



T E N N E S S E E ' S
GREEN
BUSINESS

T E N N E S S E E ' S BUSINESS

Vol. 19 No. 3 2010

Published by

Business and Economic Research Center
Jennings A. Jones College of Business
Middle Tennessee State University
Box 102
Murfreesboro, TN 37132
(615) 898-2610
email: berc@mtsu.edu

Sidney A. McPhee

President, Middle Tennessee State University

E. James Burton

Dean, Jennings A. Jones College of Business

David A. Penn

BERC Director

Horace E. Johns

Executive Editor

Sally Ham Govan

Publications Editor/Designer

Online

www.mtsu.edu/~berc

AUBER Publications Award of Excellence

1991, 1996, 2000, 2004, 2007



Tennessee's Business provides an exchange of ideas in the fields of economics and business among businesspersons, academicians, and government officials. The opinions expressed in the articles are not necessarily those of the Business and Economic Research Center, the Jennings A. Jones College of Business, or Middle Tennessee State University (MTSU), but are the responsibility of the individual authors. The material may be reproduced with acknowledgement of the source. MTSU, a Tennessee Board of Regents university, is an equal opportunity, nonracially identifiable, educational institution that does not discriminate against individuals with disabilities.

RENEWABLE ENERGY



Pros and cons of various energy sources in light of global climate change

by Horace Johns

Is the earth's temperature actually rising? If so, what is causing it — man-made greenhouse emissions (largely generated by the burning of fossil fuels), cyclical climate change unconnected with people's behavior, or both? Remember that there are differing scientific opinions on these questions. Thus, it is difficult to empirically establish absolute proof for one position over the other.

Nevertheless, it would be wise for us to err on the side of caution and do everything humanly and reasonably possible to protect our environment while, at the same time, insuring that we have ample energy supplies to sustain a healthy standard of living.

It's clear that burning fossil fuels increases carbon emissions, but it's also clear that it is still necessary to burn them to produce electricity, operate machinery, and power transportation. It really comes down to striking as wholesome a balance as we can in being environmentally protective as well as providing for the energy needs of the United States.

American Legion Magazine in March 2009 summarized pros and cons of various energy sources.

- **Wind** turbines are clean and affordable. Unfortunately, wind surges can sometimes overwhelm the electrical grids tied to turbine systems. Also, wind farms can negatively impact certain wildlife. Since wind farms necessarily have to be large, they can stir opposition on the grounds that they are unsightly to nearby residential areas.
- **Solar** power can convert sunlight directly into electricity. It is clean, cheap, and plentiful. However, it depends heavily on the availability of sunlight because storage capabilities are limited. It could be difficult for areas of the nation that have too many overcast, rainy days.
- **Nuclear** power comes from heat generated from nuclear fission to convert water to steam and drive a turbine generator to produce electricity. It is clean, dependable, and long-lasting. However, where and how to dispose of nuclear waste and the risks associated with radiation are challenging. Moreover, nuclear reactors are costly and time-consuming to build.

- **Natural gas** provides 22 percent of America's energy consumption as it heats homes and fuels many cars and buses. It is clean, efficient, made within the U.S., and easily available. But we need more terminals to handle natural gas imports, and the level of production hasn't increased significantly since 2000.
- **Hydroelectric** power produces electricity from the flow of water through turbines. It is clean, domestically produced, and can supply many millions of households with electricity. However, it can adversely affect certain species of wildlife, and there are limited remaining water sources to harness.
- **Geothermal** energy uses heat and steam from the earth to generate electricity. It is cheaper than traditional heating and cooling sources, clean, sustainable, and more efficient than oil or gas. But it's costly to install and hard to tap in some areas.
- **Bioenergy** means ethanol and other fuels derived from organic plant matter. According to the Department of Energy, these include "dedicated energy crops and trees, agricultural food and feed crops, agricultural crop wastes and residues, wood wastes and residues, aquatic plants, animal wastes, municipal wastes, and other waste materials." It offers cleaner emissions and contributes to energy independence. However, it uses massive amounts of water, can increase food prices (e.g., converting corn away from the food supply), and depends on government subsidies.
- **Clean coal** releases fewer pollutants into the air by converting coal into gas and removing the sulfur, nitrogen, and soot. The U.S. has one-quarter of the world's coal reserves; thus, coal could help us become more energy independent. However, clean coal technology is not yet perfected and could require five to 10 years of a great deal of research and money before it could be used in a large coal-burning facility.

I wish we could wave a magic wand and become energy independent through clean, renewable sources. But that's wishful thinking. Dependence on coal, gasoline, and oil will remain with us for a long time. The question is: for how long and to what extent? That's up to our will and wisdom.

EDITOR'S NOTE



Horace Johns teaches business law at Middle Tennessee State University.



Vol. 19 No. 3 2010

- **Greening an Economy with the Blues** 1
James Neeley
Tennessee Department of Labor and Workforce Development

- **Save Energy, Save Money, Save Jobs** 3
Matt Kisber
Tennessee Department of Economic and Community Development

- **The Case for a Comprehensive Energy Policy** 4
Patricia Mixon
Tennessee Environmental Council

- **Green Investment and Legislation: Creating Jobs and Revenue** 5
by Andrew Geshwiler
Wunderlich Securities

- **Electricity: A Powerful Bargain** 7
Kenneth Breedon
Tennessee Valley Authority

- **New Solar Products: Creating Rural “Green Collar” Job Growth** 8
Chris Tompkins
Outpost Solar

- **Energy Efficiency Needed for State Businesses** 10
Clint Gwin
Pathway Lending

- **An Energy Audit: The First Step toward Home Energy Efficiency** 11
Jeff Pizzino
Pro Energy Consultants

- **The Case against Proposed Energy Legislation** 12
Joseph Schmitz
Retired, Bridgestone/Firestone

- **Business Coalition Calls for Action** 13
Cortney Piper and Susan Richardson-Williams
Tennessee Business Leaders for a Clean Energy Economy

- **The Truth about Being Green: Was Kermit the Frog the First to Know?** 14
Jim Burton
Jennings A. Jones College of Business, MTSU

GREENING AN ECONOMY WITH THE BLUES

by James G. Neeley

When I was a young man, I worked in a textile factory in Huntingdon as a spindle boy. Back then, manufacturing was king, and those jobs were available to anyone who had a strong back and a willingness to work. Obviously times have changed, but the importance of manufacturing and job availability is just as great today. We know green and clean-energy jobs will be part of the new economic portfolio of the state, but how we nurture this new industry will determine how well it produces results for the laborers of the future.

