

2011 Annual Summary

Kentucky Department for Energy Development
& Independence

Kentucky Energy & Environment Cabinet

Foreward

In November 2008 Governor Steve Beshear unveiled his comprehensive energy plan for Kentucky, “Intelligent Energy Choices for Kentucky’s Future; a 7-point strategy.” The plan is designed to improve the quality of life for all Kentuckians by simultaneously creating efficient, sustainable energy solutions and strategies; by protecting the environment; and by creating a base for strong economic growth.

The Governor’s plan incorporates recommendations to improve energy efficiency for Kentucky’s homes, businesses and transportation fleet, and calls for an increase in our use of renewable energy. The plan discusses the potential for biofuels as well as coal-to-liquids and coal-to-gas technologies and recommends the initiation of an aggressive carbon capture/storage program for coal-generated electricity. Finally, the plan begins the discussion of whether or not nuclear power should provide a significant portion of electricity in the future.

By refining and adopting this energy plan, Kentucky can establish leadership in the United States for innovating and creating efficient, sound and environmentally compatible energy solutions and strategies. The energy plan serves as a roadmap toward energy independence that is designed to accomplish six important goals:

- Conserve and use energy more efficiently
- Achieve energy independence for transportation fuels
- Use coal more cleanly and efficiently
- Diversify electricity generation to optimize use of renewable and alternative fuels in addition to coal, Kentucky’s leading fossil fuel, and nuclear power
- Mitigate carbon dioxide emissions, thereby reducing our carbon footprint
- Establish Kentucky state government as a leader in green practices

During the course of the past twelve months the Energy and Environment Cabinet and the Department for Energy Development and Independence (DEDI) have worked diligently to implement the Governor’s energy plan on a broad array of fronts. This annual summary provides a brief overview of those activities that are driving results.

More information about the Governor’s energy plan and DEDI’s activities to implement the plan can be found at <http://energy.ky.gov>.



Dr. Len Peters

Fellow Kentuckians -

I am pleased to report that 2011 has been a year of impact and results. Energy programs that touch Kentucky's schools, homes, businesses, communities and government facilities are taking hold and making a difference. Today we are seeing what can happen when Kentuckians join together and work toward a common goal. This year all 174 Kentucky public school districts participated in the Energy Education Collaborative; 26 Kentucky energy providers supported the Kentucky Home Performance Program; more than 34,000 Kentuckians participated in and received rebates from the Kentucky Energy Efficient Appliance Rebate Program; 106 Kentucky industrial, commercial, and institutional facilities took advantage of sustainability and retrofit programs; 192 farm operations joined the On-Farm Energy Efficiency Initiative; 45 state government buildings were upgraded using the Kentucky Green Bank; and 60 Kentucky municipalities implemented energy efficiency projects.

Many of our American Recover and Reinvestment Act of 2009 energy programs and projects are either fully implemented or complete. By wisely investing Recovery Act funds Governor Beshear has created new jobs, retained our industries, reduced our energy dependence and lightened our impact on the environment. Together, Kentuckians are helping transform Governor Beshear's energy plan into a reality that will produce dividends for generations to come.

The Kentucky Climate Action Plan Council issued a final report that presents the methods and the pros and cons of more than 70 policy options that are intended to reduce greenhouse gas emissions from all sources in the Commonwealth while also encouraging energy efficiency, energy security, and economic growth. Also the General Assembly passed legislation that defined legal issues associated with the geologic storage of carbon dioxide that better positions Kentucky for future carbon capture and storage federal funding. We continued to develop our biomass, biofuel and renewable energy markets to enhance the diversity of our energy portfolio mix. Numerous private companies have expressed interest in Kentucky's potential but uncertain financial markets delay us from moving this potential to a reality.

An uncertain national economy coupled with new federal environmental regulations placed new challenges on the development of our fossil energy resources. Companies have expressed interest in expanding Kentucky's coal-to-gas and carbon capture initiatives, but long-term financing remains a hurdle. We are seeing some electric utilities move from coal-based power plants to natural gas to comply with federal clean air regulations. To help analyze the impacts of these actions, we developed a dynamic computer model which forecasts electricity prices, demand, emissions, and fuel consumption based on various assumptions to the generating portfolio. There is no question that our role to find balance between energy, the environment and our economy is becoming increasingly more important.

Few states have made energy investments with the same breadth and depth as Kentucky. We can be proud of these initiatives as they help shape our future for the better. We must continue to work together to solve the energy challenges that lie ahead of us. Thank you for the opportunity to serve you.



Len Peters, Secretary, Kentucky Energy and Environment Cabinet





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Intelligent Energy Choices for Kentucky's Future

Governor Steve Beshear's Energy Plan

Our Challenges

Kentucky's challenge for the 21st century is to develop clean, reliable, affordable energy sources that help us improve our energy security, reduce our carbon dioxide emissions, and provide economic prosperity. Kentucky can be – and in fact must be – a leader in this energy revolution.

Energy independence is a top challenge to the state and the nation in the 21st century, a challenge that has been made at once more urgent and more complex. As a state, it is imperative that we have policies and programs in place that allow us to shape our own energy future by making sure we utilize our energy resources in an environmentally sound manner. The Governor's strategic action plan, Intelligent Energy Choices for Kentucky's Future: a 7-point strategy, is intended to place Kentucky on such a path. Review the Governor's energy plan at <http://energy.ky.gov>

Strategy

Goal

- | | |
|--|--|
| (1) Improve the energy efficiency of Kentucky's homes, buildings, industries and transportation fleet. ●●● | Energy efficiency will offset at least 18 percent of Kentucky's projected 2025 energy demand. |
| (2) Increase Kentucky's use of renewable energy. ●●●●●●●● | By 2025, Kentucky's renewable energy generation will triple to provide the equivalent of 1,000 megawatts of clean energy while continuing to produce safe, abundant and affordable food, feed and fiber. |
| (3) Sustainably grow Kentucky's production of biofuels. ●●● | By 2025, Kentucky will derive from biofuels 12 percent of its motor fuels demand, while continuing to produce safe, abundant and affordable food, feed and fiber. |
| (4) Develop a coal-to-liquids industry in Kentucky to replace petroleum-based liquids. ●●●●● | Kentucky will develop a coal-to-liquids industry by 2025 that will use 50 million tons of coal per year to produce four billion gallons of liquid fuel. |
| (5) Implement a major and comprehensive effort to increase gas supplies, including coal-to-gas in Kentucky. ●●●●●● | Kentucky will produce the equivalent of 100 percent of our annual natural gas requirement by 2025 by augmenting in-state natural gas production with synthetic natural gas from coal-to-gas processing. |
| (6) Initiate aggressive carbon capture/sequestration projects for coal-generated electricity in Kentucky. ●●●●●● | By 2025, Kentucky will have evaluated and deployed technologies for carbon management, with use in 50 percent of our coal-based energy applications. |
| (7) Examine the use of nuclear power for electricity generation in Kentucky. ●●●●●● | Nuclear power will be an important and growing component of the nation's energy mix and Kentucky must decide whether nuclear power will become a significant part of meeting the state's energy needs by 2025. |

Governor's Task Force on Bioenergy

Bioenergy Bus Trip

In August of 2009 Governor Steven L. Beshear convened an Executive Task Force on Biomass and Biofuels to establish strategic actions to develop a sustainable biomass and biofuels industry in Kentucky. The Governor recognized the need to diversify Kentucky's energy portfolio and to provide economic prosperity to rural Kentucky.

The Task Force built on existing biomass and biofuel goals and recommendations established in Kentucky's energy plan, Intelligent Energy Choices for Kentucky's Future; the Kentucky Agriculture Council's A Pathway for Kentucky's Agriculture and its Rural Communities: 2007 to 2012 Strategic Plan; and the Kentucky Renewable Energy Consortium bioenergy Road-

map for Kentucky to formulate a single plan of action for the Commonwealth.

To maintain progress toward achieving the recommendations identified by the Governor's Task Force the Department for Energy Development and Independence (DEDI) and the Governor's Office of Agricultural Policy (GOAP) coordinated a bioenergy based educational trip to Missouri in May.

“ I really enjoyed the Bioenergy Tour for it gave me a chance to learn and see first hand the cutting edge technology regarding this important issue. ”

Representative C.B. Embry, Jr. (District 17)



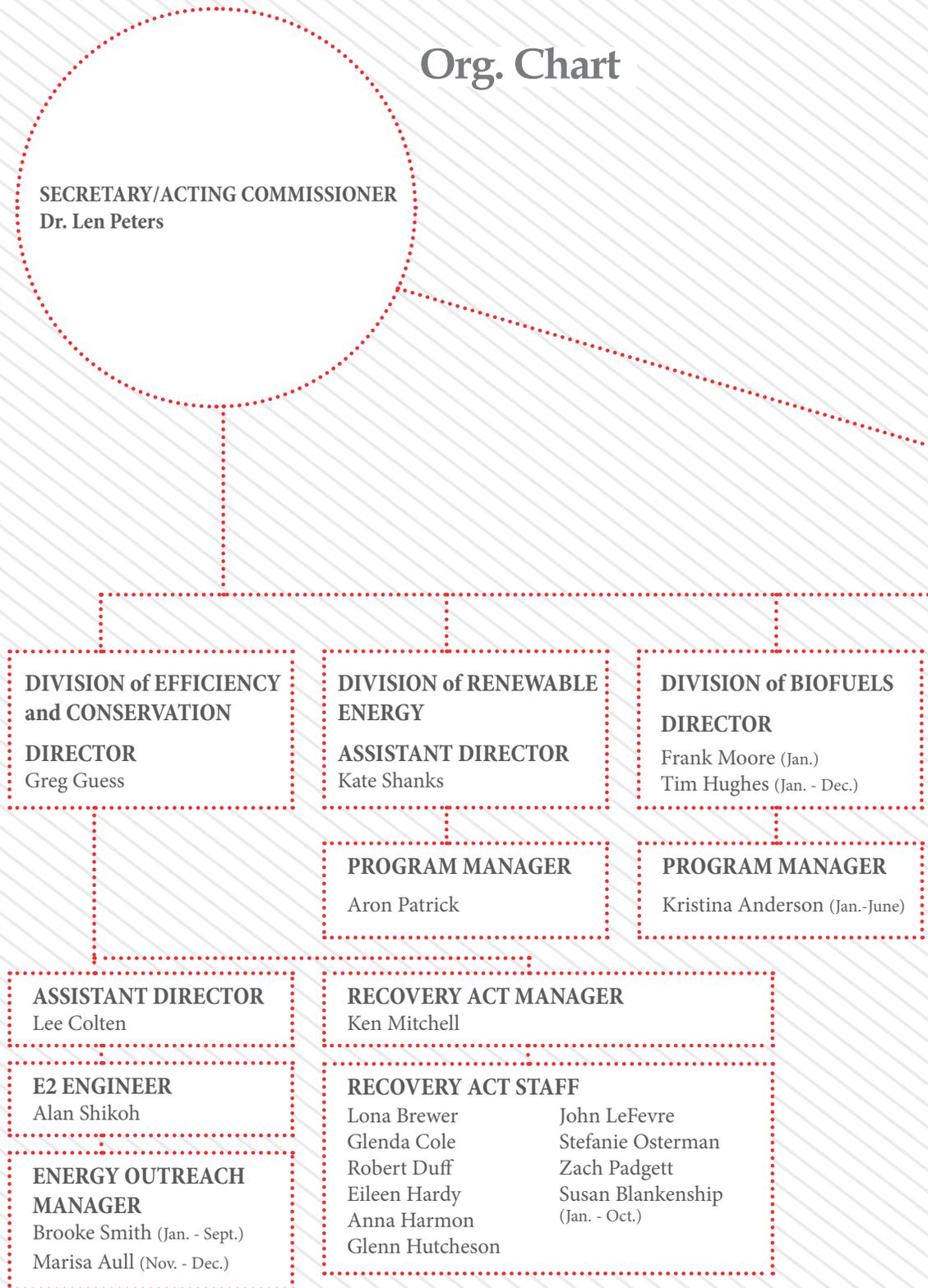
From left to right -- Pat Henderson -- KY Agricultural Development Board and Director KY Association Conservation Districts; Representative Wilson Stone, Steve Coleman, KY Division of Conservation, David Rowlett Director KY Association Conservation Districts; Karen Woodrich, USDA Natural Resources Conservation Service (NRCS); Dan Ellison Director KY Association Conservation Districts; Jeff Rice Director KY Association Conservation Districts; Representative C. B. Embry Jr., Ruthi Pike NRCS

“ Congratulation on what was a very informative tour. As I stated on the bus, I believe this information gathering event will bear fruit in the long term. ”

Kentucky General Assembly
Representative Wilson Stone (District 22)

DEDI Organization

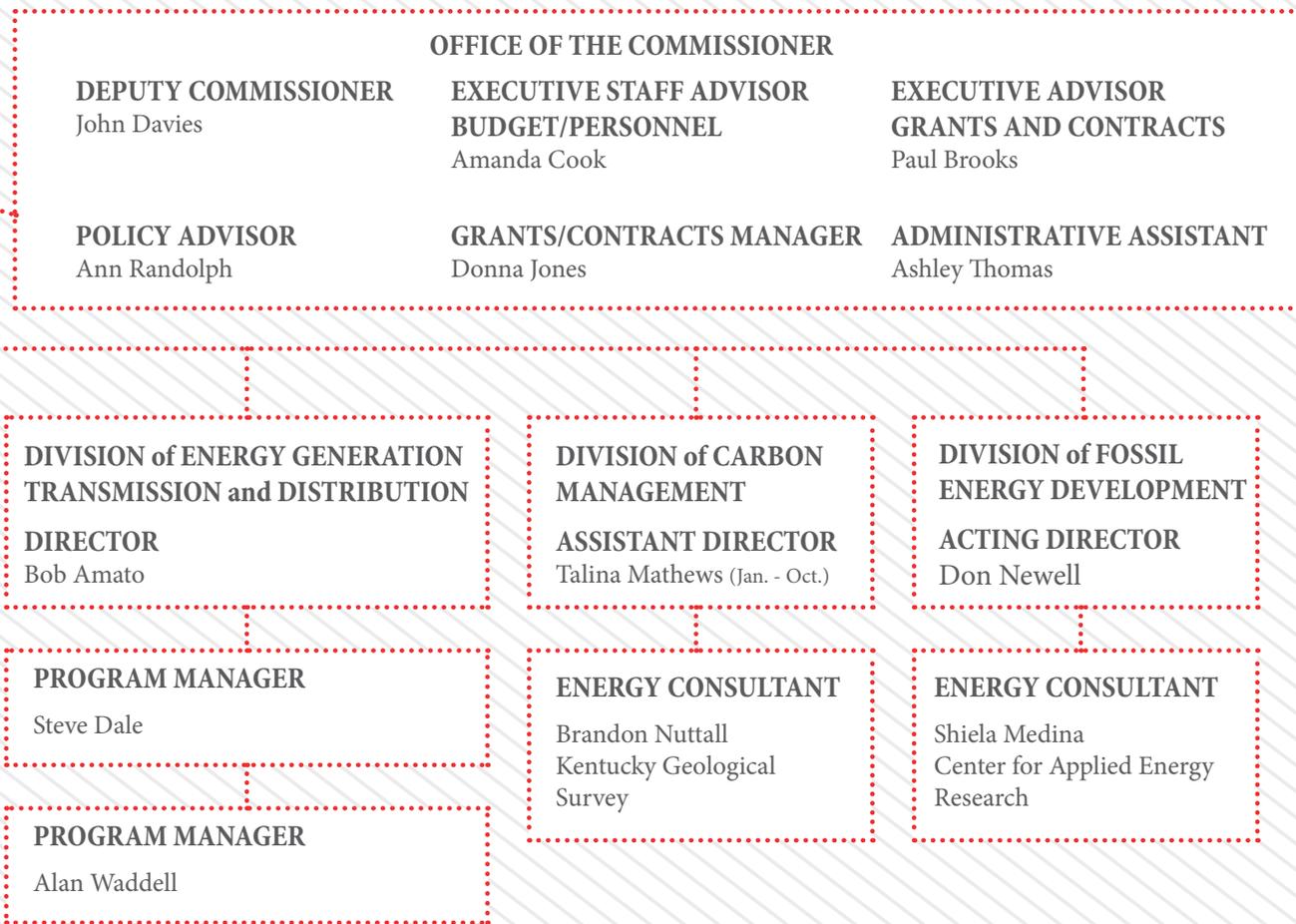
Org. Chart



In 2010 the Kentucky General Assembly passed House Bill 393 (KRS 152.712) and established the Department for Energy Development and Independence (DEDI) within the Energy and Environment Cabinet. The department was created with six divisions that support implementation of Governor Steve Beshear's energy plan. The divisions included the Division of Efficiency and Conservation; the Division of Renewable Energy; the Division of Biofuels; the Division of Energy Generation, Transmission and Distribution; the Division of Carbon Management and the Division of Fossil Energy Development. Additionally, the department collaborates with both the University of Kentucky Center for Applied Energy Research and the Kentucky Geological Survey that provide technical expertise and advice. The Department was authorized 29 fulltime employees of which 12 employees help manage the \$68 million in American Recovery and Reinvestment Act funds allocated to DEDI by the US Department of Energy.

