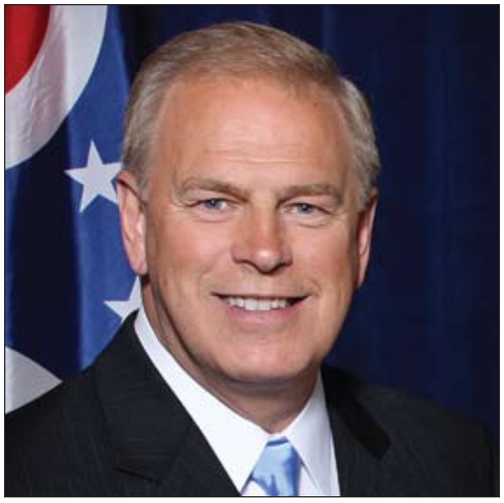
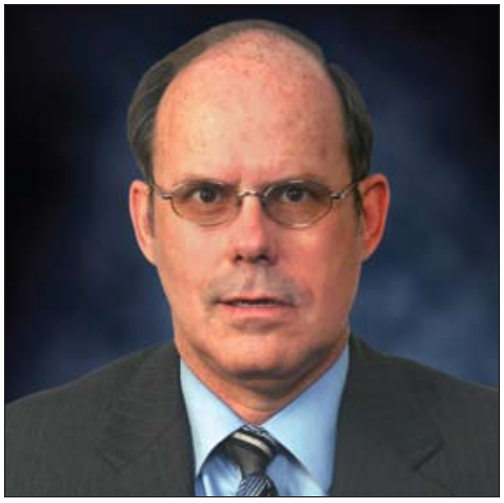
Ohio

Advanced Energy

**A Roundtable Discussion with Ted Strickland, Governor of Ohio;
Jerry Hutton, Dean, Advanced Energy & Transportation Technologies, Hocking College; and
Xunming Deng, President, Chief Executive Officer, and Cofounder, Xunlight**



Ted Strickland



Jerry Hutton

Xunming Deng

What is Ohio's vision for its advanced energy industry?

Strickland: Ohio is working to become a national and international leader in advanced energy initiatives; we want our advanced energy industry to have a global reach and a world-class supply chain. It is estimated that nearly 551,000 workers in Ohio could see new job opportunities and wage increases from the growth of environmentally friendly industries. In addition, Ohio's long history as a manufacturing leader shows that we have the workforce and expertise to succeed in the evolving manufacturing sector.

We've made major strides over the past two years to forward our vision for advanced energy in Ohio. In 2007, I signed into law a bipartisan energy bill that ensures stable energy prices, modernizes Ohio's energy infrastructure, and attracts the jobs of the future to Ohio. Our energy bill included an advanced energy portfolio standard that makes Ohio more attractive to business and creates new opportunities for thousands of Ohioans. The renewable portfolio standard requires that 25 percent of Ohio's energy come from advanced or renewable sources of energy by 2025.

Last year, I worked with the state legislature to pass the Ohio Bipartisan Job Stimulus Plan – investing in new jobs by making Ohio a powerhouse of renewable and advanced energy production such as wind, solar, and clean coal. The Ohio Bipartisan Job Stimulus Plan will fund $150 million in advanced energy projects over three years through the Ohio Air Quality Development Authority.

Deng: Ohio has a chance to become the "silicon valley of solar technologies." Particularly in the area of thin-film photovoltaics, Ohio is already a leader. With companies such as First Solar and Xunlight leading the way, there are many companies in this area, forming a cluster covering the entire value chain of solar applications.

The State of Ohio has made significant and critical investment over the past decades, planting the seeds for today's opportunity. Some of the earlier investment made to our higher education institutions have proven to be very successful in building the foundation that is paving the way toward making Ohio a major manufacturing base for advanced energy products.

Hutton: Ohio's market access to renewable energy consumers and our manufacturing capabilities together with state programs and incentives are making it attractive to companies developing the next generation of advanced energy technologies to expand or locate in Ohio.