Investments

Tennessee already has a strong foundation of investments in emerging-technology projects related to energy production and energy efficiency.

- Volkswagen is a billion-dollar investment creating high fuel efficiency diesel vehicles that will employ approximately 2,000 with an additional 500 in supplier jobs created in the Chattanooga area.
- Nissan's all-electric car, the LEAF, will be produced at Nissan's vehicle assembly facility in Smyrna beginning in 2012. The LEAF and lithium-ion battery production will create up to 1,300 jobs when the plants are operating at full capacity.
- The Hemlock Semiconductor site in Clarksville is expected to employ more than 500 people, with an additional 800 when expanded. Construction of the site will employ 1,000 workers during the next five to seven years.
- Wacker Chemie AG polycrystalline silicon manufacturing plant's investment in Cleveland is anticipated to create approximately 500 new jobs.
- Confluence Solar Inc. announced in January that it would build a facility in Clinton to produce silicon ingots, which are components for the solar industry. The 200,000-square-foot facility is projected to create 250 jobs.



James G. Neeley

It is conservatively estimated that at least 6,000 jobs will be created directly as a result of these investments. Additional indirect jobs will subsequently be created through the expansion of supplier industries.

Grants

It's no coincidence that grants are helping drive the enthusiasm for green and energy-related investments.

- The American Recovery and Reinvestment Act (ARRA) provided more than \$1 billion in initial funding for Tennessee's green job related projects. The largest initial grant was awarded for environmental cleanup at Oak Ridge including the East Tennessee Technology Park, ORNL, and Y-12 sites.
- Another ARRA project included \$99 million for home energy efficiency programs that trained and certified 500 licensed contractors to provide the work and resulted in 6,400 homes weatherized by June 30.

continued on page 2

Tennessee's challenge during these difficult economic times is in maintaining a good pace of new job creation in concert with refining a statewide energy strategy with innovative ideas in training and research.



The Nissan LEAF



Tennessee Technology Center at Dickson's Green Sustainable Energy Campus



Hemlock building at Austin Peay State University

MTSU's Business and Economic Research Center (BERC) will conduct impact studies on six groundbreaking green industry investments in Tennessee:

- Hemlock
- Wacker
- Volkswagen
- Nissan
- eTec
- Volunteer State Solar Initiative

The research will provide estimates of the projected number of jobs that might be created and retained by these new investments.

continued from page 1

■ In the past year, the Tennessee Department of Labor has received other grants to enhance workforce development in the green jobs sector. In November 2009, the USDOL awarded a \$5.5 million, three-year Green Jobs Training Program Grant to provide training to approximately 4,000 Tennesseans for energy efficiency, renewable energy, and other green jobs. The grants are directed to training programs at universities, community colleges, and technology centers as well as to private sector educators. Training opportunities differ by local area but include Pre-Apprenticeship Construction Training, LEED Certification, Certified Green Professional Training in architecture, training for energy auditors to assess residential and industrial electric energy consumption, and training in the installation and operation of solar, geothermal, wind turbine, biofuel, and other developing green technologies.

Tennessee is currently conducting a comprehensive business survey funded by a Labor Market Information Improvement Grant to identify green jobs in Tennessee. The USDOL granted \$765,000 to process more than 6,000 surveys sent to Tennessee employers. The surveys focus on economic activity in the energy efficiency, renewable energy, and pollution reduction and remediation industries as well as identifying occupations and skill requirements within those industries. The results will project what jobs will be available one year from now. The survey will be completed in May 2011 and will be available at www.sourceten.org. Half of the grant funding will be used to improve job seeker and employer services in Tennessee, including examining possibilities for dislocated auto industry workers to transition to green jobs. The grant establishes a partnership with Middle Tennessee State University's Business and Economic Research Center (BERC) to conduct impact studies on the six groundbreaking green industry investments in Tennessee (Hemlock, Wacker, Volkswagen, Nissan, eTec, and the Volunteer State Solar Initiative). MTSU's research will provide estimates of the projected number of new jobs that might be created and retained by these new investments.

Partnerships

Regional public-private partnerships within industry sectors have been found to be engines of economic growth that can direct training resources to the most critical areas.

The state is building essential partnerships with Nissan and TVA for the development of electric cars and electric charging capability, with Oak

Ridge National Laboratory (ORNL) and 13 other partners on biofuels, and with TVA and NES on retrofit projects. Additional projects with ORNL include the solar research facility.

An important example of a public-private partnership in Clarksville is the development of the Hemlock facility. Partners include the company, Austin Peay State University (APSU), the Tennessee Board of Regents, the State of Tennessee, and the City of Clarksville. The company has built a classroom building on the campus of APSU to be used for the chemical technology program that will supply workers for the facility.

On June 22, 2010, I dedicated the Tennessee Technology Center at Dickson's Green Sustainable Energy Campus. Partners at the site include Workforce Essentials and the Tennessee Career Center at Dickson. The solar instructor at the Green Campus is one of the few certified instructors in the state.

Knoxville is one of America's 25 Solar Cities. With funding from the U.S. Department of Energy's Solar America Initiative, the city is working to make solar energy cost competitive by 2015. The City of Knoxville is partnering with TVA, the Knoxville Utilities Board, ORNL, and the Southern Alliance for Clean Energy to promote solar energy sources, educate the public and businesses, and build solar facilities.

With all of these new green job initiatives, program evaluations are necessary to capture what is found to be the most effective in job creation efforts. Tracking the number of jobs is important. Calculating savings and payback periods for investment in energy efficiency and renewable energy is also vital for attracting further private investment. When estimates of green jobs become available, supply and demand analysis will be used to compare the number of jobs with the number of people completing training to determine gaps or excess supply.

Tennessee's challenge during these difficult economic times is maintaining a good pace of new job creation in concert with refining a statewide energy strategy with innovative ideas in training and research. Tennessee has a great foundation in these areas, and as consumer confidence increases, all of these factors could very well come together to create a momentum that will drive our local economy for years to come.

** James G. Neeley serves as commissioner of the Tennessee Department of Labor and Workforce Development.*

SAVE ENERGY, SAVE MONEY, SAVE JOBS

by Matt Kisber

Governor Phil Bredesen has placed a strong emphasis on creating an environment suitable for clean energy development. Under his leadership, Tennessee has charted a new course toward sustainability and economic development in the renewable energy industry and further diversified our state's economy.