DEDI's mission is to improve the quality and security of life for all Kentuckians by creating efficient, sustainable energy solutions and strategies and promoting clean, reliable, affordable energy sources that help Kentucky improve energy security, reduce carbon dioxide emissions, and provide economic prosperity. Additionally, the department supports and encourages energy-related research and development that will benefit Kentuckians.

A short summary highlighting the accomplishments and future direction of each division follows.



Division of Efficiency and Conservation *-Greg Guess, Director*

The Division of Efficiency and Conservation is charged with implementing the first of the seven strategies in the Governor's "Intelligent Energy Choices for Kentucky's Future." The first strategy has the goal of offsetting 18 percent of Kentucky's projected 2025 energy demand through increased energy efficiency.

The division has been engaged with numerous partners to manage some \$68 million in American Recovery and Reinvestment Act (ARRA) funding over a roughly three-year period. While some of this funding has supported renewable energy and bio-fuels programs managed by other divisions within DEDI, the predominant program area has been in the energy efficiency and conservation arena.

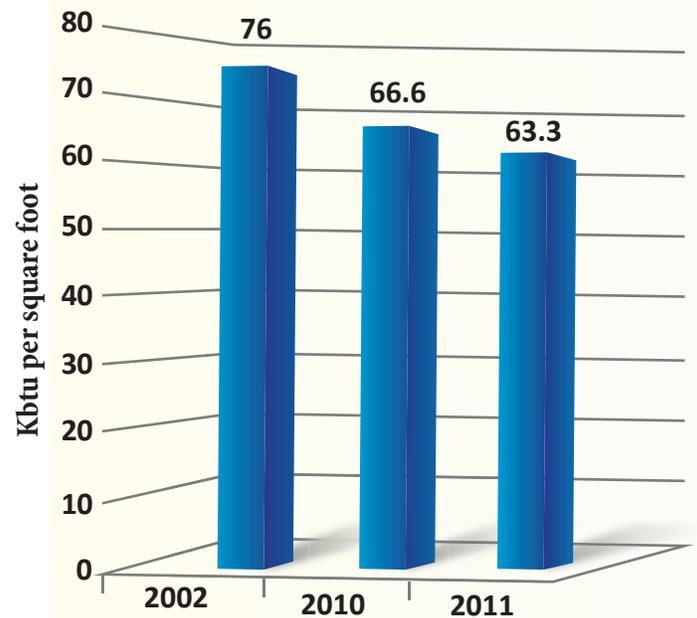
Division staff worked with 24 partner agencies/organizations on over 30 programs that impacted every major area of Kentucky's economic activity including K-12 and higher education, local government, state government, residences, industry, commercial buildings, agriculture, and electric utility "smart grid" initiatives..

The division staff provided funding for a number of innovative and cutting-edge projects. Perhaps the most innovative project was the Houseboat to Energy-Efficient Residence Project. This program was designed to develop a new product to revive the distressed houseboat manufacturing industry.

Our challenge in the coming year will be to sustain as many of the programs as possible given the fact that two major grants will expire in the coming year. Considerable effort went into planning programs that offered the greatest opportunity for sustainability beyond the Recovery Act funding period. For example, the Kentucky Department for Housing, Buildings and Construction used ARRA funding to hire and train inspectors to enforce the state's new HVAC standards. That inspection program will now be supported by fees generated from inspections.

The programs that are profiled in the following pages have enjoyed a great deal of success and recognition because of the outstanding partnerships that have been forged. Kentuckians have benefited from these partnerships.

**Kentucky K-12 School
Energy Use Index (Kbtu/sq ft)
per year**



Source: 2011 KEEPS Annual Report

Division of Renewable Energy *-Kate Shanks, Assistant Director*

The Division of Renewable Energy is tasked with implementing Strategy 2 which calls on Kentucky to triple its renewable energy generation to provide the equivalent of 1,000 megawatts of clean energy while continuing to produce safe, abundant, and affordable, food, feed and fiber. In meetings its objective, staff primarily focuses on policy development, policy analysis and education and outreach and provides technical assistance to those pursuing renewable energy.

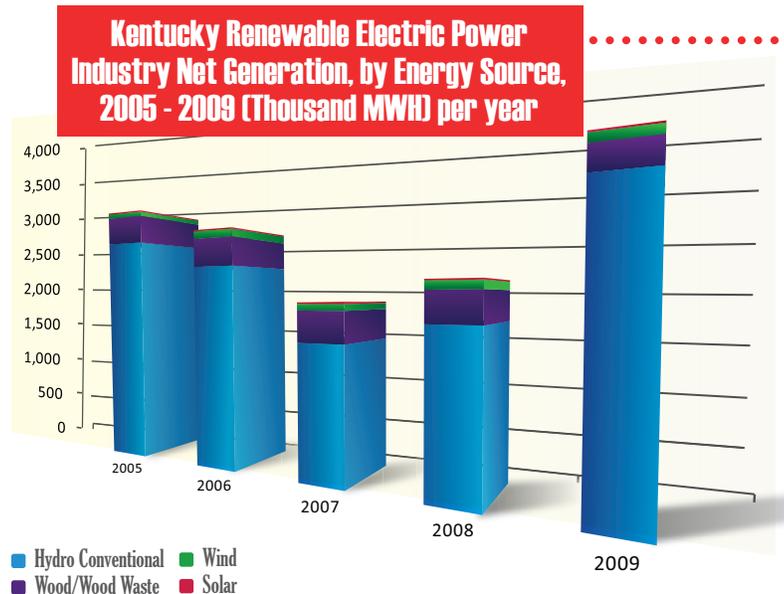
Division staff continue to work on policy analysis and policy development related to renewable energy and during the past year focused on identifying barriers to distributed generation of renewable energy including solar. The National Renewable Energy Lab completed a review of Kentucky's net metering and interconnection standard and assessed the legality of establishing third party financing for distributed renewable electricity. Both assessments provide guidance for policy development.

Also, several facilities in Kentucky will receive grants from the U.S. Department of Agriculture under the Rural Energy for America Program to install solar arrays. Renewable resources provide a small percentage of the electricity in Kentucky, but developers are assessing or initiating projects to utilize our biomass, hydro, solar and wind resources.

Kentucky now has two large companies collecting wind speed data to evaluate the suitability of constructing a wind farm in Kentucky. Perdue Farms is collecting biogas at a chicken processing facility and converting it to electricity. Developers in Bowling Green are installing nearly 2 megawatts of solar photovoltaic (PV) panels, and Kentucky is now home to a 5 megawatt solar manufacturing facility near Danville, Kentucky. The roof of the new visitors' center at the Governor's mansion now provides a display of solar PV and hot water panels for visitors. Division staff assist with these projects and others by providing information about permitting, zoning, tax credits and potential partners.

Division staff provide education and outreach services through presentations, webinars and workshops. Staff utilize numerous resources to develop outreach materials including a model that has been designed to simulate different electricity portfolios under various policy and economic situations. Staff can model a renewable electricity portfolio to quantify the impact of developing renewable sources on price, emissions and resources.

The division provided primary staff support for the Kentucky Center for Renewable Energy Research and Environmental Stewardship. The Center's purpose is to promote renewable energy, energy efficiency and environmental stewardship. The division is also a liaison to the Conn Center for Renewable Energy Research at the University of Louisville.



Source: USDOE National Renewable Energy Laboratory

Division of Biofuels - *Tim Hughes, Director*

The Division of Biofuels' mission is to provide leadership to grow Kentucky's biofuels and biomass industries through research, development and commercialization while continuing to produce safe, abundant and affordable food, feed and fiber. The division has oversight in implementing Strategy 3 of the Governor's energy plan for biofuels production, and coordinates the biomass power generation features of Strategy 2 for production of renewable electricity.

Diminishing federal funds, uncertainty in federal regulatory definition and implementation, volatility in fuel prices, instability in several foreign governments, timidity in the financial markets, and extreme national weather events made for many interesting debates regarding the future of renewable energy development and implementation. Even with these challenges our division was able to strengthen the networking opportunities among our academic, governmental, and industry leadership to improve awareness, leverage resources, stimulate investment, and move our state toward greater bioenergy development and independence.

In February, over 300 agricultural leaders attending the Governors Office of Agricultural Policy Conference in Bowling Green were challenged by Governor Beshear to explore economic development opportunities. Other speakers identified avenues to become more involved in "green" energy. Later that month, farmers were given an opportunity to visit with over 20 agencies, researchers, and grant consultants in one room at the National Farm Machinery Show to get advice on new production opportunities and ways to secure federal and state funding for energy projects. Over 50 stakeholders traveled on a bioenergy exploration to Missouri with many new relationships forged and the commissioning of a feasibility study for a biomass pelleting business in Bracken County. Appetite for further integration of agriculture, forestry, and energy fostered a statewide Bioenergy Symposium as part of the Kentucky Agricultural Council's November Summit. Numerous other educational and networking events were initiated throughout the Commonwealth.

Our universities provided great leadership in securing federal funding and advancing bioenergy intellectual capital throughout the state: Murray State – expansion of a farmer network to explore additional cropping opportunities and identify renewable feedstocks for various chemical processes; University of Louisville – licensing of technology to generate jet fuel from biomass; University of Kentucky – receipt of a \$6.9 million federal grant to expand their biofuel research efforts; Eastern – hosting of the Interim Joint Committee on Agriculture to discuss bioenergy growth.

There were significant gains made in the private sector as well. UPS built biofuel infrastructure at their Worldport in Louisville and is transitioning to a 20% biodiesel blend for its ground support vehicles. Perdue Farms in Ohio County is capturing methane from its waste lagoons and converting the biogas to electricity. South Kentucky Rural Electric Cooperative Corporation investigated the biomass resources in its region to determine the viability of biomass generated electricity with encouraging conclusions. Ecopower Generation, LLC continues to make progress toward the construction of a wood-fueled power plant in Hazard. Recast Energy, LLC is retrofitting a thermal plant in Louisville to generate steam heat from woody biomass for adjacent industries. A number of other firms are in discussions with state personnel and are finding that we have the workforce, support systems, transportation infrastructure, climate, agricultural expertise, and market access to facilitate additional bioenergy growth and utilization in Kentucky.

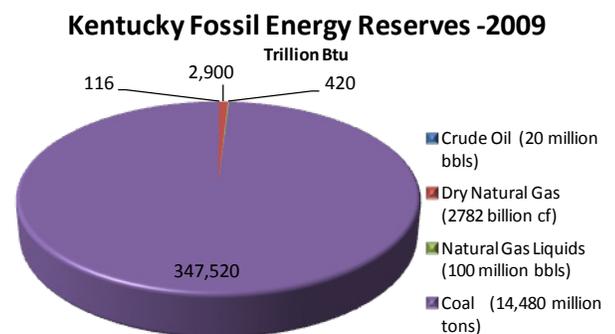
Division of Fossil Energy Development *-Don Newell, Acting Director*

The Division of Fossil Energy Development’s mission is to maximize the benefits of Kentucky’s fossil energy resources in a clean and sustainable manner while creating a base for strong economic growth and fostering national energy independence and security. The Division has oversight in implementing Strategies 4 (coal-to-liquids) and 5 (coal-to-gas). As an area of special interest the Division also assists in the development of waste-to-energy (WTE) projects.

The recent recession still has electricity demand depressed below pre-recession levels. Therefore, there has been virtually no expansion of Kentucky’s fossil fueled electricity generation capacity. While the depressed demand situation will not continue indefinitely, future electric generating capacity fueled by coal is unlikely. Risks to coal-fueled electricity projects include: new United States Environmental Protection Agency air and water regulations, the probability there will be more regulations and tighter emissions standards, requirements for greenhouse gas control, and difficulties obtaining new mining permits in Appalachia.

Given the current federal regulatory climate, natural gas is considered by many to be the fuel of choice for electricity generation, at least for the next forty to fifty years. Improved drilling techniques (like horizontal fracture drilling, or “fracking”) have greatly expanded recoverable gas reserves. These increased reserves, relatively cheap and easy to bring to the market, are expected to keep natural gas plentiful and its price stable for the foreseeable future. This projection of natural gas availability and price stability, combined with relatively low construction costs compared to alternatives such as nuclear and solar, make natural gas combined cycle power plants an attractive choice for new electricity generation.

Another area where the roles of various fossil fuels (oil, coal, and natural gas) may soon undergo a fundamental shift is in transportation. While coal and natural gas supplies have been plentiful and their prices have been relatively low and stable, the same hasn’t been true of oil. Conflicts in Libya and Iraq, social unrest in Iran, and environmental concerns over Canadian crude oil derived from tar sands, have all contributed to great uncertainty of supply and prices over \$100.00 per barrel.



Source: www.eia.gov

350,956 Trillion Btu's

Consequently, there has been renewed interest in coal-to-liquid (CTL) fuel projects and conversion of heavy diesel engines (both on road and off road) to compressed or liquefied natural gas (CNG or LNG). There are currently three (one in Western Kentucky, two in Eastern Kentucky) CTL plants permitted in the Commonwealth, and there are two active projects (one East, one West) for conversion of fleets of heavy trucks to CNG or LNG. Also, the Greater Cincinnati Airport is pursuing building a CNG fueling station to service the taxis, buses, other airport vehicles, and privately owned vehicles in Northern Kentucky.

There are also several Waste-to-Energy (WTE) projects being developed in Kentucky. The Kentucky Horse Park is gasifying horse muck (horse manure mixed with straw) and making electricity; Eco Power Generation is planning a 50 MW wood waste power plant in Eastern Kentucky; Recycling Solutions Technology in Martin County is in the process of modifying their municipal solid waste (MSW)-to-electricity plant, and will have it operating at its permitted 400 ton per day rate next summer (2012). These are just a few of the more advanced WTE projects; there are others that have been proposed or are in the planning stage.

CTL, WTE, and CNG/LNG conversion projects offer the promise of addressing several national and local issues such as energy independence, reduced transportation costs, solid waste disposal, and reduced air pollution. Continued development of these types of projects will enable Kentucky to take a leadership role in a more secure, more affordable, and more environmentally friendly energy industry.

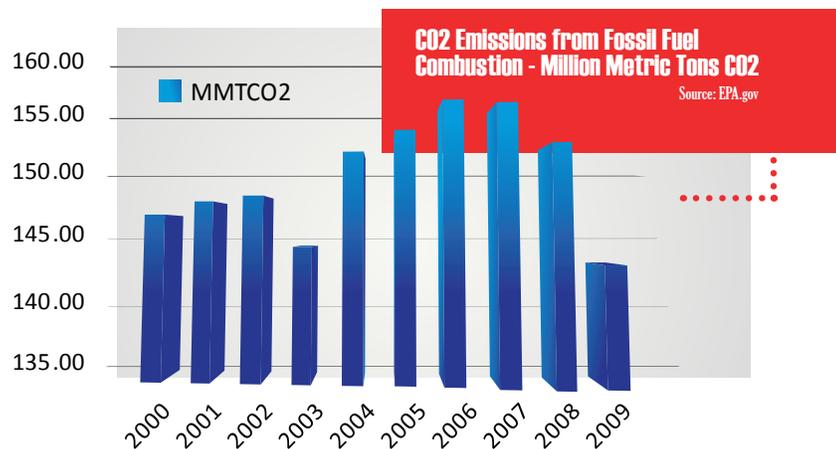
Division of Carbon Management *-Talina Mathews, Assistant Director (Jan. - Oct.)*

The Division of Carbon Management's goal is to investigate, develop, and promote technical solutions for carbon capture, storage and reuse; and to engage with state, regional and federal agencies in the development of state policy designed to manage greenhouse gas emissions, especially carbon dioxide, in a carbon constrained environment. The Division has oversight in implementing Strategy 6 of the Governor's energy plan.

Division staff managed the Kentucky Climate Action Plan Council's development of recommendations addressing greenhouse gas emissions. The Council, a diverse stakeholder group, proposed approximately fifty recommendations that, if implemented, would reduce greenhouse gas emissions to 20% below 1990 levels by 2025.

During the 2011 legislative session the division, along with stakeholders from private industry, universities and public agencies, assisted with legislation which was passed with regard to the legal issues associated with the geologic storage of carbon dioxide. This legislation was necessary to put Kentucky in a position to apply for future federal funding for carbon capture and storage. For up to five demonstration projects, this legislation sets forth the regulatory framework for geologic storage, defines the ownership of pore space, provides for access to that pore space, and allocates long term liability. The General Assembly also passed a law granting eminent domain rights for the purpose of transporting carbon dioxide via pipelines.