Through initiatives such as Governor Strickland's Energy, Jobs and Progress for Ohio plan, the state is attracting renewable energy jobs for the future. Through legislation passed in 2008 that commits Ohio to a strong advanced energy agenda, businesses are seeing Ohio's commitment to advanced energy and their industry.

With Ohio's large agricultural industry, the state together with the ag community has been a driving force behind the development of a biofuels industry. Hocking has planned a facility focused on biofuels and bio-energy technologies as phase II at the Energy Institute.

In what sectors of advanced energy is Ohio competing on a national scale?

Strickland: Ohio ranks second in the nation for manufacturing the components of wind energy. The Renewable Energy Policy Project ranks Ohio as the second largest "impact state" for job creation potential as the U.S. expands its wind energy resources. Manufacturing strengths, logistics capabilities, skilled workforce, and a competitive business environment make Ohio a major competitor when it comes to the development of the advanced energy supply chain.

Ohio's investments in solar energy build upon the 50 years of glass manufacturing technologies that have been a key economic driver for Toledo's economy. Today, The University of Toledo's Clean and Alternative Energy Incubator, affiliated with Ohio's Third Frontier Wright Center for Photovoltaic Innovation and Commercialization, is building upon the Glass City's heritage to become a global leader in solar technologies. Collaboration with Ohio universities is clearing a path toward innovative research and technology, and breeding commercialization in the solar industry.

Companies like Xunlight, a producer of thin-film solar panels, have located their manufacturing operations near Toledo to capitalize on research, innovation, and commercialization opportunities. First Solar, located in Perrysburg near

Toledo, is also contributing to Northwest Ohio's increasing prominence as a solar energy hub.

Additionally, Ohio is one of the few places where all phases of fuel cell development take place. Our state's research and development capabilities, component suppliers, and final product manufacturing provide a supportive business network and a unique environment for fuel cell producers.

Ohio has unlimited potential for the production of biomass, a substantial renewable resource that can be used as fuel for producing electricity and other forms of energy. With agriculture and food processing as two of Ohio's largest industries, biomass feedstocks are relatively unlimited. Other biomass feedstock available in Ohio include industrial wood and logging residues, farm animal wastes, and the organic portion of municipal waste.

How has the state helped you succeed as an advanced energy business?

Deng: Over the years, Xunlight Corporation has been fortunate to have received a great deal of financial support from the state as well as resource support from the local community. With those funds, the company has been able to create over 85 direct jobs and establish a solid foundation for a successful company going forward.

Specifically, the state provided a $250,000 grant to The University of Toledo [UT] in 1989 to build $500,000 worth of equipment at UT for amorphous silicon research. Another $250,000 came from Harold McMaster, First Solar's founder. In 2004, the state provided a $2 million grant to UT to establish the Center for Photovoltaic Electricity and Hydrogen, which supports the development of partner companies and other companies in solar. In 2006, the state awarded a Wright Center project to UT/The Ohio State University/Bowling Green State University to work with local solar companies. In addition, the state has provided several major research and development grants to Xunlight, including $5 million for the Research Commercialization Program to help Xunlight develop advanced manufacturing technologies.

Additionally, the commitment from political leaders in the state was an important component in supporting Xunlight's effort in attracting outside venture capital funding.

How have the state's public/private partnerships helped educational initiatives prosper?

Hutton: One of the most significant initiatives supporting the development of Ohio's renewable energy industry and future job market is the state's Third Frontier Project, a 10-year, $1.6 billion initiative to help establish relationships between companies and academia. The project is the state's largest ever commitment to expand high-tech research capabilities and promote innovation and company formation that will create high-paying technical jobs. Graduates of programs like Hocking College's Energy Institute will fill many of those jobs. The state is also committed to expanding job retraining initiatives with companies so displaced workers can enter new jobs in the new advanced industry.

Locally, Hocking College has been working with the Appalachian Advanced Energy Association, a nonprofit trade organization, to encourage advanced energy businesses to locate to the area. This partnership helps the college gain a strategic advantage through direct contact with industry representatives and provides industry with a pipeline to a highly trained, skilled workforce.