Not long ago, I had the pleasure of joining Governor Bredesen in announcing the launch of a new \$50 million Energy Efficiency Loan Program to help Tennessee companies finance investments in energy-efficient technology, energy retrofits, and renewable energy systems. With this announcement, Tennessee has taken another innovative step in helping our state's economy prepare for a future in which the efficient use of energy will take on growing importance in our ability to create and sustain jobs for our citizens.

Collaboration Is Key

This new resource for businesses is a model of how collaborative efforts between the public and private sectors can have positive and lasting impacts on the economy and the environment. The State of Tennessee, the U.S. Department of Energy, the U.S. Economic Development Administration, Pathway Lending, Pinnacle Financial Partners, and the Tennessee Valley Authority all had a hand in making this program a reality.

Pathway Lending will administer the program, and collaboration with the state is nothing new for them. Pathway, under its previous name, Southeast Community Capital, was the state's partner in creating the Rural Opportunity Fund, a loan fund aimed at making business loans more accessible to companies in rural Tennessee. The Rural Opportunity Initiative was recognized earlier this year with a national award from the Federal Financial Institutions Examiners Council.

Energy Efficiency within Reach

In these still uncertain economic times, businesses are looking for any ways they can save money. Energy costs continue to rise while operating budgets continue to shrink, and energy consumption can have a serious impact on bottom lines. Offering resources to companies considering becoming "leaner" and "greener" may help them move forward to make their Tennessee facilities more productive and competitive.

Pathway Lending will offer below-market rate loans of \$20,000 to \$1 million at 5 percent with terms extending to 10 years to finance energy-efficient improvements. There are no out-of-pocket expenses for businesses, and 100 percent of project costs can be financed, including equipment, engineering, design, installation, loan fees, and facility assessments.

This is a great opportunity for companies who previously had little or no access to clean energy alternatives to jump into the game head first. Another great feature of the program is the Shared Savings Option, which allows businesses to retain up to 50 percent of their monthly energy savings, using the remainder as repayment on the loan.

The initial application period for the Energy Efficiency Loan program opened Aug. 25 and will close Nov. 1, 2010. Businesses interested in applying for a loan should visit www.pathwaylending.org soon for instructions and an application. Businesses should not wait, however. To be eligible for a loan, they must complete an energy audit, assessment, or vendor proposal with detailed project energy savings. Once verified, these energy savings determine the amount and term of the loan and the applicant's ability to repay the loan with those savings.

I'm happy to report there has been great interest in the program. Our friends at Pathway Lending tell us they've seen a strong response via their online application process. In addition, Pathway has held six free informational workshops across the state to help businesses interested in the program with maximum capacity crowds in attendance.

Why Now?

It's just good business to take advantage of this program. Every dollar a company invests in energy efficiency creates \$2.84 in benefits over the lifetime of that investment—a return of more than 184 percent. You can't find returns like that just anywhere.

What's good for business is good for Tennessee. Typically, most of the energy retrofits and system upgrades are done by local installers, benefiting Tennessee's economy. Energy efficiency is a powerful tool—one that will create jobs, save money, and help our Tennessee businesses thrive.



Matthew H. Kisber serves as commissioner of the Tennessee Department of Economic and Community Development.

A new \$50 million state Energy Efficiency Loan Program will help Tennessee companies finance investments in energy-efficient technology, energy retrofits, and renewable energy systems.

THE CASE FOR A COMPREHENSIVE ENERGY POLICY

by Patricia Mixon



Patricia Mixon is on the Board of Directors of the Tennessee Environmental Council.

A broad-based energy and climate bill can help us toward energy independence in a fiscally responsible way.

America needs a new, comprehensive energy policy. Our current dependence on imported oil undermines our economic well-being and national security. We spend hundreds of billions of dollars every year to purchase oil from countries that in many cases do not share our values, leaving us vulnerable to regional instability and economic shocks. We import a product that is relatively inefficient in terms of its energy production per unit and when burned pollutes our air, water, and land. We use oil to power cars, meaning we all walk a lot less, get fatter and sicker, and spend more at the doctor's office. Our car and truck-based culture has propelled a land grab away from agriculture and natural lands that offer numerous benefits, not the least of which is the sequestration or removal of pollution. Finally, overreliance on oil and coal have dramatically increased the amount of carbon dioxide and other greenhouse gases in our atmosphere.

The U.S. bears the flags of capitalism and democracy. As the events of 2008 show, capitalism depends on transparency as well as stability. Transparency means a robust, accurate pricing mechanism between producers and consumers. A comprehensive energy policy must level the terrain between traditional sources of energy and other sources, such as natural gas, wind, solar, and biomass, by assessing at the front end all the costs—short- and long-term—that a manufacturer truly incurs through its use of our shared natural resources. Oil and coal seem cheaper now but have a dramatically more costly future; renewables are more expensive now but long-term are virtually limitless in supply. Additionally, when more people worldwide demand a diminishing resource such as oil, economic stability may be undermined. As supplies get harder to come by, greater risks—deep water oil drilling and mountaintop removal—will be taken, elevating the likelihood of disastrous accidents or toxic by-products. Prices will necessarily rise, more likely than not in an unpredictable way.

One needn't be a believer in global warming predictions to make the case for a comprehensive energy policy, but a few facts bear repeating. The current level of carbon dioxide in the atmosphere is 390 parts per million (ppm) and dramatically increasing. Yes, this level has fluctuated throughout the earth's measured history, but it has never been higher than 300 ppm over the past 650,000 years at least. Yes, some people and locations may benefit from the predicted effects of global warming; the trouble is that we won't truly know who wins and who loses until it's too late. And yes, to reference a recent article in the *American Scholar*, life on earth

will almost certainly survive our CO₂ run up—in geologic time. The question then becomes whether we care if those conditions favor human life or not.

For our nation to have a stable and prosperous future, we must have a diverse, sustainable energy supply. Oil and coal, for any of the above reasons, are not part of the long-term solution. Some will argue that we shouldn't subsidize the development of new energy sources. If you have a good business model, you should be able to make it on your own! For some kinds of businesses, this might make sense, but energy supply cannot be run strictly as a conventional business; rather, it is a critical industry, undergirding all of our economic activity. It must be subject to comprehensive planning, regulation, and even subsidies—just as we currently subsidize oil, coal, agriculture, and many critical sectors. China, now the world's second largest economy, has already taken significant steps through subsidies to boost renewable energy research, production, and export. In just five years, they have garnered a 50% market share of solar panels—which they export to the U.S.