Staff, in its partnership with the Kentucky Geological Survey (KGS), continues to support projects to investigate and demonstrate the technical feasibility of geologic storage in Kentucky. The KGS formally closed its successful CO2 injection test well in Western Kentucky, and has a memorandum of understanding in place to begin its demonstration of carbon storage potential in the Devonian Shale of Eastern Kentucky.



Did You Know?

In 2010 Kentucky's mining industry contributed approximately \$4.4 billion to the Commonwealth's Gross Domestic Product (GDP) making mining the 12th highest contributor to our economy.

Carbon Management Continued...

The division partnered with Louisville Gas and Electric/Kentucky Utilities (LG&E/KU), to evaluate the technological solutions of capturing carbon dioxide from its fleet of existing coal-fired power plants.

As part of the evaluation, the KGS was asked to estimate the geologic storage capacities at or near those existing power plants.

In the area of carbon reuse, East Kentucky Power Cooperative, the Center for Applied Energy Research at the University of Kentucky, and the Department for Energy Development and Independence have entered into an agreement to fund a three-year project at one of EKPC's power plants which will seek to demonstrate a multi-pollutant strategy utilizing algae to capture carbon dioxide and control criteria pollutants. The Carbon Management Research Group, a public/private partnership consisting of most of the Commonwealth's utilities, the Electric Power Research Institute, the Center for Applied Energy Research, and the Department for Energy Development and Independence, was awarded \$14.5 million under a competitive grant from the US DOE. The funding will support their work on carbon capture. This research seeks to improve the efficiency of the capture process on existing power plants.

Finally, staff also assisted with the development of the department's modeling efforts, including the management of a grant to the University of Kentucky's Center for Business and Economics Research. This grant supports their work in estimating the impacts of electricity prices on the industrial sector in Kentucky.

Division of Energy Generation, Transmission and Distribution *-Bob Amato, Director*

The Division of Energy Generation, Transmission and Distribution primary responsibilities are to analyze and develop policies that will facilitate the generation, transmission, and distribution of adequate, affordable, and clean energy within the Commonwealth; to understand the reliability and economic trade offs for baseload electricity generation; to develop policies that will ensure adequate transmission of energy resources; and to promote alternative and renewable sources for electricity generation. The division also has responsibility for initiating discussion and gathering information in nuclear energy as a baseload source of power in Kentucky's Future Strategy 7.

During 2011, staff developed an Energy Assurance Plan and Energy Profile. These documents will provide an overall picture of energy production, consumption, and delivery in Kentucky and will improve energy emergency response. The staff also exercised its Energy Assurance Plan by participating in two Interstate Regional Emergency Exercises and in the extensive New Madrid Seismic Zone Emergency Exercise.

Division staff published the inaugural edition of the Kentucky Energy Profile in 2011 that is posted on the department's Web site. It is intended to serve as an impartial point of reference for data and issues regarding energy within the Commonwealth of Kentucky. A product of extensive research, database construction, and quantitative analysis, the profile is designed to help identify and explain the dynamics of energy consumption and production that are particular to the Commonwealth. The Profile is divided into four general sections: Energy Commodity Costs, Energy Consumption, Energy Production, and Electricity.

Staff is also tracking changes in environmental regulations. Pending changes will have significant impact on the energy industries in Kentucky, particularly the electricity industry and the fuels used by it. The division is using electricity price forecasting software developed by DEDI to evaluate the potential change in price due to the regulatory changes.

Division staff represents the Governor's office on the Eastern Interconnection States Planning Council (EISPC). The EISPC is a collaboration between state utility commissions, and governors' offices of the states east of the Rocky Mountains organized to direct the analysis of electricity system plans for the Eastern Electricity Interconnection. The result of this collaboration will be the identification of needed interstate transmission corridors.

While safety has always been of utmost importance in the nuclear industry, the earthquake and tsunami that crippled the Fukushima nuclear power plant in Japan redirected the focus of the nuclear power issue from cost squarely onto safety. The staff has monitored the events of Fukushima and the regulatory and technological discussions concerning nuclear power that have ensued.



DEDI Partnership Activities

Governor Steve Beshear's energy plan provided DEDI the direction and guidance to initiate and implement many programs and projects throughout the year. These activities connect with Kentucky's economic sectors to help create jobs, save energy, increase the production of alternative energy, and improve the environment. To broaden the impact of these activities, DEDI has built partnerships with many public and private organizations across the Commonwealth. These partnerships have helped transform good ideas into highly successful projects and programs. A chronological list highlighting DEDI and its partners more significant activities follow.

7th

Boone County Schools celebrated its first ENERGY STAR-rated building, Burlington Elementary School, for its efforts in conserving energy during the last school year. They were presented with Governor Beshear's certificate of recognition by the Department for Energy Development and Independence (DEDI). The ENERGY STAR program is sponsored by the U.S. Environmental Protection Agency and the U.S. Department of Energy.

11th

Fayette County Public Schools (FCPS) announced its new sustainability initiative has saved the school district about \$700,000 in energy costs since its inception last summer. Sustainability consultant Scott Smith told the Fayette County Board of Education at its planning meeting that the total represents annual and one-time savings, including: about \$200,000 in annual savings resulting from intervention to get the schools a better deal in Kentucky Utilities' rate-increase. FCPS is supported by the Schools Energy Manger Program and Kentucky Energy Efficiency Program for Schools.

13th

Governor's Office of Agricultural Policy (GOAP) announced the availability of applications for the 2011 American Recovery and Reinvestment Act (ARRA) On-farm Energy Efficiency & Production Incentives Program. On-farm energy incentives are made possible through the Renewable Energy Partnership between GOAP and DEDI.

DEDI announced the release of its 2010 Annual Summary. The summary outlines the department's activities for the calendar year, including a highlight of energy projects funded by the American Recovery and Reinvestment Act.

DEDI released its December/January edition of Energy at Work, a monthly newsletter showcasing Kentucky's ongoing Recovery Act energy initiatives. Energy at Work can be found on the department's website.

1st



19th

The Kentucky Green and Healthy Schools (KGHS) program offered \$800 grants to K-12 schools completing student-led energy efficiency projects. The grants were used to purchase materials that would save energy or improve energy efficiency at school facilities, but may also include projects that reduce school waste, conserve water or plant trees. The grant program was made possible by an ARRA stimulus grant awarded to the Kentucky Environmental Education Council (KEEC), which administers the KGHS program.

24th

The Energy and Environment Cabinet and the DEDI offered its first edition of the Kentucky Energy Profile to provide the public with a snapshot of energy production, delivery and consumption as well as trends in the energy industries of Kentucky.

28th

Federal economic stimulus funding allowed the University of Louisville Kentucky Pollution Prevention Center to hire 28 people and retain three more, who are helping the state's schools and businesses to save on energy costs. The result benefitted the economy, the state's education system and the environment, said U of L President James Ramsey at a Louisville press conference.

20th

January 20, U.S. Department of Agriculture Secretary Tom Vilsack announced new investments in 33 states to support the production and usage of advanced biofuels. Vilsack highlighted these projects as ways to reduce the nation's dependence on foreign oil by creating alternative energy sources and promoting economic development and job creation. Authorized under Section 9005 of the Farm Bill, the Bioenergy Program for Advanced Biofuels authorizes payments to eligible producers to expand production of advanced biofuels. The two Kentucky industries receiving payments were Owensboro Grain Company, LLC (\$401,187.10) and Griffin Industries, Inc. (\$12,186.11).

26th

The Green Castle Baptist Church, Louisville, became the first house of worship in Kentucky to receive an Energy Star certification from the EPA, and only the ninth in the nation to receive one.

31st



14th

DEDI facilitated a meeting between the Louisville Metro Government and the Lexington-Fayette Urban County Government (LFUCG) staff and Bluegrass PRIDE to exchange information and discuss knowledge transfer on the successful Louisville Kilowatt Crackdown. LFUCG and Bluegrass PRIDE were interested in conducting similar programs in their area. The Kilowatt Crackdown is a county-wide competition among commercial building owners and managers, with recognition and awards for various categories of buildings and projects.

17th

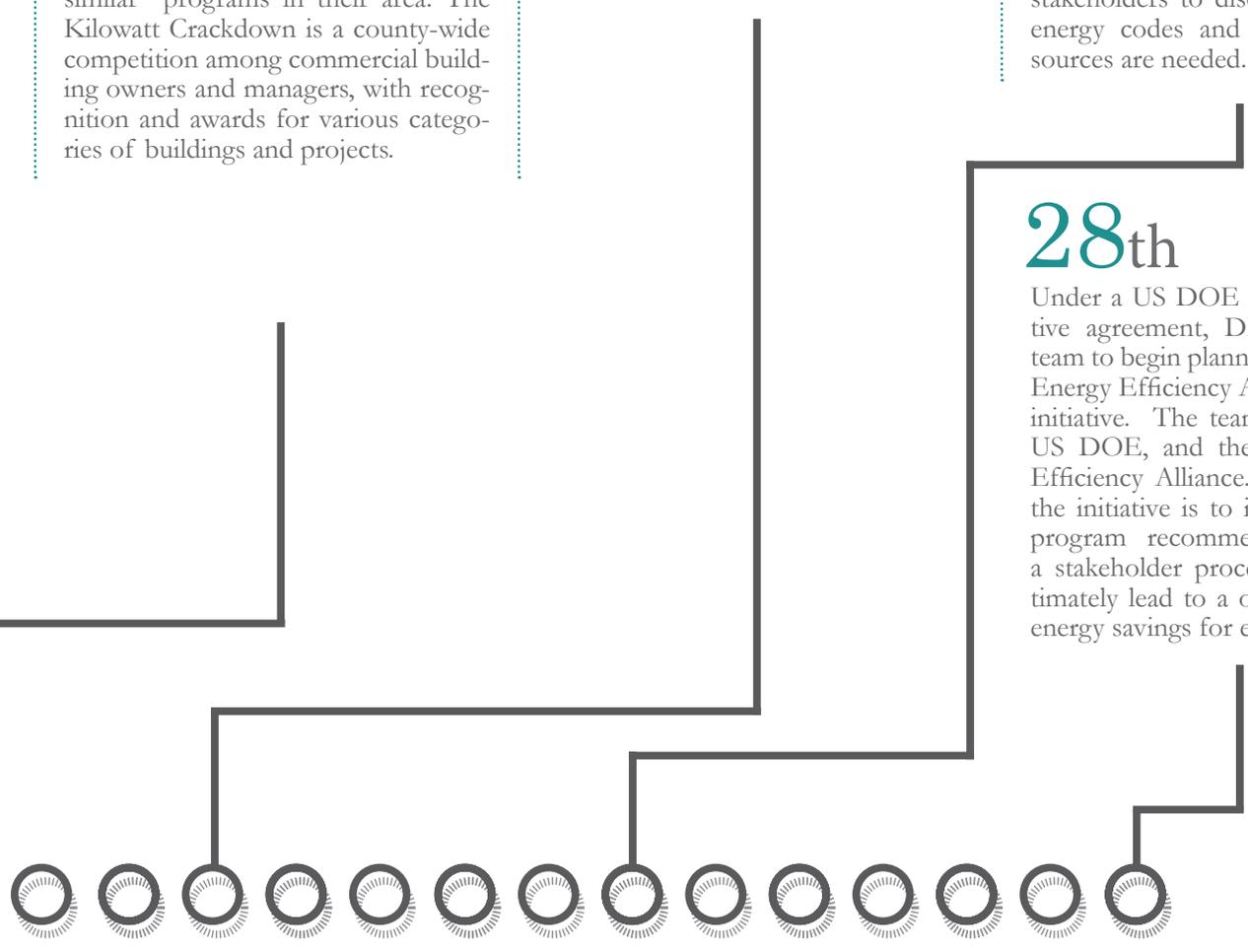
Using ARRA dollars, DEDI collaborated with the University of Kentucky (UK) to conduct 14 workshops with a total of over 550 attendees. The workshops provided technical energy code information to the design community for commercial buildings. The workshops were held from April through May.

22nd

With the prospect of new energy codes soon to be adopted, the Kentucky Department of Housing Building and Construction. The Building Codes Assistant Project (BCAP), to hold a focus group meeting and prepare a training assessment. The focus group included energy code officials, builders, trade associates, and other stakeholders to discuss the proposed energy codes and what training resources are needed.

28th

Under a US DOE \$500,000 cooperative agreement, DEDI assembled a team to begin planning the Stimulating Energy Efficiency Action in Kentucky initiative. The team includes DEDI, US DOE, and the Midwest Energy Efficiency Alliance. The objective of the initiative is to identify policy and program recommendations through a stakeholder process that would ultimately lead to a one percent annual energy savings for electricity.



2nd

Governor Steve Beshear announced an Energy Efficiency and Conservation Block Grant (EECBG) to three municipal recipients in Knott County. The city of Hindman, the city of Pippa Passes and the city of Vest will use the funding to support local energy efficiency improvements. Through the EECBG program administered by the Kentucky Department for Local Government (DLG), a \$375,000 grant will be used to conduct energy audits at public facilities and finance the energy efficiency retrofits recommended by these audits. The buildings include the Caney Community Center in Pippa Passes, the Human Services Center in Hindman and the Beckham Combs Community Center in Vest.

7th

The Sherwin-Williams Company and Kentucky's Pollution Prevention Center (KPPC) co-hosted the "Kentucky Energy Alliance Facility Tour and Roundtable." As part of the Kentucky Energy Alliance (KEA), the meeting brought 45 representatives together to share energy management best practices from industry, health care, academia, and state agencies.

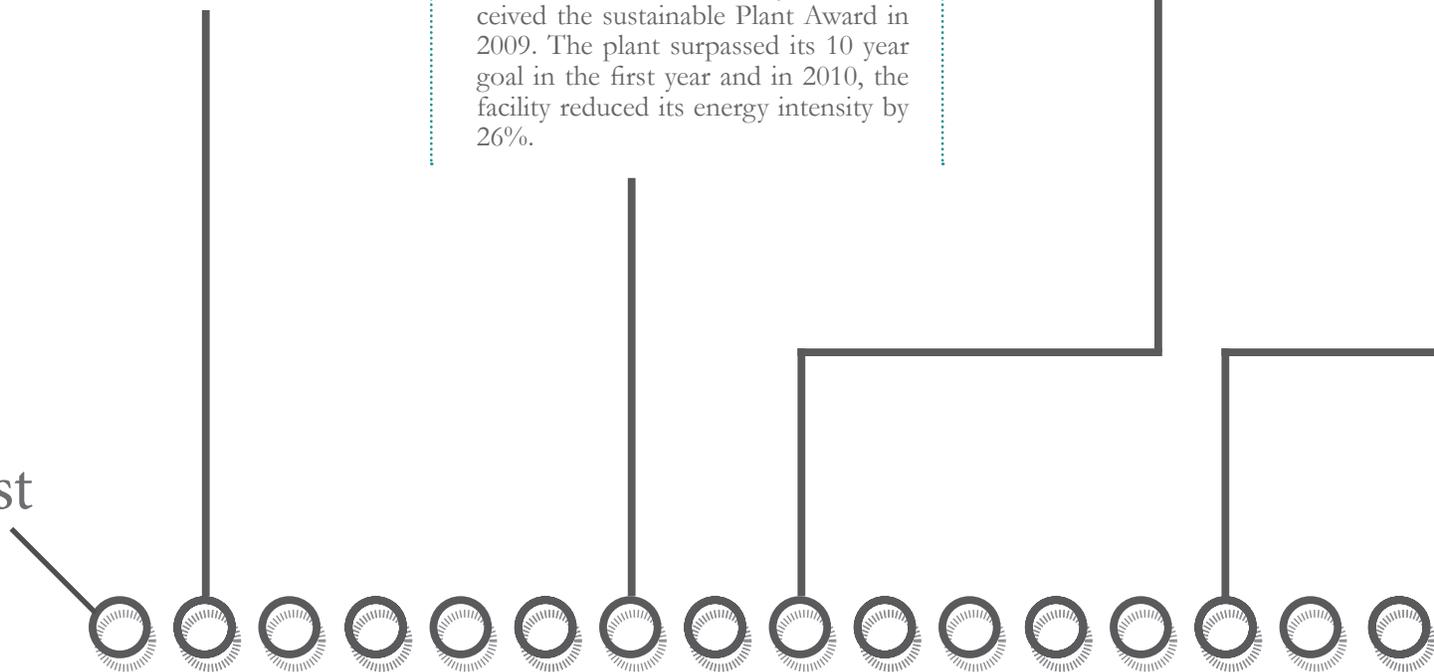
During the meeting, attendees were provided the opportunity to converse with peers and discuss what their companies have been doing to improve energy efficiency.