How is the state helping to prepare its workforce to compete for the renewable energy jobs of the future?

Strickland: We are investing more resources than ever in our students, understanding that the economic future of our state is absolutely dependent on a skilled workforce. Our 10-year Strategic Plan for Higher Education builds a link between a quality education and economic development.

Proposed in our budget, currently before Ohio's general assembly, is a plan to begin funding co-op and internship programs for college students, a $150 million portion of our Ohio Bipartisan Job Stimulus Plan. The programs are designed to give businesses early access to talent at Ohio's colleges and universities.

We are building connections between businesses and students of all ages to allow students to gain meaningful work experience through cooperatives and internships in partnership with the Ohio Board of Regents. Students successfully completing a co-op or internship are more likely to choose to settle in Ohio and become part of Ohio's 21st century economy.

We are increasing our workforce training programs to ensure Ohio workers are able to meet the demands of the changing world. Ohio is committed to supporting and enhancing our most valuable asset: our workers. Our state's labor pool of 5.9 million workers is one of the largest in the country.

Ohio's institutions of higher education are creating more programs to prepare students to work in the renewable and alternative energy fields: Cuyahoga Community College has established the Green Academy and Center for Sustainability and the "Pathways out of Poverty through Green Collar Jobs" program that will train workers in green building and constructing; Hocking College and its Advanced Energy Institute is a leader in green technology and job training, offering an associate's degree in applied science in alternative energy and fuel cells, including an option to major in automotive hybrids; the University of Dayton, Central State University, Wright State University, and the Air Force Institute of Technology are offering the state's first master's degree in renewable energy; and other institutions like Cincinnati State Technical and Community College, Owens Community College, Lakeland Community College, and Sinclair Community College have expanded solar technician and other green programs. In addition, The University of Toledo is a leader in solar research and instruction, helping a region that was heavily dependent on the auto industry to now employ more in the solar field than Toledo's two auto plants combined.

Additionally, the Ohio Skills Bank is a tool that uses labor market data to analyze workforce demand in each of the state's economic development regions. The data enables educational institutions to align curriculum and programs to meet future demand. This will include analyzing future demand for "green" jobs through partnerships with higher education, Ohio's Department of Development, and private industry.

TED STRICKLAND

EDITORS' NOTE *Ted Strickland was elected Governor of Ohio on November 7, 2006. Prior to this, he served as Administrator at a Methodist children's home, an Assistant Professor of Psychology at Shawnee State University, a Consulting Psychologist at the Southern Ohio Correctional Facility, and a Member of Congress. Strickland received a B.A. in History from Asbury College in Kentucky in 1963. He then received a Master of Divinity from the Asbury Theological Seminary, and a doctoral degree in Counseling Psychology in 1980 from the University of Kentucky.*

JERRY HUTTON

EDITORS' NOTE *Jerry Hutton began at Hocking College in 1978 as the Department Director and Instructor in the Automotive Service Management department. From 1990 through 2003, Hutton worked at companies such as Tren-Fuels, Inc. and also did some personal consulting for the industry through his business, Hutton Consulting and Associates. In October 2003, Hutton rejoined the Hocking College team and was promoted to Dean of Advanced Energy & Transportation Technologies in 2007. He holds a Bachelor of Science degree from Weber State University in Ogden, Utah and a Master of Education degree from Ohio University in Athens, Ohio. He is currently studying for his Doctoral degree from Capella University. He also served as a Munitions Maintenance Specialist in the United States Air Force from 1971 to 1975.*

COMPANY BRIEF *Hocking College was recently awarded a $1.6 million grant from the Economic Development Administration for the construction of an innovative learning facility near the Logan-Hocking Industrial Park in Hocking County. The Energy Institute will feature green building design aspects and hands-on learning labs for students studying in the college's energy programs such as alternative energy, fuel cells, and vehicular hybrids. The anticipated opening date is fall 2009.*