Before the U.S. Senate recently decided to drop an effort to pass a comprehensive energy bill, the Congressional Budget Office had calculated that one proposed climate and energy bill would cut the federal deficit. This finding helps dispel the myths that cleaner air, water, and land are too expensive and that we can't be smart about our abundant array of natural resources and the national budget at the same time. This finding demonstrates that explicitly recovering some of the hidden costs of oil and coal pollution makes good economic sense—right now. Drafted by Senators Kerry and Lieberman, that bill sought participation from all stakeholders—electric utilities, transportation fuels, and chemical producers. Their final proposal attempted to calculate and assess the true cost of greenhouse gas and related emissions from power plants and other sectors with the ultimate goal of a reduction to more sustainable levels. Their proposed new regulations for electric utilities would have been similar to the Republican-led effort during the first Bush presidency that reduced acid rain without the oft-touted hampering of industry.

Our current or next Congress should take up comprehensive energy reform. We cannot approach this problem piecemeal. To single out one industry or sector now may produce unintended negative distortions without solving the problem. We are all in this together. A broad-based energy and climate bill can help us toward energy independence and do so in a fiscally responsible way, twin goals we as a nation desperately need to meet.

GREEN INVESTMENT AND LEGISLATION

Higher energy prices alone could be the driver that moves these companies into the mainstream economy, but a number of legislative or regulatory actions could jump-start this sector and ignite rapid expansion and job creation.

by Andrew Geshwiler

Another summer of scorching temperatures and soaring utility bills is quickly coming to a close. For Tennesseans shoveling their disposable income into the cranked-up air conditioner, it really doesn't matter if this is a short-term weather pattern or a longer-term change of climate. What really matters is the question of how long we can keep this up. Can we continue to shovel on a little more coal to keep the AC chugging? In this difficult economy, can we afford to keep paying ever-rising energy bills? Can our environment keep up with the demands that our ever-increasing energy appetite requires of it?

At Wunderlich Securities we see a long-term path that places greater and greater emphasis on energy efficiency and non-carbon based sources of energy. This trend will play out over time in the open marketplace as emerging green technologies become increasingly price competitive. Two key factors are at play here:

- the increasing global demand placed upon existing, conventional energy resources; and
- efficiencies and economies of scale that will be realized as green technologies mature.

Wunderlich Securities initiated equity research for new energy economy investments in 2009. We follow companies involved in waste-to-energy, alternative energy, clean tech, smart grid, solar, wind, and energy storage. We seek to identify those companies that have superior technologies, solid financials, and a history of solid execution. We feel that it is important that investors seeking to participate in this market sector be mindful of some important facts:

- Investing in new energy economy stocks is not the same as ethical or socially responsible investing.
- Government spending on the new energy economy will be important as this sector fights to achieve cost parity.

- Companies don't invest in green technology just to make a statement—they do it to enhance profits. Every single Fortune 500 company is currently undertaking some program to increase their efficient use of energy or materials.
- This is not a fad. The wind industry now employs more Americans than the coal industry. This is a market measured in billions, and it will only grow.
- New energy economy stocks are highly correlated to traditional energy shares. If you already invest in traditional energy names, new energy economy stocks will not help you achieve greater diversification. New energy or clean-tech portfolio exposure is statistically equivalent to overall energy exposure.

Energy is the world's largest market by revenue, and it is a wonderful, magical thing. With the flick of a switch, a light comes on. Gas tanks can be filled on almost every corner anytime day or night. It is available almost without thought. But there is a great deal that goes on behind that light switch and that gas pump. Most consumers don't realize that Tennessee Valley Authority (TVA) generates nearly 70% of its electricity from coal. We see all those dams and think that surely much of our electricity comes from hydropower. Nope — a mere 6%.

Most folks filling their car at the pump don't know the source of that oil. It comes from that most volatile place, the Middle East, right? Actually, it doesn't. Most of our imported oil comes from Canada and Mexico. Saudi Arabia is number three. That oil is getting increasingly difficult and expensive to find, drill, and process.

The western world used to drive the energy markets. Not anymore. It is now a global marketplace for energy. Emerging markets throughout the world are struggling to their feet, eager to partici-

continued on page 6





Andrew Geshwiler is a vice president with Wunderlich Securities in Franklin and a member of Tennessee Business Leaders for a Clean Energy Economy.

continued from page 5

pate in the global economy. The fastest-growing car market is in China. In India, car sales grew 38%, year over year, for July 2010. Millions of Chinese and Indians are purchasing their first automobile and, at the same time, increasing global demand for gasoline. Every successful, growing economy, ours included, is built upon the steady supply of affordable energy. Every day American consumers are competing with consumers from China, India, and Indonesia to set the price on that last drop of oil, that last lump of coal, that last vapor of natural gas.

What if there's a better way? What if we refuse to be hidebound to conventional thinking? What if we could maintain our lifestyles, our air conditioners, and our personal transportation? What if we could take back our economic and energy security from foreign states and chaotic markets? What if we could do all that while improving our environment? We can, and the companies involved in the new energy economy will be the leaders in this economic transformation. Higher energy prices alone could be the driver that moves these companies into the mainstream economy. However, there are a number of legislative or regulatory actions that could jump-start this sector and ignite rapid expansion and job creation.

As we all know, political divisions in the Senate have delayed efforts at comprehensive energy and climate legislation that puts a price on

carbon. However, as we've seen demonstrated at the state level, it is possible to establish standards for renewable energy and energy efficiency for residential and commercial buildings. The efforts of our forward-thinking states are laudable, but they have created a patchwork quilt of varying standards and regulations. Uniform national standards for renewable energy and energy efficiency for residential and commercial buildings would create a stable regulatory foundation that would provide the confidence needed for investors and businesses alike to make sizable, long-term investments.

According to a recent study by Georgia Tech and Duke University, the aggressive adoption of energy-efficiency programs would lower utility bills by \$1.6 billion and create 15,600 new jobs by 2020 in Tennessee alone. Imagine the economic impact if that were done nationwide. Renewable energy standards would be just as impactful, creating an additional 20,000 jobs in Tennessee and increasing real gross domestic product by \$900 million. These are real jobs, real economic benefits, real revenues. They will come. Putting a price tag on carbon and establishing national standards for renewable energy and commercial and residential building energy efficiency will speed their arrival.