The meeting was held at the Sherwin-Williams Richmond facility which received the sustainable Plant Award in 2009. The plant surpassed its 10 year goal in the first year and in 2010, the facility reduced its energy intensity by 26%.

9th

First Lady Jane Beshear was in Bowling Green when stimulus money was presented to upgrade Richardsville Elementary. She returned to tour the only Net-Zero school in the nation. The students led the tour on how they saved energy in their school. Mrs. Beshear said it was a good way for her to see a combination of things that are great for the students, the school, and our planet.

1st

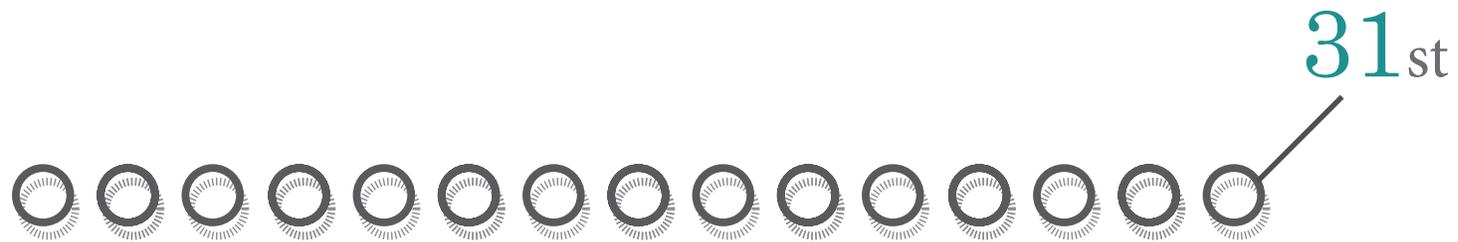


14th

A new hybrid electric school bus capable of improving fuel efficiency from 7 to 11 mpg joined the fleet of 46 traditional school buses in Trigg County. The keys to the new hybrid electric school bus were presented to Superintendent Travis Hamby. Kentucky will have the distinction of having the largest hybrid electric school bus fleet in the nation. Trigg County is one of the 30 districts awarded a share of the \$13 million in funding from the U.S. Department of Energy, adding a total of 213 hybrid electric vehicles to public school fleets across Kentucky.



The University of Louisville's Conn Center for Renewable Energy Research sponsored a workshop that focused on discoveries to advance the science of renewable energy and energy efficiency and looked at ways to make those energy technologies work in Kentucky. The 2011 Kentucky Statewide Workshop in Renewable Energy and Energy Efficiency took place March 13 to 15 at the Kentucky International Convention Center, it attracted nearly 150 industry representatives, scientists, policy-makers and professionals from energy-related fields and organizations.



22nd - 23rd

The Kentucky Energy in Education Collaborative hosted the 9th Annual High Performance School Buildings Workshop in Bowling Green, Kentucky. Over 150 school superintendents, board members, facilities managers, architects, energy managers and engineers attended the two-day workshop to learn about high performance concepts for their next school construction or renovation project. These annual workshops have resulted in the construction of a number of high performance energy-efficient schools across Kentucky. Two of Bowling Green's high performance schools were showcased during the meeting.

24th - 25th

Kentucky Home Builders Association, Louisville Gas & Electric/ Kentucky Utilities, Eastern Kentucky Power (EKPC), and the Department for Energy Development and Independence (DEDI) sponsored the 2011 Midwest Regional ENERGY STAR Conference. The Midwest Regional ENERGY STAR conference appealed to individuals, trade associations and industry professionals that have any role in the production and sale of homes. Speakers educated Kentuckians and their neighbors from surrounding states about energy efficiency, ENERGY STAR homes, energy efficient home products, financing, and marketing of energy efficient homes. The conference hosted over 400 attendees.

29th

EKPC launched the first in a series of wide-scale talks with environmental groups in an effort to expand renewable energy and efficiency programs at the wholesale electricity provider. Called the Demand Side Management and Renewable Energy Collaborative, the project is required under a deal that EKPC linked with the Attorney General's Office and environmental organizations in 2010. The meeting brought together representatives of EKPC's 16 distribution cooperatives along with the Sierra Club, the Kentucky Environmental Foundation and Kentuckians for the Commonwealth.

1st

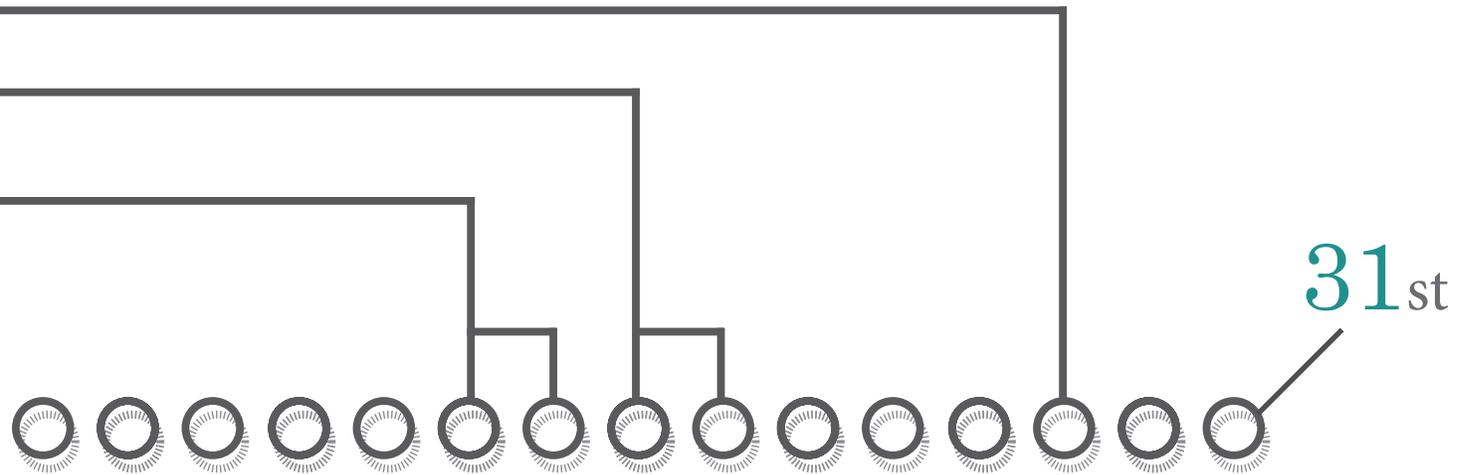


Did You Know?

Kentucky enjoyed the 3rd lowest average price of electricity in the country. This inexpensive electricity led residential consumers to have the 6th highest electricity consumption per capita.



Richardsville Elementary School surveys it's newest rooftop solar panel installation.



7th

Kentucky Bluegrass Area Development District (ADD), Kentucky Energy Services Coalition and the Department of Energy Development and Independence (DEDI) hosted a Water and Wastewater Treatment Plant Energy Efficiency Workshop. Representatives from the 17 county Bluegrass ADDs attended the workshop to learn about new advances in energy efficient technology and energy savings performance contracting. Four other workshops are scheduled for Hopkinsville, London, Florence and Ashland.

12th

At the National ENERGY STAR awards in Washington DC four Kentucky recipients were announced that included Kentucky Pollution Prevention Center (KPPC), selected as a 2011 ENERGY STAR Award winner for PARTNER OF THE YEAR, Energy Efficiency Program Provider; Toyota Motor Engineering & Manufacturing North America, Inc. (TEMA), selected as a 2011 ENERGY STAR Award winner for Sustained Excellence in Industrial Energy Management; Louisville Gas and Electric and Kentucky Utilities, selected as a 2011 ENERGY STAR Award winner for Partner of the Year, Energy Efficiency Program Provider; and GE Appliances and Lighting, selected as a 2011 ENERGY STAR Award winner for Sustained Excellence.

15th

Humana Inc. along with Kentucky's First Lady, Jane Beshear, announced that it earned the distinguished ENERGY STAR certification for its headquarters building in Louisville. The ENERGY STAR rating, granted by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy, is the designation for buildings that have superior energy performance and improve the quality of the environment. This designation signifies that Humana's headquarters performs in the top 25 percent of similar facilities nationwide for energy efficiency.

1st



20th

The Kentucky Association of Manufacturers hosted their 2011 Energy Conference in Louisville. Stakeholders in Kentucky’s manufacturing industry learned about implementing effective solutions for energy efficiency, cost mitigation and sound public policies that are critical to the sustainability and growth of Kentucky manufacturers.



The Louisville Energy Alliance hosted the 2011 Kilowatt Crackdown Awards Ceremony. The Louisville Energy Alliance is a nonprofit corporation promoting energy efficiency through Energy Star in Louisville buildings. Founding members include Louisville Metro Government and major commercial real estate associations.

22nd

The Commonwealth of Kentucky celebrated national Earth Day.



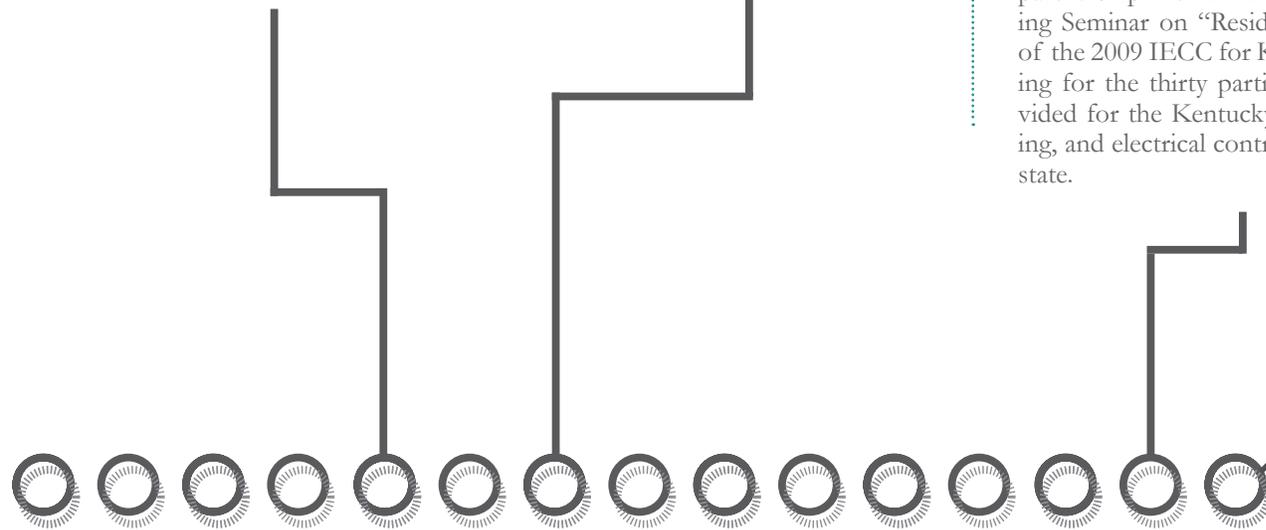
29th

The Kentucky Consortium for Energy Workforce Development (KCEWD) hosted a meeting with education leaders and energy company executives to discuss the best ways to coordinate academic programs with industry needs. The meeting aided in coordinating industry needs with college degree programs along with providing a forum to find ways to create jobs, to educate the workforce for those jobs and to commercialize technology from state research institutes and universities. DEDI helped to sponsor the event along with KCEWD partners.



The Department of Housing Buildings and Construction and Kentucky Community and Technical College System in partnership with DEDI hosted a Training Seminar on “Residential Provisions of the 2009 IECC for Kentucky”. Training for the thirty participants was provided for the Kentucky HVAC, plumbing, and electrical contractors across the state.

30th



9th

The publication Energy at Work was released by the Department of Energy Development and Independence (DEDI). It highlights the energy programs, projects and jobs created in Kentucky through funding made possible by the American Recovery and Reinvestment Act (ARRA), through the U.S. Department of Energy (DOE). Energy at Work can be found at DEDI's website.

18th

Twenty-six Kentucky schools received awards at the Kentucky Green & Healthy Schools (KGHS) — Kentucky National Energy Education Development (NEED) Project Youth Summit and Awards luncheon in Frankfort. This was the fourth annual event that recognized students who participated in the KGHS program and the Kentucky NEED Project. First Lady Jane Beshear addressed event attendees.

19th

The sun will produce electricity needed by Turkey Foot Middle School beginning Thursday at the "Flip the Switch" celebration. The building will be powered by one of the largest electric producing solar array installed in the state of Kentucky. A 385-kW solar array that comprises over 60,000 sq. ft. of thin film and crystalline panel solar technology. It is anticipated that on weekends and during the summer the building will produce an excess of electricity to sell back to Duke Energy. Solar panels were provided in part by ARRA funding, managed by DEDI.

1st

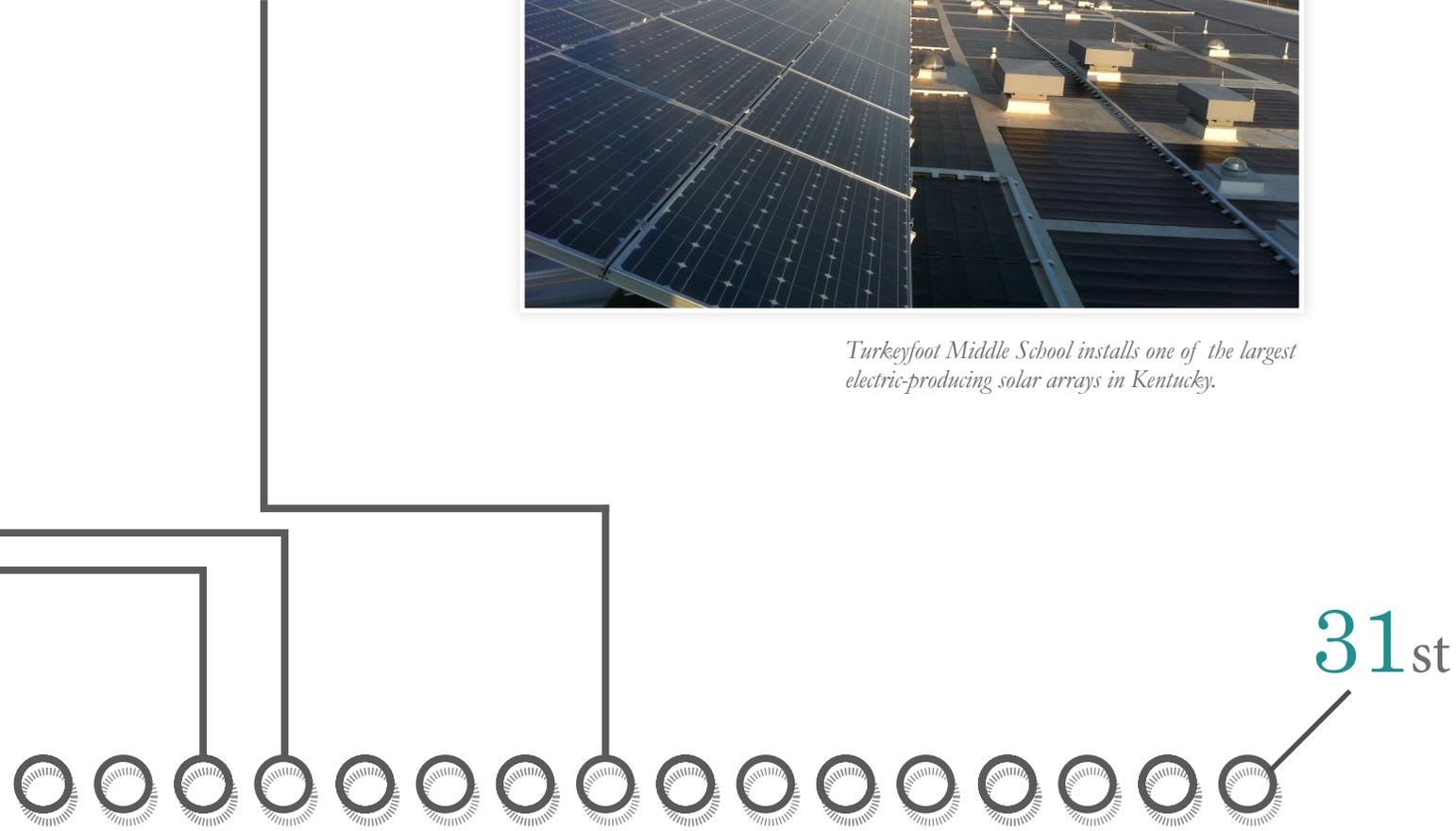


23rd

Reducing energy consumption has made one school a star. Kelly Elementary was named an ENERGY STAR building and was honored in a ceremony at the school May 23. DEDI presented a certificate from the Governor in recognition of their ENERGY STAR rating for Kelly Elementary to Boone County Schools Superintendent Randy Poe.