XUNMING DENG

EDITORS' NOTE *Xunming Deng is a Professor of Physics and Professor of Electrical Engineering at The University of Toledo, and is currently on a leave of absence to work full time at Xunlight Corporation. Prior to joining the UT faculty in 1996, Dr. Deng was Senior Scientist and Project Manager for Photovoltaic Development at Energy Conversion Devices, Inc.'s Machine Division. Deng received his PhD in physics in 1990 from the University of Chicago.*

COMPANY BRIEF *Headquartered in Toledo, Ohio, Xunlight Corporation is a technology spin-off from The University of Toledo. The company engages in the development, manufacture, and marketing of photovoltaic modules that convert sunlight into electricity. The company develops thin-film silicon based photovoltaic products and manufacturing equipment for high-throughput production of flexible and lightweight photovoltaic modules at low cost.*

How has Xunlight recruited and trained a workforce prepared to work in your high-tech industry?

Deng: Xunlight is in the unique position of not only being a high-growth company in a challenged economy, but also a manufacturing company in a struggling industrial region. There is a large pool of talented workers in the area that are very motivated to work in manufacturing, and more specifically, for a company that not only has high long-term potential, but is also striving to help rid the world of a list of its problematic issues such as climate change and political unrest through energy dependency. The company's primary recruiting efforts have been focused in the Toledo area to fulfill its manufacturing needs, but the company has also looked globally for industry experts to assist in the development of its technology and commercialization strategy. Due to the proprietary design of our manufacturing process and equipment, the scientists and engineers who designed and built our machines are now seamlessly training new employees to use them.

We have recruited several groups of talented individuals to Xunlight. We have a team of solar experts trained at UT working in the company and we have a team of equipment builders who used to build auto and glass manufacturing equipment who are now building solar manufacturing equipment at Xunlight. These people, after they have worked side-by-side with our solar experts, have turned themselves into solar experts.

Our positions require an accomplished manufacturing skill set to be able to efficiently and effectively run our processes, and it's because of the solid foundations of those other traditional industries that we're able to leverage our employees' experience in helping develop and manufacture high quality products.

Many of our current employees were trained in other industries in Northwest Ohio and possess highly useful skills for building a manufacturing company.

How are programs like the Energy Institute at Hocking College helping to prepare Ohio's students for the renewable energy jobs of the future?

Hutton: A number of colleges and universities throughout Ohio have focused on and invested in the research and development side of advanced energy technologies. Hocking College's focus has always been on programs that train workers in advanced energy technologies through hands-on learning experiences. Many of our students are working in renewable energy jobs through internships providing them with practical job experience to ready them for full-time employment after graduation.

Ohio is pioneering the development of "green collar" workers, a growing number of skilled professionals who use their talents to improve the emerging advanced energy industry. A recent report released by the American Solar Energy Society – funded by the Ohio Department of Development – predicted Ohio could have a need for 174,000 green collar jobs by 2030. Hocking College is gearing up to meet the need for skilled workers through new programs, degrees, certification programs, and customized training specific to a company's needs.

What is the vision for the Energy Institute at Hocking College Logan Campus?

Hutton: Hocking College has always been on the cutting edge of technical training in advanced energy technologies beginning with a natural gas vehicle and compressor technology program in 1981. When I returned to Hocking College from private industry in 2003, we recognized a growing need for training skilled workers in an effort to attract renewable energy companies to Ohio. We envisioned Hocking College as being the lead college in job training for these emerging technologies.

Hocking began to expand the advanced energy technologies program at our main campus in Nelsonville, Ohio to help meet the growing need for skilled green collar workers. In 2006, Hocking College was awarded a $1.6 million grant from the U.S. Economic Development Administration for the construction of phase I of an advanced energy campus at Logan, Ohio.

This state-of-the-art facility, which is scheduled to be open in the fall of 2009, will be Ohio's first Platinum LEED-certified advanced energy training building. The LEED building also serves as a learning lab through the technologies used in the building design and applications.