Andrew Geshwiler, a vice president with Wunderlich Securities in Franklin and a member of Tennessee Business Leaders for a Clean Energy Economy, can be reached at 615-567-2093.

ELECTRICITY: A POWERFUL BARGAIN

While most residents of the Tennessee Valley still pay under a dime for a kilowatt-hour of electricity, the prices of other things have climbed much farther past their 1933 levels.

by Kenneth Breeden

From the Tennessean Aug. 3 © 2010

Back in 1933, when the Tennessee Valley Authority began, the average price of a new home was \$5,700. A loaf of bread cost 7 cents, a gallon of gasoline was 10 cents, and a *Nashville Tennessean* newspaper was only 3 cents. A kilowatt-hour of electricity was even less—about 1.6 cents.

Today, a kilowatt hour from TVA still sells for less than the dime people paid for a gallon of gas during the Great Depression. That's a fairly impressive statistic when you consider everything that goes into making electricity.

All the dams and power plants that generate the billions of kilowatt-hours needed to power our modern economy and lifestyles cost billions of dollars. They require high-tech equipment and hundreds of highly skilled people to make them safe and efficient. The network of power lines crisscrossing the countryside and all the other specialized equipment and facilities needed to keep TVA's power system running 'round the clock with more than 99.9 percent reliability also are expensive to operate. In addition, these facilities follow strict environmental rules that add significant costs—more than \$5 billion over the past 30 years.

But a major cost of electricity production is fuel. Power from TVA's dams is relatively cheap, because the fuel is free—rain falling from the sky. The dams, however, can make only a fraction of the electricity the Tennessee Valley needs. Most power is produced from coal, nuclear fuel, or natural gas, and the costs of those fuels can rise and fall, just like the ever-changing price of gasoline. That makes electricity prices rise and fall as well.

TVA's base rate—the part of the electric bill that pays for the power infrastructure and other TVA services—has not changed for several months. But the price of fuel, which is another component

of power bills, has been increasing. In addition, utility bills almost always rise in the summer, when heavy use of air conditioners forces TVA to make extra electricity. But even though power bills have gone up lately, they are still slightly less today than they were two years ago when fuel prices were higher.

In addition to providing electricity, TVA manages public lands and natural resources, works with state and local governments to help bring industry and new jobs to the region, and operates waterways and reservoirs that provide navigation, recreation, and flood control. These are all missions that Congress created TVA to fulfill.

Although TVA serves the people in numerous ways, no taxpayer money comes to TVA, and TVA makes no profits. Everything TVA does is funded by customer power bills. In addition, each year TVA sends money to the U.S. Treasury to repay the government for building its first dams and other facilities (an early debt that will be paid off within the next three to four years).

While most residents of the Tennessee Valley still pay under a dime for a kilowatt-hour of electricity, the prices of other things have climbed much farther past their 1933 levels. The house that cost \$5,700 back then is now \$377,000, the 7-cent loaf of bread is \$2 today, the 10-cent gallon of gas is up to \$2.50, and the *Tennessean* newspaper has risen from 3 cents to 75¢—except on Sunday, when it's \$1.75.

So considering its importance to our modern lives, electricity is still a pretty good bargain—especially in the Tennessee Valley, where TVA works to serve the people in many ways while keeping prices well below the national average.

Kenneth Breeden is the Tennessee Valley Authority's executive vice president for customer relations, based in Nashville.



Watts Barr Nuclear Plant



Hiwassee Dam

Each year TVA sends money to the U.S. Treasury to repay the government for building its first dams and other facilities.

In-home evaluation for potential energy savings:

energyright.com



NEW SOLAR PRODUCTS

Outpost Solar is focused on designing and building photovoltaic systems for one of the most underutilized real estate areas in America, parking lots.

by Chris Tompkins

On August 4, 2010, Congressman Davis activated the Southeast's first parking area solar array with integrated electric vehicle (EV) charging capacity. After remarks highlighting American energy independence and job creation, Davis switched on the array, sending the sun's energy into the grid. Located at Richland LLC in Pulaski, Tennessee, this solar array represents the first step in a growing EV charging network. The 20kW grid-tied parking array produces enough energy to run nearly four typical American homes and is an integral part of the success of EVs.

This project is the beginning of the growing solar industry in the Tennessee Valley. "With EVs like the Nissan Leaf and Chevy Volt hitting the market soon, a network of charging stations like these is important to the vehicles' success," said Wilson Stevenson, president of Outpost Solar. Richland LLC, one of *Inc. Magazine's* 5000 fastest growing companies for the past four years, has made the investment in the solar array.

"I invite everyone to come down and see what the future of modern parking lots will look like," said Jim Greene, principal engineer, president of Richland LLC and CEO of Outpost Solar. "We want to show that a company and a community can be cutting-edge and forward thinking while still enjoying the benefits of a rural community. As the alternative energy industry grows, I'm hoping to help rural areas like Pulaski benefit from the job creation this type of innovation generates," Greene said. The project was made possible with cooperation from the State of Tennessee, the U.S. Department of Agriculture, Pulaski Electric System, and Tennessee Valley Authority (TVA).

The Outpost Solar Parking Area Solar Array (PASA) is a product that was designed, fabri-

cated, and installed by "green-collar" workers in the rural town of Pulaski. As installation of photovoltaic panels increases, it creates opportunities for more than just module manufacturers. Companies developing integration products such as the PASA are a crucial part of creating widespread adoption of solar generation. "We are focused on what we know," Greene said. "We don't make photovoltaic solar panels, but we are still creating new solar technology. The strategies, systems, and installations of the turnkey system are important to customers. When building systems for customers, I don't think it's all about the panels but how they are used," Greene said.