Turkeyfoot Middle School installs one of the largest electric-producing solar arrays in Kentucky.



13th

Kentucky NEED Project hosted their Kentucky Energy Conference for Educators that enabled 24 educators and 6 NEED coordinators to visit energy facilities throughout Central Kentucky. In five interactive days, the conference provided teachers with the most up-to-date information on all aspects of energy including the science of energy, sources of energy, transportation, consumption, electricity, efficiency and environmental and economic impacts.



14th

Kentucky Habitat for Humanity's 2nd Annual Green Housing Summit conference was held in Lexington bringing together local Habitat for Humanity and other nonprofit organizations, public sector representatives, students and concerned citizens to work together on affordable housing in Kentucky within the context of Kentucky's sustainable energy future. An agenda with over 30 speakers, local visionaries and regional experts included topics on Kentucky's energy context, mobile home replacement and redevelopment of mobile home parks, setting energy targets, and passive houses being built in Kentucky.

1st



22nd

DEDI hosted a meeting of the Energy Resources Management Board to discuss and update board members on Kentucky energy emergency management protocols. DEDI, working with the Kentucky Division of Emergency Management, has updated Emergency Support Function 12 (energy), the Kentucky Energy Emergency Plan and the Kentucky Energy Profile. These documents are available at DEDI's website.

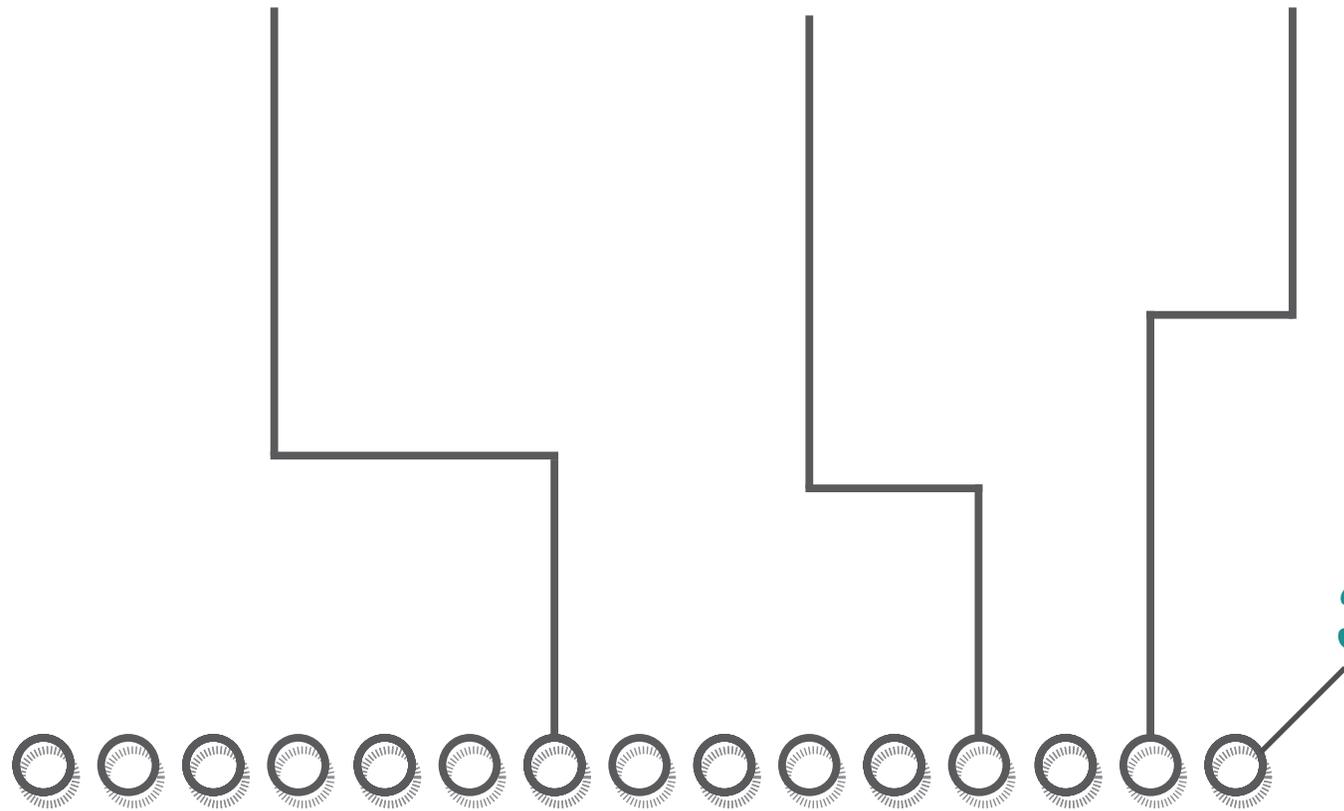
27th

The National Energy Education Development (NEED) Project Board of Directors awarded Kentucky the NEED State of the Year Award. Kentucky's executive director, regional coordinators, sponsors, teachers and students were recognized for outstanding energy education training, outreach and education. DEDI supports KY NEED through an American Reinvestment and Recovery Act grant.

29th

The Kentucky Renewable Energy Consortium (KREC) hosted their quarterly meeting to review the final reports from seven research projects that were funded with federal and DEDI resources. Renewable and energy efficiency projects included researchers from both University of Louisville and the University of Kentucky. More info on KREC is available at Kentucky Pollution Prevention's website.

30th



5th

Governor Steve Beshear congratulated the Kentucky Department of Veterans Affairs on its use of Green Bank of Kentucky loans for the East Kentucky Veterans Center in Hazard, the Western Kentucky Veterans Center in Hanson, and Thomson-Hood Veterans Center in Wilmore. The funds are being used to make utility improvements at these three veterans' nursing homes while saving Kentucky taxpayers \$2.2 million.

19th

The Energy and Environment Cabinet published its 2011 summer edition of Land, Air and Water showcasing the Energy in Education Collaborative.

27th

Governor Steve Beshear announced the award of \$773,447 in On-Farm Energy Efficiency Incentives grants. This program is the result of the partnership between the Governor's Office of Agricultural Policy and Kentucky's Department for Energy Development & Independence (DEDI) with funding from the American Recovery & Reinvestment Act through the U.S. Department of Energy.

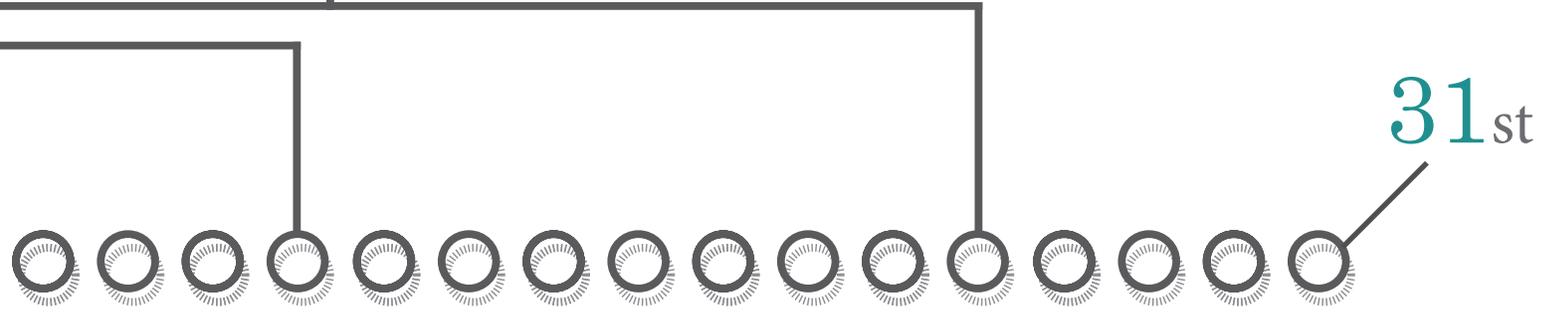
1st



•
DEDI released its 2011 summer edition of Energy at Work, a quarterly newsletter showcasing Kentucky's ongoing Recovery Act energy initiatives. Energy at Work can be found on DEDI's website.



Governor Steve Beshear congratulated the Kentucky Department of Veterans on its use of Green Bank of Kentucky loans.



31st

1st

Fayette County School District showcased its most energy efficient and sustainable elementary school building, Wellington Elementary School, with administrators, teachers, and volunteers. Wellington has two water collection systems, sloped-ceiling classroom designs to incorporate solar lighting, an outdoor classroom and garden space.



The campus of Southeast Community and Technical College in Cumberland hosted coal miners throughout the region as the college sponsored the Harlan County Safety Day Mine Rescue Competition. Organized by The Cumberland Tourist Commission, the event was a revival of once highly-popular mine rescue contests held in Harlan County years ago that brought both miners and community members to the Tri-Cities in support of mine safety.

16th

Kentucky's First Lady, Jane Beshear joined Christian County School District to host Kentucky's 100th Energy Star School Celebration. At the event, four Christian County public schools that recently earned the ENERGY STAR label were recognized (Belmont, Indian Hills, Lacy and Millbrooke Elementary Schools). The event also celebrated all Kentucky school districts that are home to ENERGY STAR schools.



The University of Kentucky Research Foundation received a \$14.5 million federal grant to develop technology that can capture most of the carbon dioxide emitted from coal-fired power plants without increasing the cost of electricity by more than a third. The U.S. Department of Energy awarded the four-year grant to the University of Kentucky Research Foundation Center for Applied Energy Research.

17th

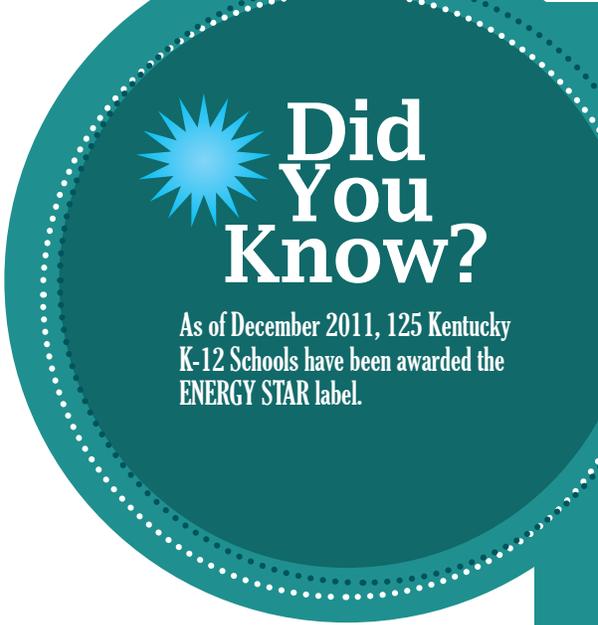
U.S. Department of Agriculture Secretary Tom Vilsack announced grants for more than 900 agricultural producers and rural small businesses across the country to implement renewable energy and energy efficiency measures in their operations. A total of \$504,300 was awarded to 42 Kentucky farmers.



Governor Steve Beshear announced GE Lighting will invest approximately \$10 million at its Lexington Lamp Plant to produce a new line of energy-efficient lighting products. The expansion, which is in response to customer demand for energy-efficient lighting, will initially create 38 new jobs in the Commonwealth.

1st

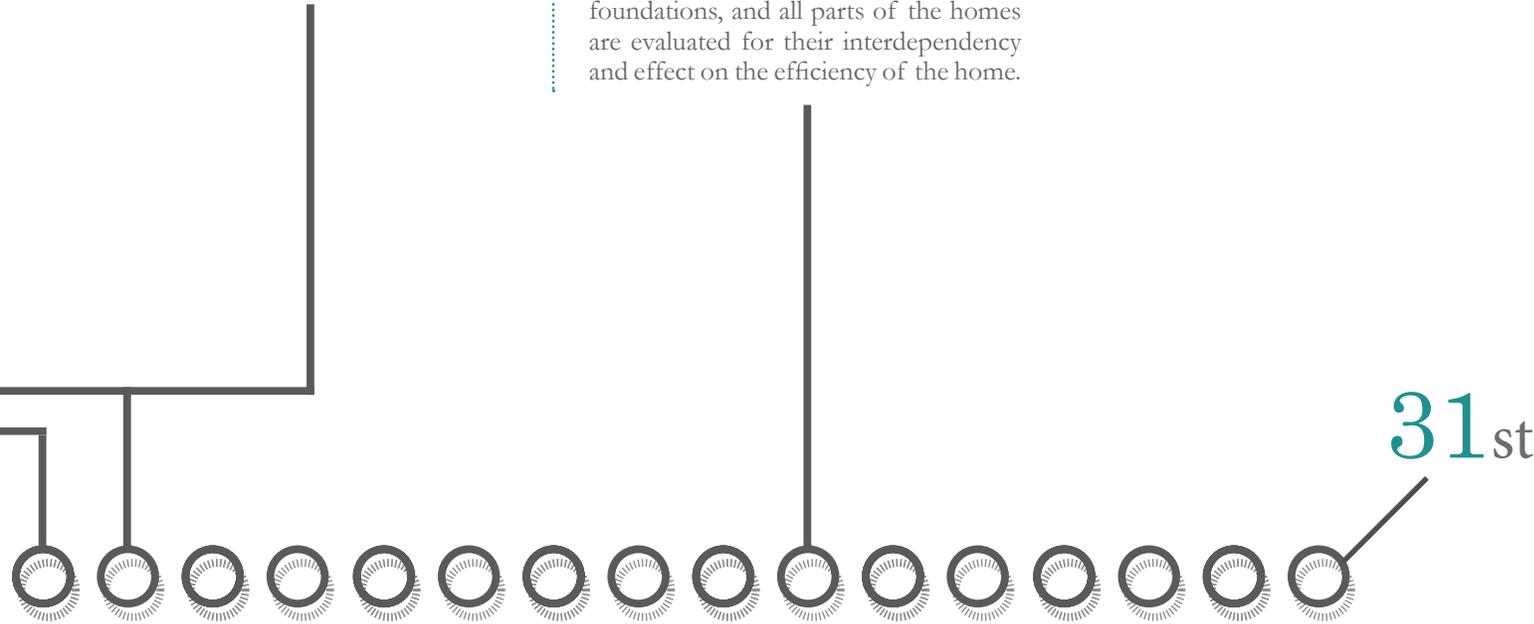




●
GE Appliances & Lighting unveiled its Platinum LEED (Leadership in Energy and Environmental Design)-Certified Data Center in Louisville, Ky. Platinum LEED is a credential held by only 6 percent of LEED-certified buildings worldwide and promotes a whole-building approach. GE designed the facility to reduce data center energy consumption and lower environmental impact. Instead of building a new facility, GE renovated factory space in an existing building, were able to maintain over 98 percent of the walls, floors, and roof and used over 30 percent recycled materials. This facility is an investment into the future.

25th

Kentucky Housing Corporation Chief Executive Officer Richard McQuady and representatives from energy and utilities gathered at the home of Sara Mateja in Cadiz, to announce a new partnership that will enable more homeowners in the region to increase the energy efficiency and comfort of their homes. KY Home Performance offers either a 20 percent rebate up to \$2,000 or below market rate financing that is currently available at a 3.99 percent rate (terms and conditions apply) for qualifying energy efficiency improvements made to single-family homes. KY Home Performance embraces a whole house approach to energy efficiency and comfort, meaning the interaction among windows, attics, foundations, and all parts of the homes are evaluated for their interdependency and effect on the efficiency of the home.



8th

Trimble County schools have made headway saving energy, but more needs to be done, the Trimble County Board of Education was told Wednesday night. Sherman Adams, energy manager for several school districts in the state, told the board that although energy use has been decreased at Bedford Elementary and Trimble County High School for a savings of more than \$5,000, the savings were offset by increased use at Trimble County Middle School and Milton Elementary.

13th

U.S. Department of Energy (DOE) Secretary Steven Chu announced more than \$30 million for 24 universities in 23 states across the country to train undergraduate- and graduate-level engineering students in manufacturing efficiency to help them become the nation's next generation of industrial energy efficiency experts. University of Kentucky Research Foundation in Lexington, KY, was awarded funds. Each school will receive \$200,000 to \$300,000 per year for up to 5 years to help university teams gain practical training on core energy management concepts through DOE's successful Industrial Assessment Center program.

16th

U.S. Department of Agriculture Secretary Tom Vilsack announced loans and grants for more than 500 agricultural producers and rural small businesses across the country to implement renewable energy and energy efficiency measures in their operations. Twenty Kentucky farmers and small businesses received 18 grants (\$805,801) and 2 loans (\$88,520).

1st



1st

Governor Beshear proclaimed October as Kentucky's energy awareness month and asked all Kentuckians to make a difference by reducing their energy use.



