these losses, new wind power manufacturers and bio-based product manufacturers have emerged building off of Arkansas's existing manufacturing strengths.

For example, the state has attracted wind turbine manufacturers, such as Mitsubishi Power Systems (\$100 million, 400 jobs projected),

Nordex (\$100 million project, currently 100 jobs) and wind blade manufacturer LM Wind Power USA (\$150 million project, currently 350 jobs). In addition, Arkansas is looking to build out the complete wind turbine supply chain. For instance, Beckmann Volmer, a German company that manufactures steel components for wind turbines, is a direct supplier to Nordex and is building a \$10 million manufacturing facility in Osceola, Ark. The facility will be less than one hour away from the Nordex plant in Jonesboro and create 300 jobs.

Bio-based Products. Arkansas's natural resources, research efforts and agriculture and forestry history give a good foundation for a strong bio-based products industry. The bioeconomy provides a broad range of job creation and economic activity, from feedstock development to product distribution. Research efforts at the Arkansas Center for Plant-Powered Production (P3) and Arkansas State University (ASU) provide opportunities for new companies to form from new innovations. For example, Infinite Enzymes is developing new enzymes for the conversion of biomass into new products, such as cellulosic ethanol. The company is a spin-off of the research being done at ASU.

Companies that focus on manufacturing bio-based products, including biofuels, biopower and other consumer products, are also doing business in Arkansas. For example, L'Oreal USA uses plant ingredients in the manufacturing of cosmetics. The company employs 4,000 Arkansans.

Energy Efficiency/Green Building. From workforce development programs that train energy efficiency auditors to landscape architects, there is significant activity in Arkansas surrounding energy efficiency and green building. Energy efficiency not only

creates jobs for those who are installing and maintaining energy efficient products but also reduces the bottom line for Arkansas companies and households.

While the three areas of clean technology manufacturing, bio-based products and energy efficiency are where most of the clean technology activity is occurring, there are other areas where new opportunities are emerging. This includes the growing capacity in research and commercialization of solar and electricity transmission technologies.

Next Steps

With the state's strong support for research, entrepreneurs and existing businesses, Arkansas has the potential to become a leader in the clean technology economy.

Southern Growth Policies Board and the Arkansas Advanced Energy Association will be convening a set of strategic planning sessions for development of the clean technology economy in the upcoming months to identify specific recommendations of how Arkansas can further take advantage of this opportunity.

These sessions will gather input from public, private and nonprofit leaders to create a set of recommendations for action-oriented strategies to support the clean technology economy in Arkansas.

End Notes

- ¹ Council on Competitiveness and Deloitte, *2010 Global Manufacturing Competitiveness Index*, Atlanta, GA: Council on Competitiveness, June 2010.
- ² Southern Growth Policies Board analysis of imports and exports of coal, natural gas, and motor gasoline in Arkansas.
- ³ Bureau of Labor Statistics, "Employment, Hours, and Earnings – State and Metro Areas," 2010.
- ⁴ Economic Research Service, "Arkansas State Fact Sheet," United States Department of Agriculture, 2010.
- ⁵ Muro, Mark, Jonathan Rothwell, Devashree Saha, and Battelle Technology Partnership Practice, *Sizing the Clean Economy*, Washington, DC: Brookings Institution, 2011.
Pew Center on the States, *The Clean Energy Economy*, Washington DC: Pew Charitable Trusts, June 2009.
The United States Conference of Mayors and the Mayors Climate Protection Center, *U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy*, Lexington, MA: Global Insight, October 2008.
- ⁶ Steve Stanley email to Charity Pennock, Southern Growth Policies Board, September 7, 2011.
- ⁷ Bureau of Labor Statistics, "Employment, Hours, and Earnings – State and Metro Areas," 2010.

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Southern Growth Policies Board is a non-partisan public policy think tank based in The Research Triangle Park, North Carolina. Formed by the region's governors in 1971, Southern Growth Policies Board develops and advances visionary economic development policies by providing a forum for partnership and dialog among a diverse cross-section of the region's governors, legislators, business and academic leaders and the economic- and community-development sectors. This unique public-private partnership is devoted to strengthening the South's economy and creating the highest possible quality of life.

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