Outpost Solar is focused on designing and building photovoltaic systems for one of the most underutilized real estate areas in America, parking lots. When performing solar site evaluations, Greene realized that the buildings' roofs were not the ideal location for an array. "So many factors go into each site. Designing systems for roof mounts was a custom project each and every time. We designed the PASA to eliminate all the challenges, limitations, and expense that a roof mount system has," Greene said. Parking lots are generally free from obstructions and provide a clean view of the southern sky, which is important when relying on the sun for power. The life of a solar array is also significantly longer than the life of most roofs, especially if a new roof is not installed at the same time as an array. When factoring in the installation, upgrade, or replacement of a roof with an array, project cost becomes less than palatable for most customers. Stand-alone parking lot systems such as the Outpost Solar PASA operate until the end of their useful life and can be upgraded or repaired with commercially available components as needed.

continued on page 9



continued from page 8

The integrated electric vehicle charging station that Outpost Solar installs with its PASA system is an accessory that helps to develop the charging infrastructure. Located under the array, the EV charging station integrates into the PASA system flawlessly, further increasing the structure's value to commercial customers.

Outpost Solar includes an EV charging station with each of its PASA systems in an effort to increase solar generation and broaden the EV charging infrastructure. Outpost Solar is currently installing the EV-Charge America's station, featuring two J1772 plugs, designed for the Chevy Volt and Nissan LEAF, and two level-one outlets for smaller, low-speed EVs. The solar array's energy is sold to the grid through TVA's Generation Partners Program at a premium. When a car charges off the EV charging station, the electricity is bought from the local utility at the normal market rate. This grid-tied system allows 100% of the solar power to be used instead of providing EV charging capacity only when an EV is present. The incentives reduce the customer's payback period, and the EV charging station provides a free place for future customers to refuel vehicles while visiting the business.

Outpost Solar is a middle Tennessee based company that provides creative solutions for solar energy implementation ranging from deployable off-grid generation systems, designed for military and recovery operations, to electric vehicle infrastructure solutions and array systems that generate a megawatt or more. Outpost Solar provides its clients with the necessary expertise to assess power needs and maximize the return on investment. Outpost Solar's staff provides the full range of solar power project services



Congressman Lincoln Davis activating the array.

including design, fabrication, installation, financing, and incentive optimization for projects of any size or application. Outpost Solar's fabrication and manufacturing partner, Richland LLC, is located in Pulaski and focused on the rural job growth that emerging industries such as solar bring.

Chris Tompkins, special projects manager at Outpost Solar, has an MBA from Belmont University.

At left, the southeast's first parking area solar array with integrated electric vehicle charging station, at Richland LLC in Pulaski, Tennessee; at right, Anitech low-speed electric truck charging at the EV-Charge America station.



Plugs at the EV-Charge America station can be used for the Chevy Volt and Nissan LEAF.

ENERGY EFFICIENCY NEEDED FOR STATE BUSINESSES

In a unique public-private collaboration, the State of Tennessee is creating a targeted loan program for financing energy efficiency improvements.

by Clint Gwin

From the Tennessean Aug. 29 © 2010

Thanks to the leadership of Governor Brede- sen and the legislature, Tennessee busi- nesses will now have access to energy- efficiency financing at an unprecedented level.

Through this leadership, the State of Tennessee is creating a unique public-private collabora- tion to develop a model for the rest of the na- tion to follow. This first-of-its-kind collabora- tion is leveraging state funds with capital from the Tennessee Valley Authority (TVA), Pinnacle National Bank, and Pathway Lending for the creation of a targeted loan program for financing energy efficiency improvements. This program is receiving additional support from the U.S. Economic Development Administration and the U.S. Department of Energy as a possible blue- print for other states.

Why is it important that Tennessee and Path- way Lending develop and launch this type of loan program at this time? As many businesses understand, energy costs are rising, corporate budgets for capital projects are shrinking, and as the Pew Foundation recently reported, lack of finan- cing is the number-one barrier to implement- ing energy-efficiency projects.

This program will bring businesses in our state what is currently unattainable—access to loan capital to finance energy efficiency and renew- able energy projects. The program will provide below-market-rate loans to finance energy effi- ciency improvements ranging from \$20,000 to \$1 million in Tennessee facilities. Whether it's building retrofits, upgrading equipment, or add- ing renewable-energy generation, businesses can now take the next step in achieving the sig- nificant, long-term energy savings they've been demanding, all while becoming more competi- tive and reducing impact on the environment.

The study *Energy Efficiency in the South*, re- leased in April 2010, cites that by reducing the growth of electricity consumption, Tennesseans could save as much as \$1.6 billion a year by 2020 and \$3.1 billion a year by 2030. More important, energy-efficiency projects create and retain jobs right here in Tennessee. These economic im- pacts are felt locally where trained contractors, consultants, and installers are needed for proj- ect implementation. Over the next 10 years, it is expected that this loan program will generate more than \$100 million in loans and will create and retain more than 3,500 jobs while decreas- ing Tennessee's demand for new electric power generation and reducing environmental impacts.

Tennessee has made significant strides to be- come a national leader in sustainability and green business over the past few years. Major corporations specializing in solar energy are moving to our state. Organizations like the Southeastern Energy Efficiency Alliance are educating businesses on the value of energy effi- ciency. Oak Ridge National Laboratory is us- ing commercially available and lab-developed technology for energy-efficiency efforts such as the Net-Zero Energy Building and Sustainable Campus Initiative, all of which have been rec- ognized as potential national models.

Energy efficiency is a smart decision for busi- ness and the economy of our state and an even better decision for the environment. Pathway Lending is launching an efficient online applica- tion process to assist businesses across Tennes- see from sole proprietors to corporations in their efforts to become more energy efficient, envi- ronmentally friendly, and globally competitive.

Clint Gwin is president of Pathway Lending, a Community Development Financial Institution as certified by the U.S. Department of the Treasury.



Clint Gwin

AN ENERGY AUDIT: THE FIRST STEP TOWARD HOME ENERGY EFFICIENCY

A comprehensive, diagnostic energy audit will not only pinpoint the source of the problem but also prioritize recommended improvements to maximize the return on investment.

by Jeff Pizzino

With the Aug. 24 launch of Tennessee's energy-efficient appliance rebate program, along with continuing concern about finding ways to reduce energy usage and overhead in these challenging economic times, more residents and businesses are becoming energy conscious. According to the U.S. Department of Energy, an energy audit is the "first step to assess how much energy your home consumes and to evaluate what measures you can take to make your home more energy efficient."

Lifelong Nashville resident Derek Pace, with over 10 years' experience in the design, construction, and repair of homes ranging from \$200,000 to more than \$2,000,000, founded his middle Tennessee Pro Energy Consultants franchise in July 2010. "No matter what the cost or age of the building or how well it was constructed, I saw firsthand the need for improved energy efficiency to lower energy costs, potentially saving the owner thousands of dollars," said Pace. "Energy costs are a monthly expense that compound over time. Any cost reduction reflects significant cumulative savings to home and light commercial office owners."