The 11th edition of Coal Fact was published and posted by the Department for Energy Independence and Development on their website. Information found in the booklet includes production, employment, the economic impact, coal market, resources, and electricity. Put link on the online version

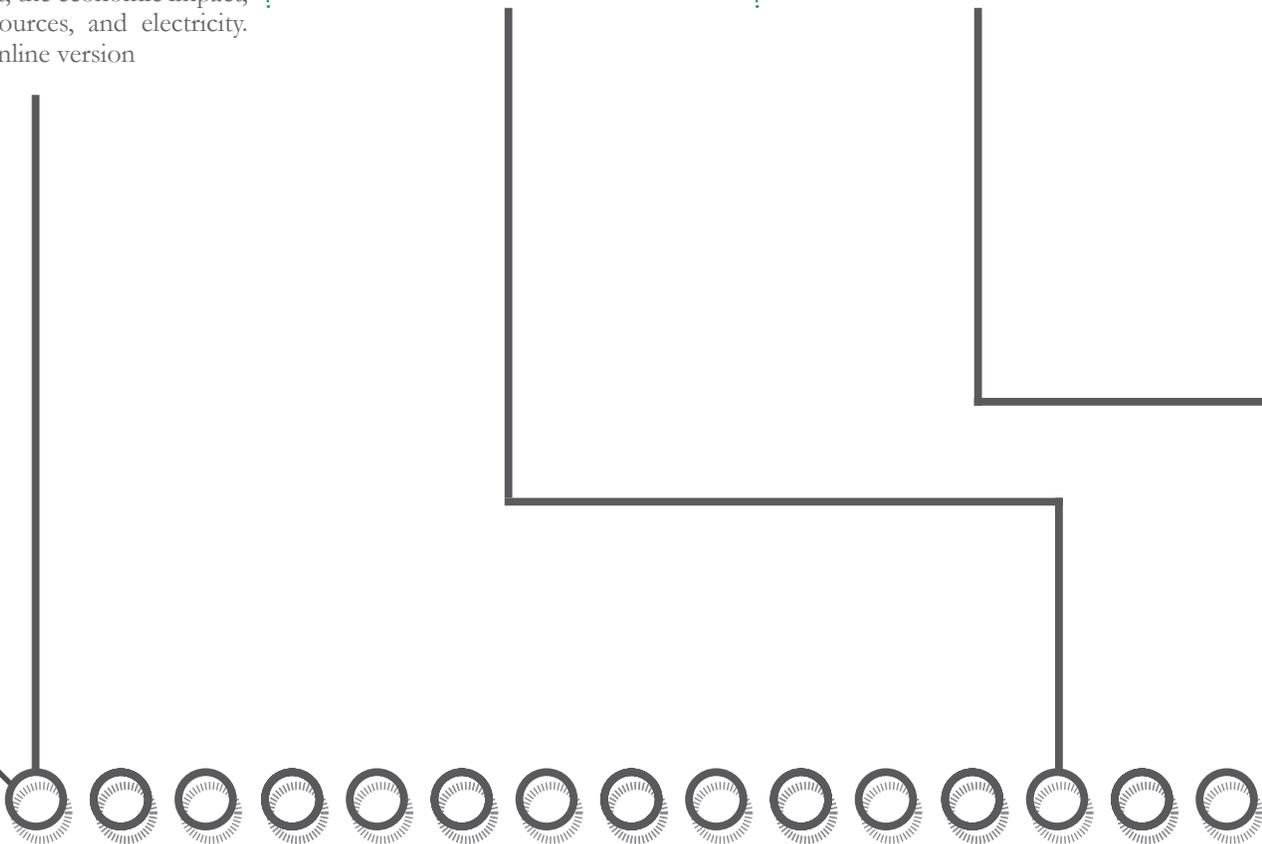
13th

DEDI and the University of Kentucky Cooperative Extension Service received a \$260,000, two year grant, by the US Department of Energy (DOE) to promote energy efficiency throughout the Commonwealth. Kentucky, along with Wisconsin and Nebraska, will be the first three states to deploy DOE's new initiative of collaboration between state energy offices and land-grant university cooperative extension services.

17th

Governor Steve Beshear joined community leaders and officials from Hitachi Automotive Systems Americas Inc. to announce the company has selected its Mercer County plant as the site of its North American lithium-ion battery packs production. The Governor's announcement of the new manufacturing capability will create 60 new jobs and represents an approximate \$12 million investment in the Commonwealth.

1st



21st

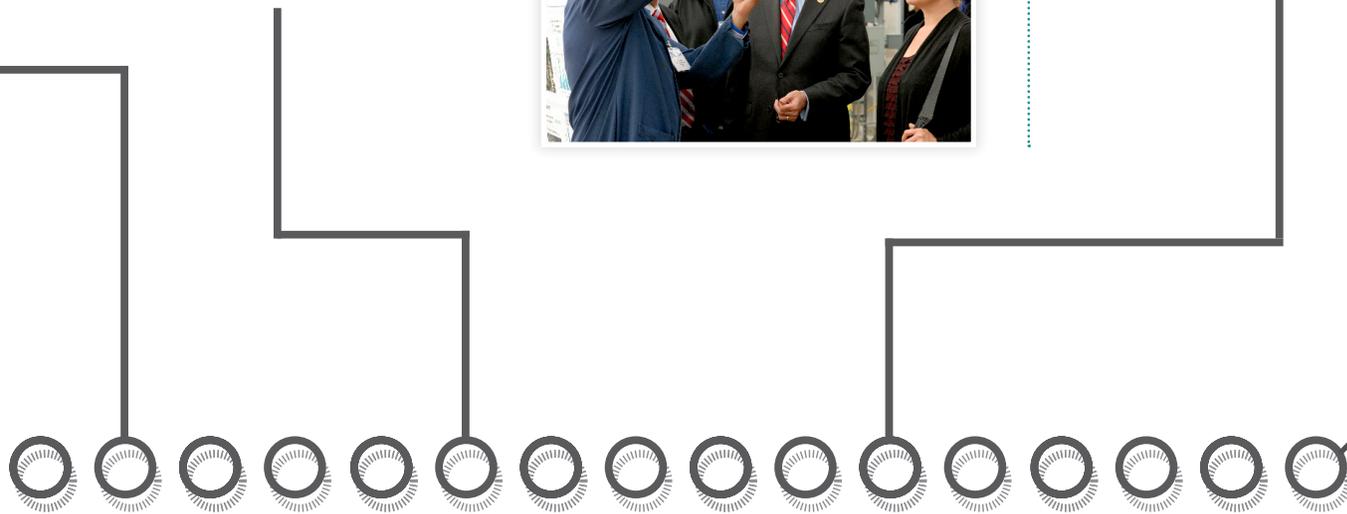
State officials and representatives from the University of KY (UK) announced funding for research that uses algae to capture carbon dioxide from coal-burning power plants and convert it to biomass. The Energy and Environment Cabinet (EEC) has committed \$1.3 million over two years for the UK Center for Applied Energy Research (CAER) to demonstrate this process. East Kentucky Power Cooperative's station in Winchester will be the test site and is providing in-kind costs of 75,000. A smaller-scale project began in a commercial-scale greenhouse at CAER and has been refined for the past three years. Researchers are looking at the potential of using waste carbon dioxide and the heat from a coal-fired power plant to cultivate algae, which then will be processed into products like biodiesel, animal feed, fertilizer, and chemicals.



26th

Governor Steve Beshear announced a unique three-member partnership utilizing the state's first active energy services biomass project will bring \$22 million in investment and 14 new jobs to Louisville. He joined community leaders and officials from The Lubrizol Corporation, Zeon Chemicals and Recast Energy to announce the partnership will also keep 340 Kentucky workers on the job. Lubrizol and Zeon are located adjacent to one another in west Louisville and share the use of steam and other utilities. Both facilities need steam, de-ionized water, waste water treatment and compressed air to operate.

31st



9th

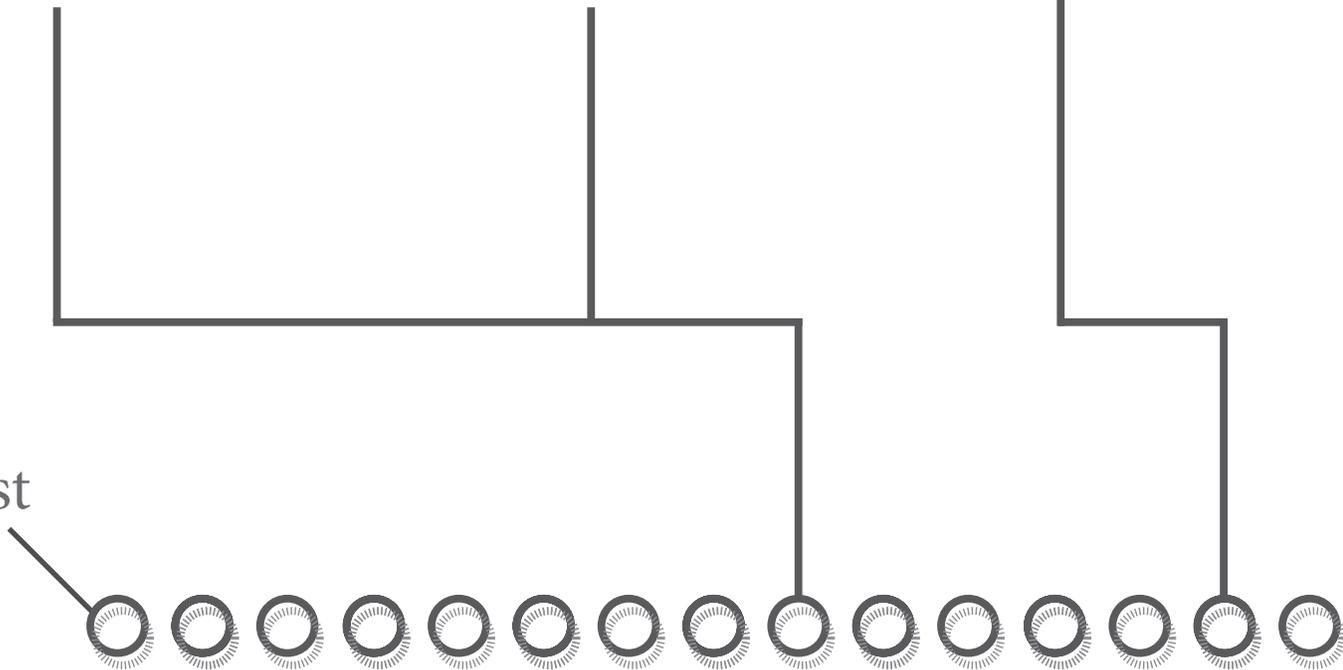
Congressmen Geoff Davis and Hal Rogers were on hand for the groundbreaking of a University of Kentucky coal/biomass-to-liquids unit that could lead to development of vehicle fuels made from Kentucky coal and biomass. The \$5.7 million facility at the UK Center for Applied Energy Research (CAER) could produce transportation fuels from these indigenous resources, which could help guarantee the nation's energy future. Funding for the process-development unit includes support by the U.S. Department of Energy (\$4.55 million), the Kentucky Energy and Environment Cabinet (\$708,000), and a UK cost share (\$453,000).

The Kentucky Public Service Commission (PSC) approved an expansion of residential and commercial energy conservation and efficiency programs for Kentucky Utilities Co. (KU) and Louisville Gas & Electric Co. (LG&E). The PSC authorized KU and LG&E to continue 10 existing programs for residential or commercial customers and to initiate three new programs for residential customers. One of the new programs will provide incentives for the purchase of energy-efficient appliances. The KU and LG&E energy conservation and efficiency initiatives are included in the companies' demand-side management (DSM) programs.

14th

The Kentucky Division of Forestry (KDF) released recommendations for harvesting forest biomass as an alternative energy source. Woody biomass, which is material that includes trees, tree branches and other vegetation, can be used as a source of heat or power for the generation of electricity. Technology is also being developed that would allow wood to be converted into ethanol and be used as a replacement for gasoline in motor vehicles.

1st



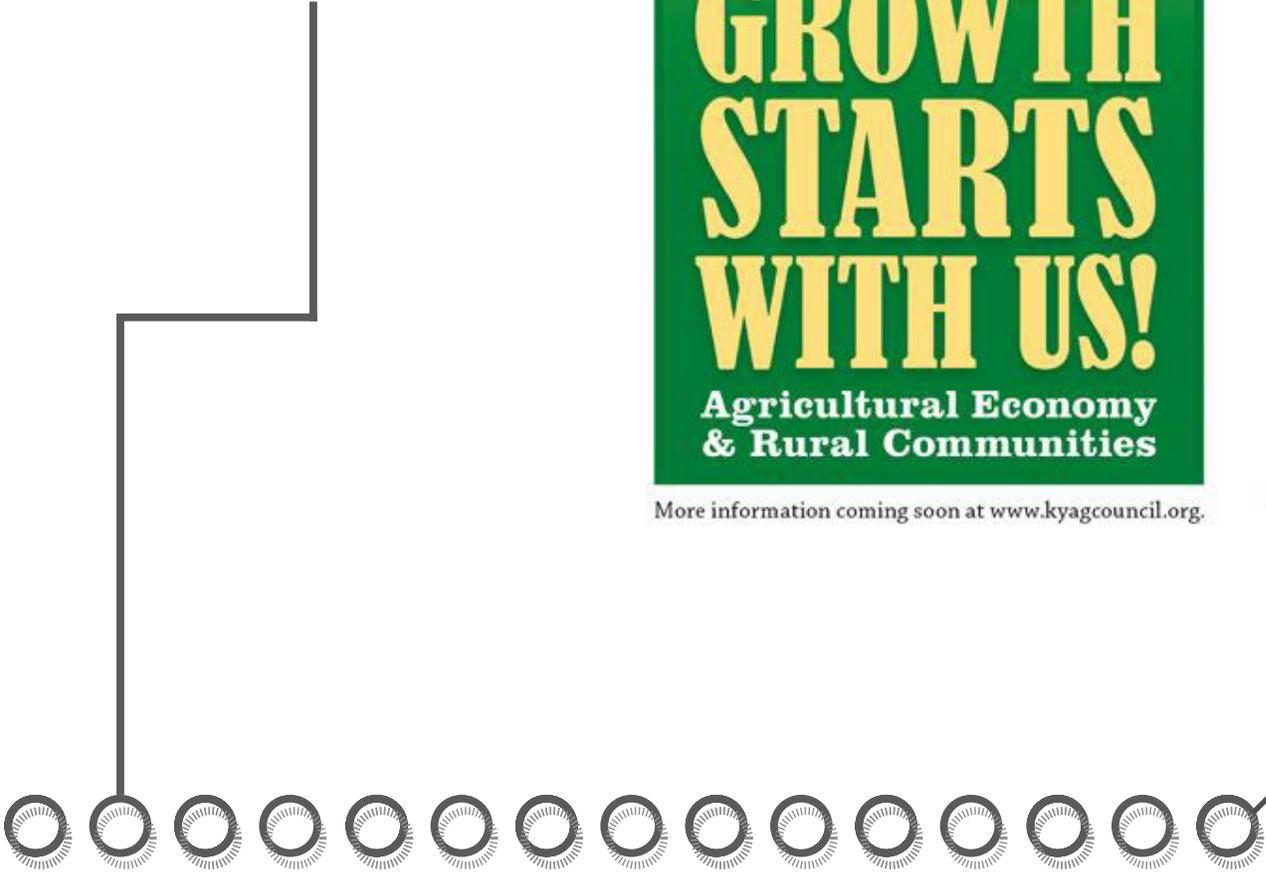
17th

The Department for Energy Development and Independence (DEDI) and the Kentucky Agriculture Council jointly hosted Bioenergy: A World of Opportunity. This one-day symposium offered bioenergy and energy developers, researchers and stakeholders an opportunity to learn and discuss emerging bioenergy opportunities in Kentucky and the nation.



More information coming soon at www.kyagcouncil.org.