The facility will allow for training in fuel cell, hydrogen, and natural gas vehicle technologies. An American Society for Testing and Materials biofuels testing lab is already part of the campus and will serve as a learning lab and commercial testing center for biofuels. The campus will also operate a compressed natural gas refueling station.

The new Energy Institute is located next to the Hocking County Community Improvement Corporation's industrial park where there will be an emphasis on attracting advanced energy companies, which will provide internships for students and jobs for graduates. This will promote the theme of the new campus, "learning to live and work locally."

Hocking College Energy Institute is well-positioned to continue their excellence in technical job training that will result in jobs for graduates.

How does a company like Xunlight, known for manufacturing solar panels and based in Northwest Ohio, intend to reach a global audience?

Deng: Xunlight has the confidence to become one of the world's leading solar module manufacturers because our product is unique. The solar modules we develop are large in size, flexible, and lightweight. These product characteristics make our modules perfect applications for commercial rooftops, which are currently a high-demand market globally. Xunlight is quickly becoming a recognized name as a high potential company in the global solar industry. It is widely known in the industry that we have an accredited team of scientists, exceptional technology, and that we develop products in high demand.

As far as our location, The University of Toledo has a strong photovoltaic program and is continuing its efforts to achieve global credibility and excellence. Our technology came out of the university and many of our top scientists were trained there. Also, being headquartered on a major port like Lake Erie makes for timely and efficient exporting to our global customers.

We have launched a global marketing effort to introduce our products to potential customers, and have exhibited our products in many of the largest industry trade shows in the U.S., Europe, and Asia.

What opportunities exist for students to compete globally in the advanced energy industry?

Hutton: A student trained through Hocking College's advanced energy program has the skills to compete globally for advanced energy and green collar jobs. The training they walk away with when they complete the program will be transferable anywhere across the globe and to various technologies. In fact, many of our students study abroad as part of their advanced energy training. Many regions of the country and of the world have an abundance of renewable resources that can be converted to energy. Recently, students from Hocking College's advanced energy and vehicular hybrids programs spent a quarter at the college's working laboratory on Andros Island, the Bahamas, studying wind, solar thermal, solar PV, and micro hydro power systems. The quarter culminated with the construction of an operational Skystream 3.7 wind turbine that provides electricity to the laboratory.

How does Ohio support renewable energy businesses?

Strickland: The Ohio Third Frontier Advanced Energy Program helps companies in Ohio continue to make technical progress toward the commercialization of advanced energy-related products for future applications. The Advanced Energy Program funds support organizations seeking to commercialize new products, manufacture processes or technologies, or adapt or modify existing components or systems that can reduce the cost of advanced energy systems or address technical and commercialization barriers.

Additionally, the Ohio Fuel Cell Initiative is a $100-million-dollar program that is creating jobs while positioning Ohio as a national leader in the growing fuel cell industry. To date, Ohio Third Frontier has awarded more than $77 million in funding to fuel cell research, development, and commercialization projects across the state. By strategically utilizing Ohio Third Frontier and other economic incentives, we are ensuring the growth of Ohio's advanced energy sectors and the good jobs that come along with that growth.

As part of the Ohio Bipartisan Job Stimulus Plan, the Ohio Air Quality Development Authority will be funding projects from clean coal to fuel cells, solar, and wind. From that plan, $150 million in funding over three years will be targeted toward initiatives focused on the development, production, and use of advanced energy technologies.

In addition, Ohio's comprehensive tax reforms have made our state the best in the region in which to do business. Ohio's tax rates are the lowest in the Midwest. Companies are seeing a dramatic reduction in the overall tax rate – in many cases by as much as 63 percent. The suite of tax reforms will be fully phased in by 2010, when they are expected to grow Ohio's economy by increasing gross state product by $5.6 billion, and the personal income of Ohioans by $3.6 billion. The reforms are also expected to infuse an additional $6.3 billion of new capital investment in Ohio's economy, including major developments in our state's targeted industries, including the advanced and alternative energy sectors. ●