The business is the first national energy auditing franchise and has quickly grown to more than 60 locations, mostly in the eastern U.S. The company's customized, diagnostic energy audit uses the latest technology to evaluate the performance of a home or light commercial office to identify precisely what improvements are needed to solve the top three building performance problems:

- comfort issues (difficult rooms to heat or cool, uneven temperatures from room to room, etc.);

- excessive energy usage issues (i.e., high heating or cooling bills); and
- poor indoor air quality issues (such as excessive humidity or rooms that are always dusty).

Unlike a do-it-yourself or utility company energy audit, this type of audit will not only pinpoint the source of the problem but also prioritize recommended improvements to maximize the return on investment. Although Energy Star-rated appliances are a good idea and can save homeowners money, they don't address the underlying causes of building performance issues.

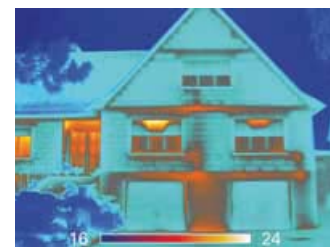
"Our job as an independent third party is simply to educate homeowners about their home and show them what improvements will be most cost-effective," said Pace. "Some energy audits provide only a best guess as to what's wrong with your home. It takes a comprehensive, diagnostic energy audit to remove all the guesswork and possibly save homeowners from making unnecessary costly repairs."

"The most intriguing part was the infrared camera," said customer Nicholas Rubadeau, a Nashville resident who runs a dehumidifier every night to battle a high moisture content and large temperature variance between rooms. Rubadeau's audit discovered improper insulation and window caulking as well as insufficient or missing insulation in the attic and crawl space.

Jeff Pizzino is the director of corporate communications for Pro Energy Consultants.



The energy audit starts with the home or business owner explaining the specific performance issues he or she has been experiencing. Next, an electronic blower door is installed in an exterior door.



Once activated, the blower door pulls air out of the house. As air comes back into the house from elsewhere, Pace uses an infrared camera to essentially take an "X-ray" of the building and identify all the hidden air leaks and failed or missing insulation—the real causes for excessive energy usage and major comfort complaints. The entire process takes approximately two to three hours.



THE CASE AGAINST PROPOSED ENERGY LEGISLATION

by Joseph Schmitz

The allocation of labor, resources, and capital is best done in the private economy, where markets are free to operate without government interference.



Joseph Schmitz retired from Bridgestone/Firestone Lavergne plant, where until 2005 he was in charge of budgeting, long-range forecasting and cost accounting.

The long-awaited Kerry-Lieberman climate and energy bill was unveiled recently. Among its provisions are the following:

- establishing a carbon cap, reducing economy-wide emissions to 58% of 2005 levels by 2030 and 17% of 2005 levels by 2050;
- establishing a Clean Energy Technology Fund, whose source of funding is not disclosed;
- supporting electric vehicle infrastructure;
- implementing new taxes to force the carbon reductions, of which two-thirds of revenues will be rebated to consumers, though not directly.

The Congressional Budget Office has concluded that, over 10 years, this bill would reduce the deficit by \$19.1 billion. It will not. Instead it will increase the deficit by hundreds of billions of dollars. Why should anyone dispute the CBO? The CBO uses static analysis when evaluating Congressional proposals. The agency should be using dynamic analysis, which takes into consideration people's behavior along with other factors that can vary. The information used to analyze Congressional proposals is provided by the lawmakers themselves, who could benefit by providing data that tend to make the proposals appear cost effective. "Garbage in" is going to produce "garbage out." Consequently, the CBO's track record is poor when actual results are compared to its projections.

Since the CBO uses static analysis, the actual effect on the overall economy is not considered. With few exceptions, the government should not interfere in the activity of markets. The allocation of labor, resources, and capital is best done in the private economy, where markets are free to operate without government interference. One of the best examples of the detrimental effects of government interference is the labor market. Involuntary unemployment is basically due to defects in the pricing system. Imagine what the present unemployment rate would be if we had a truly free labor market. The Kerry-Lieberman climate and energy bill will place caps on carbon that are almost impossible to meet, and it redirects capital to numerous projects that, in a free market, would not receive funding, taking capital away from more worthy endeavors. All this reduces economic growth, individual wealth, and federal revenue, contributing to a larger budget deficit.

What should be done to combat global warming? You first have to ask several questions. Is it happening? If not, we do nothing. If so, we must determine the cause. If it is determined to be due to natural causes, we do nothing. If it is man-

made, we have to ask what humans are doing to cause warming. If we cannot pinpoint the cause, we conduct further research to find the cause. If we can determine the cause, such as emitting excessive greenhouse gases, we must ask whether warming is good, bad, or a combination that can more or less cancel each other out. If it turns out to be bad, the question is what to do about it.

The Kerry-Lieberman Energy Bill takes the wrong approach. It fails to consider that, in order to make even a small reduction in greenhouse gases, the rest of the world will have to take similar measures. Fast-growing economies like India and China, which have approximately one-third of the world's population, are unlikely to go along. Neither are other developing countries, which are likely to have little interest in measures that would slow their economic growth. Kerry-Lieberman will result in slower growth in the U.S. compared to the rest of the world. If warming is determined to be detrimental, we must determine whether the proposed solution may be even more detrimental.

If we determine that warming is man-made and harmful, what should we do? Foremost, we need to implement a pro-growth expansionary fiscal policy in the U.S. and encourage the same in other countries. The wealthier a country becomes, the more resources it can devote to solving problems. We must realize that many predicted calamities never came to pass because developing technologies addressed the issues. An example a few decades ago was the predicted mass starvation: what was not seen at the time was an increase in the world's wealth, which tended to slow population growth and produce major advances in agriculture. It was said in the mid-19th century that, within a hundred years, London would be covered in three feet of horse manure. What was not foreseen was the invention of the automobile. In a free market, if there is a need, people will produce the product, service, or technology to provide for that need.

Why do leaders so often propose solutions to problems or nonexistent problems that do not resolve the problem or that make things worse? Most people are driven by desires. I suspect most politicians are driven by the desire for power and control. Rather than implement policy that advances freedom and prosperity and makes people independent, they would rather keep people dependent and limit their freedom. They are doing what many rulers have done since the beginning of time, just using more sophisticated methods.