30th

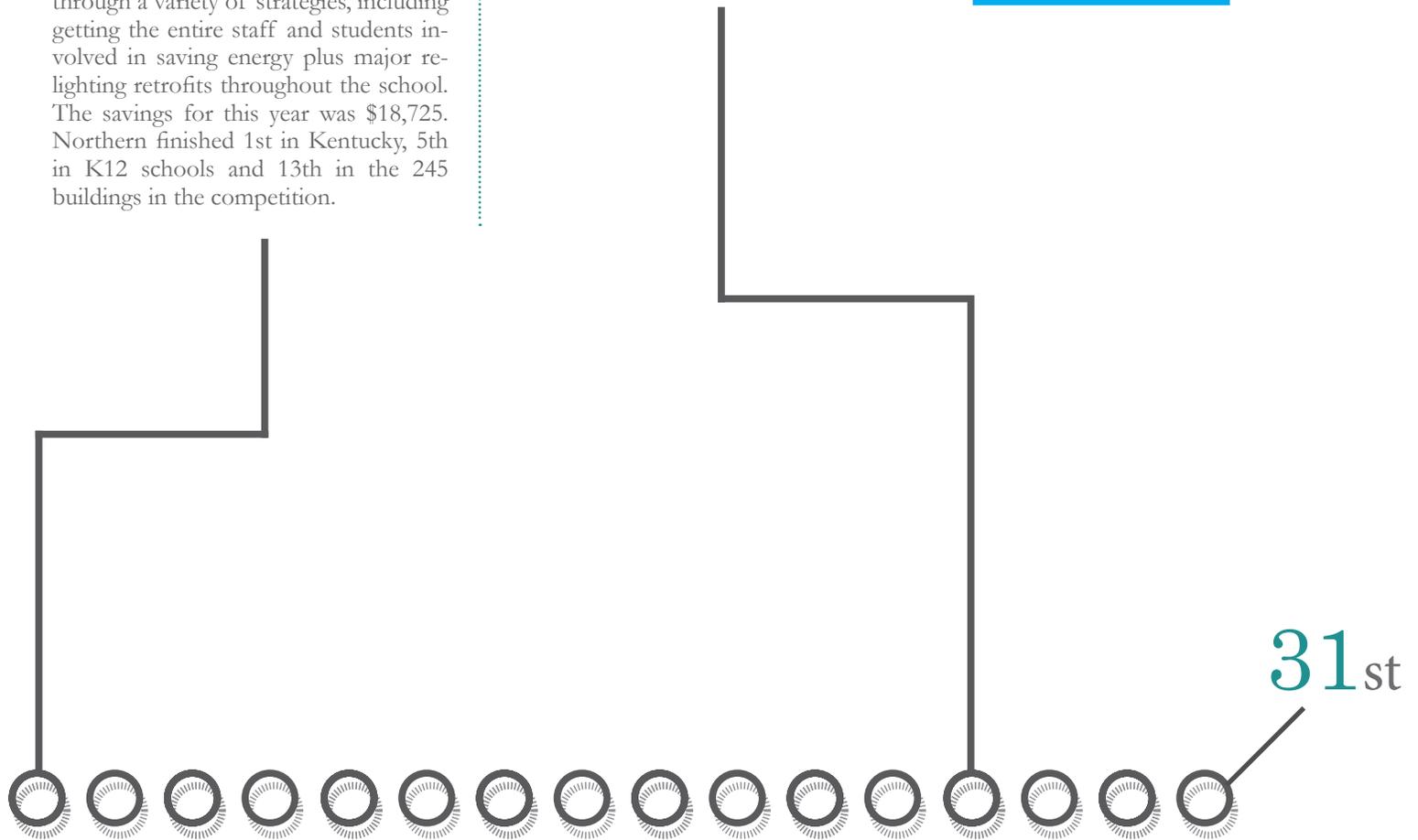


16th

Scott County Schools hosted an award celebration to honor Northern Elementary Schools results in the National Building Competition. Northern Elementary School participated in the Environmental Protection Agency's (EPA) 2011 ENERGY STAR National Building Competition: Battle of the Buildings and reduced its energy use by 28% through a variety of strategies, including getting the entire staff and students involved in saving energy plus major re-lighting retrofits throughout the school. The savings for this year was \$18,725. Northern finished 1st in Kentucky, 5th in K12 schools and 13th in the 245 buildings in the competition.

28th

The Kentucky Energy Efficiency Program for Schools (KEEPS) Annual Status Report was released by the University of Louisville – Kentucky Pollution Prevention Center (KPPC). KEEPS is supported by Recovery Act funding managed by DEDI. The KPPC status report can be found on the KPPC website.





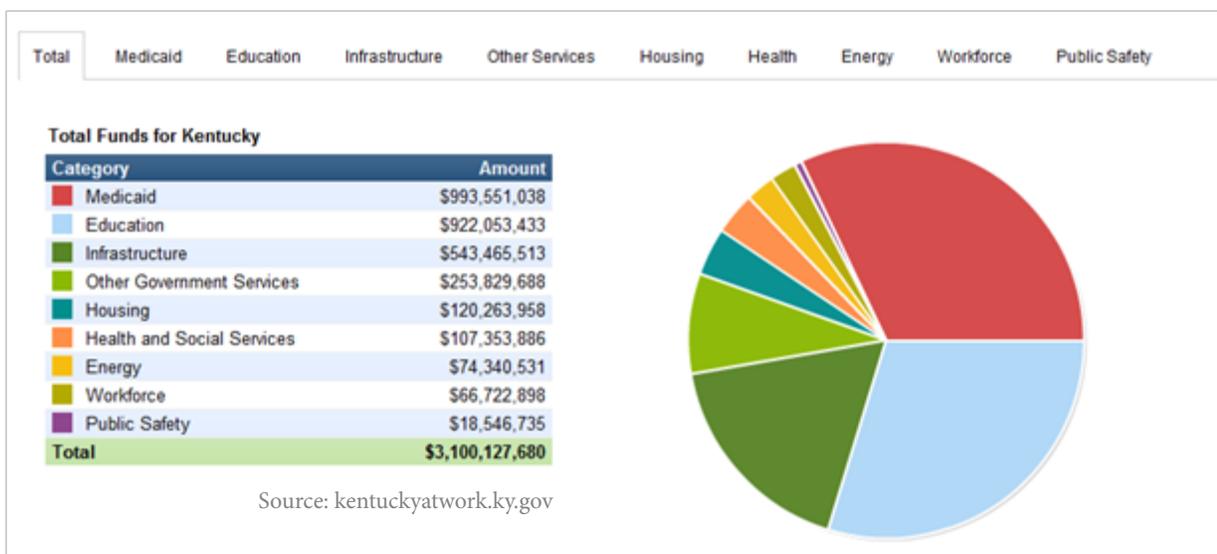
DEDI & Recovery

In early 2009, President Barack Obama signed the American Recovery and Reinvestment Act of 2009 (ARRA) to stimulate the nation's economy. Of the approximately \$787 billion that Congress appropriated nationally, Kentucky received about \$3 billion. Of that total amount about approximately \$74 million or about 2.4 percent went toward Kentucky energy initiatives (see chart below).

DEDI has administered over \$68 million since 2009 and other energy-related funds for hybrid school buses, low-income weatherization of homes and jobs training have been administered through other state agencies. Most ARRA energy related contracts will close in 2012.

These funds have allowed the Department for Energy Development and Independence (DEDI) to expand proven programs and to create innovative programs that will have beneficial impacts for years to come. They helped further DEDI's overall goal of market transformation, meaning an increased demand for efficient and renewable sources that can result in an increase in clean energy jobs. The benefits of market transformation and the four metrics DEDI tracks to determine program effectiveness include 1) an increase in jobs created or retained; 2) a decrease in energy consumed; 3) an increase in renewable energy generated; and 4) a reduction in greenhouse gas emissions.

The pages that follow highlight numerous programs and projects that have been implemented and accomplished by DEDI and its outstanding Kentucky partners.



“With the Governor’s leadership we have used Recovery Act funding to help leapfrog Kentucky’s economy toward greater energy efficiency.”

- Kentucky Secretary Len Peters, EEC

Energy in Education Collaborative

The Department for Energy Development and Independence has provided energy efficiency and conservation programs to Kentucky's schools and offered sustainable solutions to reducing operational costs through the Energy in Education Collaborative, a partnership that includes four programs and two projects funded by the American Recovery and Reinvestment Act (ARRA). The program elements of the collaborative are designed to be a comprehensive, holistic approach to focusing on energy and sustainability issues in the design, construction and operation of energy-efficient sustainable schools as well as addressing educational curriculum opportunities presented by this focus. Highlights of the past year include the following:

The Energy in Education Collaborative includes: the School Energy Managers Project (SEMP); the Kentucky Energy Efficiency Program for Schools (KEEPS); Kentucky National Energy Education Development Project (NEED); and the Kentucky Green and Healthy Schools (KGHS) program and two Net-Zero Energy School projects: Richardsville Elementary (Warren County Public Schools) and Turkey Foot Middle School (Kenton County School District).

Kentucky Energy Efficiency Program *for* Schools



The Kentucky Energy Efficiency Program for Schools (KEEPS), a partner in the Energy in Education Collaborative, provides technical consulting services to 174 Kentucky school districts and support to school energy managers. Managed by the University of Louisville's Kentucky Pollution Prevention Center (KPPC), KEEPS regional coordinators, technicians and engineers continue to conduct energy assessments, training, and assist school districts through the process of enrolling and implementing structured energy efficiency programs.

KEEPS recognized early in 2011, that districts must be empowered with the right tools to achieve on-going successful energy savings. In response to this need, KEEPS developed a seven-step, on-line toolkit for all technical skill levels, equipped with over 200 resources available 24 hours a day, seven days a week. These resources are customized for schools to analyze and understand their energy consumption, and include everything from light usage and heating/air-conditioning issues to natural gas usage and best environmental management practices.

This year kicked off with 100 percent of Kentucky's public school districts enrolled in an energy efficiency program and by early fall, KEEPS engineers completed on-site school energy assessments and 106 District Energy Management Reports necessary to benchmark and track a district's energy performance and cost savings.

More information may be found: <http://www.ksba.org/energy-management>



In the past five years school districts across the Commonwealth have come to recognize the importance that reduced energy consumption has to their bottom lines. At the time of this publication, Kentucky is now home to 125 ENERGY STAR labeled schools. By following ENERGYSTAR standards, districts are able to cut energy costs, reduce their carbon emissions and put those cost-savings back into their school systems for teachers and curriculum.

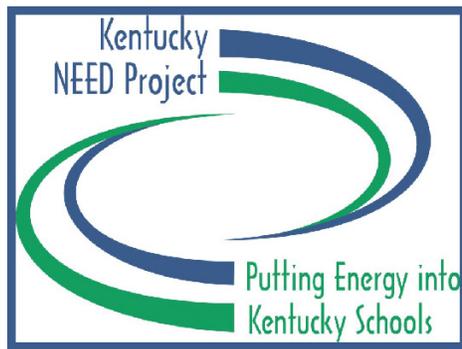
Becoming an ENERGY STAR partner is another way districts have demonstrated their commitment to energy programs, and also serves as criteria to earn the KEEPS Stewardship Award. Today, 67 % of Kentucky's school districts have become ENERGY STAR Partners, compared to less than five percent just one year ago.

Kentucky National Energy Education Development Project

The Kentucky National Energy Education Development (KY NEED) project provides energy workshops for teachers, grade-appropriate curriculum materials and kits for energy activities in the classroom. NEED has a program to assist schools with the information of student-based energy teams that look at how energy is used in the school. KY NEED also works with DEDI to produce an annual High Performance School Buildings Workshop, focused on the best practices for design of new, highly energy efficiency schools. The workshop target audience is architects, engineers and school officials, particularly those officials who are from districts that plan to build or renovate within the coming years.

KY NEED regional coordinators punctuated the 2010-2011 school year with 12 teacher/student workshops totaling 955 in attendance; conducted two High Performance Workshops, hosted two youth awards events ; conducted on-going professional development sessions and workshops for student energy teams. Also during the year, 53 schools were recipients of education grants totaling \$7,950.

On March 22-23, over 130 school administrators, architects and engineers gathered in Bowling Green to attend the High Performance Sustainable Design professional had the opportunity and benefits of building a high performance school and the chance to tour two high performance school buildings: T.C. Cherry Elementary, Bowling Green Independent Schools and Richardsville Elementary, Richardsville Elementary School was designed to be the first "net zero"



administrators, architects and engineers gathered in Bowling Green to attend the High Performance Sustainable Design professional had the opportunity and benefits of building a high performance school and the chance to tour two high performance school buildings: T.C. Cherry Elementary, Bowling Green Independent Schools and Richardsville Elementary, Richardsville Elementary School was designed to be the first "net zero"

Fifty three Kentucky NEED teams from across the state were recognized for their outstanding energy education projects in May at the KY NEED Youth Awards Luncheon in Frankfort. Eleven teams were awarded scholarships to attend NEED's national youth awards ceremony in Washington, D.C., by the KY Department for Energy Development and Independence, LG&E/KU and Duke Energy.

The annual Kentucky NEED Energy Tour for Educators was held in June 2011. This five-day adventure took NEED to energy sites in Eastern Kentucky and Tennessee. The trip began with a tour of the Laurel Ridge Landfill Gas facility. To learn more about nuclear and wind technologies, participants traveled to the Buffalo Mountain wind farm and Watts Bar Nuclear plant, both in eastern Tennessee.

A visit to the KY Mining Museum and Portal 31 in Benham and Lynch, KY, provided the educators with a look at the history of the coal mining industry in southeastern Kentucky. In Hazard, the educators were treated to a visit to eastern Kentucky's Challenger Learning Center – learning about the center's mission scenarios – connecting technologies used in space exploration with technologies used in the energy industry.

As part of October Energy Awareness Month activities, KY NEED launched the 6th annual "Change the World, Start with ENERGY STAR" campaign in partnership with DEDI and Louisville Gas & Electric/Kentucky Utilities (LG&E/KU).

Student groups were encouraged to apply for \$150.00 mini-grants to design and deliver a school and/or community project that educates on topics related to energy efficiency and conservation.

Grant recipients were encouraged to sign on as Change a Light pledge driver as a Kentucky NEED partner. Kentucky NEED along with other NEED participants across the U.S. continue to be the leading pledge drivers in the education sector.

The KY NEED project is part of a national non-profit organization that focuses on the scientific concepts of energy and provides objective, grade-appropriate information about conventional and emerging energy sources—their use and impact on the environment, economy and society.



Education and Workforce Development Cabinet Secretary Joseph U. Meyer gives the special address at the joint 2011 Kentucky NEED and Kentucky Green and Healthy Schools Awards Luncheon in Frankfort on May 18, 2011



“ In six short years, Kentucky has gone from having zero ENERGY STAR schools to now having over one-hundred schools with this esteemed energy accolade. ”

- KY First Lady, Jane Beshear



First Lady Jane Beshear celebrated Millbrook Elementary's ENERGY STAR rating.

Kentucky Green & Healthy Schools Program

The Kentucky Green and Healthy Schools (KGHS) program is administered by the Kentucky Environmental Education Council in the Education and Workforce Development Cabinet. This inquiry-based program uses the entire school grounds as a learning laboratory for students. Students conduct inventories in nine different areas, including energy, solid waste and water. They then develop and implement improvement projects in each area, receiving awards and recognition as certain milestones are reached.

The Kentucky Environmental Education Council reports a 196% increase in enrollment in the KGHS program in 2011. KGHS awarded \$19,325 in grant funds to 28 Kentucky schools in 15 counties. Students and teachers at these schools used ARRA funds to implement 38 energy-saving improvement projects at their schools, while learning about energy and ways to conserve it. Success is not always measured in numbers. The real rewards of the KGHS program come from the students' feeling of accomplishment from creating a more sustainable environment, a healthier school and from the real-world learning that takes place.

The Kentucky Green and Healthy Schools (KGHS), is an initiative of the Kentucky Environmental Education Council (KEEC) and the Kentucky Department of Education. Last year, through a partnership with the Department for Energy Development and Independence, KGHS was expanded with the help of Recovery funds from the U. S. Department of Energy.



As part of the Green and Healthy Schools program Model Lab freshman Liza Krein and Kaylin Burchell collect recyclables at the school in Richmond, Ky.

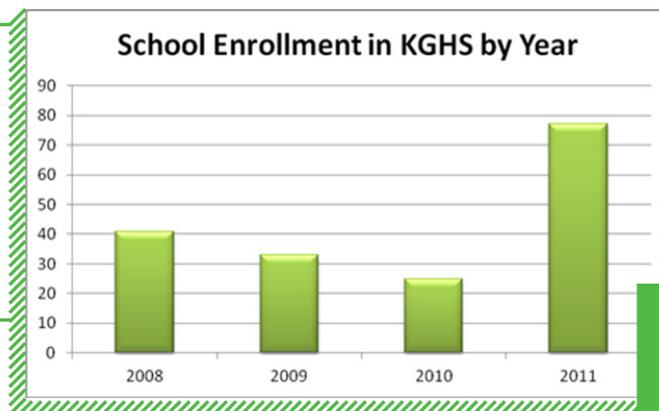


Photo by Amy Wallot



KGHS program experienced a 196 percent increase in enrollment in 2011.
More information may be found: <http://greenschools.ky.gov>

The increase in enrollment in the Kentucky Green and Healthy Schools program can be attributed to the availability of small grants for schools, as well as an increase in support for teachers. This increased support is found in the form of the Energy in Education Collaborative, which includes programming and technical support from energy education organizations and district energy managers hired by the Kentucky School Boards Association.