BUSINESS COALITION CALLS FOR ACTION

Climate and energy legislation can create new jobs and increase investments in Tennessee and the U.S.

**by Cortney Piper
and Susan Richardson-Williams**

From the Tennessean July 22 © 2010

In true bipartisan fashion, Tennessee Business Leaders for a Clean Energy Economy recently visited our U.S. senators to talk about the benefits of passing climate and energy legislation to support Tennessee's clean energy economy—because good jobs and clean energy are not partisan issues.

Representatives from Alstom, Signal Energy, and the Energy, Technology, and Environmental Business Association along with the vice chairman of the Chattanooga Green Committee were united in their message to our senators: Pass climate and energy legislation that puts a price on carbon and gives the industry market certainty to unleash investments, innovation, and jobs.

All agreed that without a comprehensive energy policy, investments will be lost to China and Germany, countries that have already established market certainty for clean technologies.

All agreed the time to act is now. With climate and energy legislation, they can create new jobs and increase investments in Tennessee and the U.S. Without it, those jobs and investments go overseas. America's 21st century, clean-energy businesses, like the ones we took to Washington, D.C., have a message you don't hear too often these days: We're hiring.

Investors Are Waiting

The way we see it, however, the current-day U.S. economy is like a baseball team with a roster full of top-notch players but a coaching staff that refuses to field a full team. Until the U.S. Sen-

ate acts by passing comprehensive energy and climate legislation, America's talented team of workers and innovators can't win the global competition game as often or as quickly as we'd like.

Large-scale investors are ready to put their money into the clean-energy game—like Alstom and Hemlock. But first they need to know clean energy's costs relative to fossil fuels.

As the catastrophic event in the Gulf Coast reminds us, there are hidden costs to our dependence on old-school energy sources. And many investors won't unleash their cash until those fuels are fairly priced. Once markets start to factor in the true cost of carbon, clean energy will become an even more attractive investment. But until the U.S. gets clear about carbon pricing, these investors will stay on the sidelines.

Existing technology is also sitting on the bench. From energy-efficient windows and lighting to advanced wind, solar, and geothermal technologies, we have an array of American technologies, goods, and services ready for prime time. The American businesses that manufacture, market, distribute, and provide these goods and services are ready to expand when our country is ready to buy.

The clean technology industry is booming in Tennessee. Pew Charitable Trusts says we have the third-fastest-growing clean-energy economy, and major investments from Hemlock, Confluence Solar, Nissan, Volkswagen, Wacker, and Sharp Solar show we are in a position to gain more. We need Senators Lamar Alexander and Bob Corker to work with us to further support Tennessee jobs and investments in the clean-energy economy, and we encourage them to do so.



Cortney Piper (above) and Susan Richardson Williams (below) cofounded Tennessee Business Leaders for a Clean Energy Economy. The informal network of businesses and business leaders spans a wide spectrum of industry and commerce and supports a transition to a low-carbon clean energy economy in Tennessee and nationally.



THE TRUTH ABOUT BEING GREEN

A green business must also be economical and feasible if it is to succeed.

by Jim Burton

Jim Henson's Muppet frog, Kermit, is a smart little rascal. He sings a song proclaiming, "It's not that easy being green." Of course, he was referring to his own color and how that creates all sorts of problems for him, but it's also true about today's economy—"It's not that easy being green."

First, you have to determine exactly what it means to be green. The Urban Green Partnership in an article titled "What is Green?" notes:

Green is the design, commercialization, and use of processes and products that are feasible and economical while

- *reducing the generation of pollution at the source;*
- *minimizing the risk to human health and the environment....*

Since the industrial revolution, people have become disconnected from the very life forces that sustain us (urbangreenpartnership.org/what-is-green).

One could deduce that "going green" means a return to the days of an agrarian society in which family units essentially hunted and gathered to meet basic needs. Indeed, meeting basic needs is about all they were able to do. While using animals for transportation and power reduced the generation of pollution at the source (unless you were the one who had to muck out the barns), a return to those days is not feasible.

Brian Milani says green economics is "primarily about 'use-value,' not 'exchange-value' or money," and "about regeneration—of individuals, communities, and ecosystems—not about accumulation, of either money or material" (www.greeneconomics.net/what2f.htm, "What Is Green Economics?"). He adds that in the current economic system, "any use-values generated (i.e., social needs met) have been secondary ... to the primary goal of monetary accumulation."

Entrepreneur.com proclaims in "The Green Economic Revolution" that "going green is a trillion-dollar industry propelled by the energy independence and global warming solutions your customers, colleagues, investors, and competitors desire now."

I think green is a lot simpler than these quotes would indicate. We cannot return to an agrarian or barter economy. The only way people accumulated money (wealth) was by producing things others valued—food, transportation, clothes, shelter, etc. At the base of the human-needs pyramid, these things made life better for individuals and for society. I don't know if green is a trillion-dollar industry, or even an industry, or if there is a revolution. This may be hyperbole. But I think the Urban Green Partnership may be at least partially right. That "the design, commercialization, and use of processes and products" must be "feasible and economical" has always been a key to success. If you add reducing pollution and minimizing risk, you have a winner and might just get a significant piece of this supposed trillion-dollar green pie.

But beware those who seek the rewards by improper means. *Fraud Magazine's* "A New Wave in Green Energy Fraud" (Vol. 24, No. 5, Sept./Oct. 2010) suggests there is reason to suspect that all of the money being thrown at green technologies is leading to many instances of fraud around the world. The article indicates that governments have allocated about \$200 billion in direct spending, subsidies, and tax credits (p. 37). The author details a number of discovered frauds in various countries ranging up to 5 billion Euros—signaling a direct link between "easy money" and those who would acquire it dishonestly. When the rules are unclear, people will make them up as they go.

You are obviously interested in green possibilities, or you wouldn't be reading here. This issue features the well-crafted thoughts of some gifted people on the subject of "green"—articles you may find enlightening, provocative, and well worth the time. You may get a great green idea.

Kermit's song continues: "People tend to pass you over"—which will happen if you focus entirely on the green without enough attention to the feasible and economical. We must remember Kermit's admonition, "It's not that easy being green," as well as his conclusion, "I'm green, and it'll do fine."

Jim Burton is the dean of Jennings A. Jones College of Business at MTSU.