School Energy Managers Project

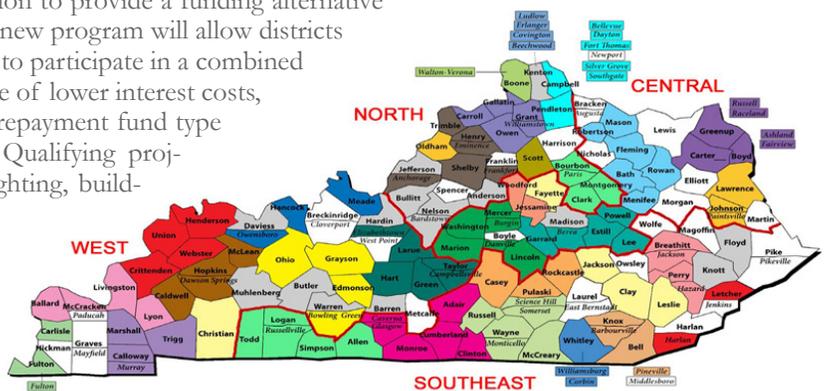


In 2010, in support of the State's energy plan to increase energy efficiency in Kentucky's public schools, Governor Steve Beshear authorized \$5.2 million in Recovery funds from the U.S. Department of Energy to create the Kentucky School Energy Managers Project (SEMP).

The Department for Energy Development and Independence coordinated a partnership with the Kentucky School Boards Association (KSBA) to bring increased energy efficiency management to school districts throughout the state. As administrator of the project, KSBA hired 35 energy managers throughout the state to serve 130 Kentucky school districts. These energy managers are the front-line managers responsible for coordinating energy efficiency and sustainability programs in the district. Four curriculum coordinators also joined this team of professionals to provide assistance to those districts with energy managers already on board. As a result, 144 school districts receive benefits of SEMP.

The School Energy Managers Project came about during a time of cost cutting measures, reducing faculty positions, when even justifying a new position was difficult at best. None the less, districts entered into SEMP believing they could achieve savings. By the end of September, 2011 the return on investment was greater than expected. School energy managers unleashed \$3.3 million of annual avoided costs found through rate and utility analysis, lighting retrofit and holiday shutdowns and one-time receipts from utility rebates or tax refunds totaling \$787,000. Under the direction of the energy managers, 144 local boards of education adopted energy policies; formed 121 district energy advisory teams and implemented energy management plans. Within the first year, energy managers have completed utility bills audits and worked with utility suppliers to correct numerous tariff misapplications. Many districts have implemented HVAC and computer setback procedures and are beginning to make investments in energy efficient technologies to facilitate future savings. The ARRA funded school energy managers were evaluated by their lead district pursuant to individual board policy, and on the implementation of the ENERGY STAR Seven-Step Process.

With the demand for more energy savings growing during 2011, KSBA formed partnerships to give districts new ways to maximize resources and reduce costs. Through a partnership with Fellow McCord districts can join the Kentucky Gas Aggregation Program to lock in natural gas prices. KSBA and the Kentucky Interlocal School Transportation Association (KISTA) formed an affiliation to provide a funding alternative to implement energy improvement projects. The new program will allow districts with smaller energy improvement related projects to participate in a combined tax-exempt financing and be able to take advantage of lower interest costs, flexibility in term of repayment (2-20 years) and repayment fund type (unrestricted, restricted or guaranteed savings). Qualifying projects include HVAC upgrades or replacements, lighting, building controls, commissioning, kitchen equipment and building envelope improvements (windows, doors, insulation.) Seven districts participated in the first bond sale totaling \$1.5 million in October. KSBA and Kentucky School Plant Management Association's partnership ensures energy managers receive on-going training to meet school district's growing facilities needs. The first joint conference was conducted in October.



This map identifies SEMP participating school districts.

Net-Zero Energy Schools

On May 19th, 2010 First Lady Jane Beshear announced the award of \$1.374 million grant to Warren County Public Schools for the installation of solar panels on the Richlandville Elementary School, putting it one step closer to achieving an energy-neutral facility. Simultaneously, during a press conference in Kenton County, Energy and Environment Secretary Len Peters announced a \$2 million grant to Kenton County School District for the installation of solar panels on the Turkey Foot Middle School. Both grants, funded by the American Recovery and Reinvestment Act, were designed to help these highly efficient schools generate as much energy as they use, allowing them to achieve net-zero energy usage over the course of a year.

Following years of improvements in building designs, enabling new schools to progressively be more and more efficient, solar becomes more affordable as a means to offset the energy demands of the building. In both districts, the clean energy the school is able to produce, will be fed back into the grid and is then sold back to their respective utility providers—resulting in energy- and operating cost-neutral facilities.

Richlandville Elementary opened its doors in October 2010. Four months later, the 208 kW thin film photovoltaic (PV) system became operational, ushering in a new era of energy efficient school facilities in Kentucky. Some of the unique features of this high-performance school include hands-on learning areas throughout the building, big-screen televisions to show students the real-time energy production/consumption of the school and hallways which feature educational energy themes like geothermal, solar, recycling and water conservation. With more than 2,000 solar panels on the roof, and an additional 700 installed on top of a parking shade structure by the end of 2011, Richlandville Elementary is capable of producing 2,500 kilowatt hours of energy per hour on a sunny day -- enough to energize 50 Richlandville homes. It is estimated the school's PV system will generate 245 MWh of electricity per year and its usage per square foot per year will be 18 kBtus, compared to the national average of 76 kBtus. The cost of the 77,466 square foot elementary school is \$14.8 million with the grant-funded solar PV system; without solar, the cost is \$13 million, or \$199 per square foot.

The Kenton County Net-Zero Energy Project is also testament to the district's commitment to energy management, believing school buildings should use less energy, demonstrate sound environmental practices and serve as fundamental tools for learning. During a "Flip the Switch" event on May 19th, 2011, Turkey Foot Middle School connected their solar power system. The first phase of this project was a 385 kW solar array comprised of over 60,000 square feet of thin film and crystalline panel solar technology. The second phase will provide a student walkway covered by a structural column canopy with solar panels.

By mid-October, 2011, monitoring of Turkey Foot Middle School showed the PV system generated 255 MWh, and sold \$10,230 worth of electricity back to their utility provider. Projections of the annual PV production are estimated to be 428 MWh, representing an annual value of \$24,140. The 133,000 square foot middle school opened to students in August last year. The cost of construction with the solar array is \$192 per square foot, well within Kentucky Department of Education guidelines; without the solar system, the cost of this highly efficient facility is only \$172 per square foot.



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Turkey Foot Middle School after completion.



Kentucky Energy Club

The Kentucky Energy Club, began in the fall of 2010, is a relatively new organization and is directed at students within the Commonwealth of Kentucky's higher education system. To engage the next generation of energy technologists and policy leaders, for Energy Efficiency and Independence (DEDI)funded the University of Kentucky's Center for Applied Energy Research (CAER) to facilitate the formation of the Kentucky Energy Club, a student-directed organization modeled after the very successful program at Massachusetts Institute of Technology (MIT). While CAER serves as a host organization, the stated goal is to develop individual club chapters at each of the state supported institutions of higher education in the Commonwealth. Currently, chapters exist at the University of Kentucky, Eastern Kentucky University, Morehead State University, and Ashland Community and Technical College. The clubs are structured as formally registered student organizations with appointed executive members, a state-wide club coordinator, faculty advisors, constitution and bylaws. The clubs maintain a policy of open membership, requiring no dues or fees; in addition, outreach and mentoring programs are encouraged through the support of faculty members. The clubs represent a broadly diverse membership representing a variety of interests and backgrounds, including design, agriculture, public policy, business and law.



As part of the inaugural year activities, the KY Energy Club has held a series of lectures entitled KY Energy 101 at each of the member campuses. The series is designed to bring energy experts in their field directly to the student body, facilitating networking opportunities. To expand student awareness, the club also offers opportunities to partake in the site tours series and travel to energy related facilities within Kentucky.

The KY Energy Club provides students with opportunities pursuant to the formation of social capital within clubs. The capital generated through leadership development, community engagement, teamwork exercises and collaborative ventures positively affects student success both academically and institutionally, providing them with a culture of connectedness and a wealth of personal resources.

University of Kentucky CAER Lab

The University of Kentucky Center for Applied Energy Research (CAER) broke ground in October 2010 on what will become the University's first LEED-certified laboratory. LEED stands for Leadership in Energy and Environmental Design and consists of a rating system for high performance green buildings, homes, and neighborhoods. The \$19.8 million renewable energy laboratory will allow the Center to expand research devoted to Kentucky's growing renewable energy industries, including biomass and biofuels, electrochemical power sources (like capacitors and batteries), and distributed solar energy technologies. The laboratory will open in the fall of 2012.

The facility will be a living laboratory with interpretive displays and activities for school children, visitors and the general public related to the building's energy consumption and the technologies and research that will be conducted.



The facility is being funded by a competitive grant won last year from the U.S. Department of Commerce's National Institute of Standards and Technology (NIST) under the American Reinvestment and Recovery Act's (ARRA) NIST Construction Grant Program. The award consisted of \$11.8 million in federal funds from UK. An additional award of \$3.5 million in state ARRA funds has also been provided by the Department of Energy Development and Independence to achieve LEED-Gold certification and insure this new laboratory is a model for energy-efficiency and renewable energy technologies.



“ I see this as a major boost to augment and supplement the state's initiative in the area of advanced battery research and development. The funding supports our efforts to become a leader in the production and use of biomass for biofuels and electricity generation. ”

- KY Governor, Steve Beshear

Residential

The Department of Energy Development and Independence (DEDI) has managed programs in the residential sector. The Kentucky Energy Efficient Appliance Rebate Program offered residents the opportunity to obtain rebates on a range of qualified energy efficient appliances. The intent of the Appliance Rebate program was to educate consumers on the ENERGY STAR brand and help stimulate the efficient appliance market. The Kentucky Home Performance (KHP) program continues to provide incentives to homeowners to improve the energy efficiency of their residences in a cost-effective manner and to ensure homeowners that their investment was installed correctly. KHP addresses the four biggest barriers to energy efficient home improvements: Homeowners don't know (1) what to do; (2) who to contact to perform the improvements; (3) how to finance without going to a bank; or (4) how to verify that the work was done correctly. The Kentucky Home Performance program is administered by DEDI's partner, the Kentucky Housing Corporation, an agency that is part of the Kentucky Finance and Administration Cabinet.



Kentucky Energy Efficient Appliance Rebate Program

Thanks to the Appliance Rebate Program, Kentuckians received \$4 million this past year to help replace inefficient appliances, while simultaneously stimulating our economy and investing in long-term energy savings for their homes. The Department for Energy Development and Independence administered the appliance rebate program through American Recovery and Reinvestment Act funding from the U.S. Department of Energy. Kentucky Residents filed for rebates after purchasing one of 16 qualified ENERGY STAR appliances, which account for 70 percent of typical household energy costs.

Not only did the program assist consumers as they purchased new, energy-efficient appliances, but the funds fed directly into Kentucky's economy through local retailers and helped to lessen the demand on Kentucky's power plants through energy conservation.

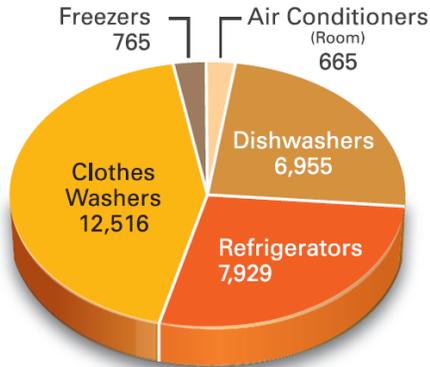
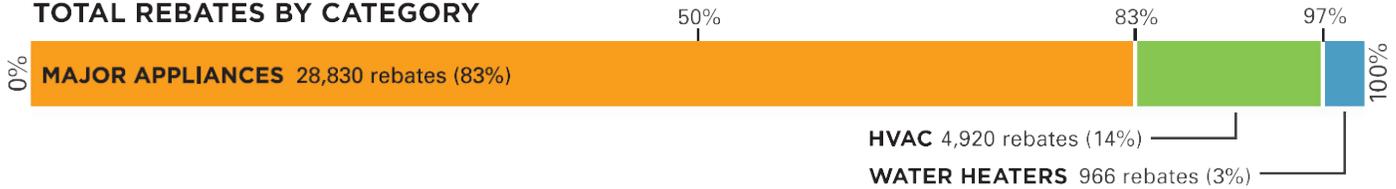
With the success and closeout of the Kentucky Energy Efficient appliance Rebate Program, DEDI lauds Kentuckians for their enthusiasm in replacing inefficient appliances and helping the Commonwealth invest in energy-efficiency and conservation.

“What better way to acknowledge 40 years of Earth Day celebrations than to give Kentuckians the opportunity to be environmentally responsible by purchasing energy efficient appliances while at the same time receiving rebates for making our planet a better place to live. Beyond energy efficiencies, they are helping stimulate Kentucky's economy as well. I call that a great deal for everyone.”

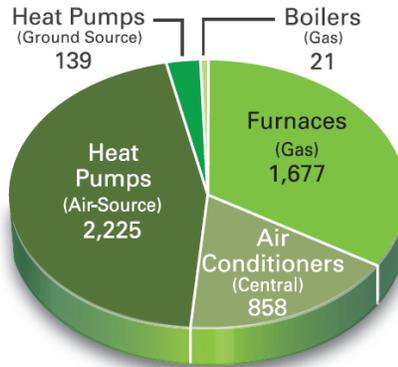


– Kentucky Governor Steve Beshear

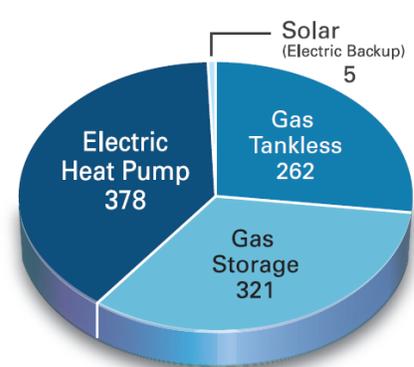
TOTAL REBATES BY CATEGORY



MAJOR APPLIANCES



HVAC



WATER HEATERS

	Major Appliances	HVAC	Water Heaters	All Products
Rebate Payments to Customers (Thousands)	\$2,061	\$1,539	\$248	\$3,848
Consumer Spending (Thousands) and Leveraging Ratio	\$20,962 (10.2:1)	\$28,958 (18.8:1)	\$1,189 (4.8:1)	\$51,108 (13.3:1)
Sales Tax Leveraged* (Thousands) and Leveraging Ratio	\$1,258 (0.6:1)	\$1,737 (1.1:1)	\$71 (0.3:1)	\$3,067 (0.8:1)
Annual Cost Savings* (Thousands)	\$967	\$433	\$119	\$1,519
Annual Energy Savings* (Billions of Btu)	14	25	6	45

* Estimated

Note: Due to rounding, the sum of the first three columns may not equal the "All Products" total.

Kentucky at a glance

Kentucky received \$4,096,000 from the federal government to implement the program; nearly 94 percent of this funding went directly to rebates.

Fourteen types of products received rebates ranging from \$40 to \$400.

Clothes washers were the most popular product; combined with dishwashers, these rebated products will reduce Kentucky's annual water consumption by nearly 86 million gallons.

The state covered administrative costs with \$16,592 of its own funds; retailers and manufacturers also provided \$393,414 of in-kind support.

KY Home Performance

The Kentucky Home Performance (KHP) program was launched to the public in December, 2010 to generate more energy-efficient homes across the Commonwealth and create jobs in the ‘green’ building industry. Teams of certified industry professionals identified affordable green strategies that provide long-term value to homeowners across the state. As a result, over 327 home energy improvement projects have been completed to date with another 100 in the pipeline, and the pipeline continues to grow on a weekly basis. The total development cost of the jobs completed under KHP already exceeds \$2.8 million.

More than 120 participating contractors received training, marketing and sales assistance, gained new customers through a wider spectrum of services, and improved sales closing rates, even during the typical “off” season. KHP provided certified training according to the Building Performance Institute’s and the national ENERGY STAR program at Community and Technical College System for the residential sector. Training and presentations were including the Midwest Energy Conference and



Building Analyst I Technical (BPI) Standards, education institutions including the Kentucky professionals in the commercial and residential also held at several professional conferences the State Housing Conference in Louisville.

Certified industry professionals performed over 1,038 comprehensive energy evaluations resulting in 485 home energy-efficiency improvement projects in 49 counties; this represents a 69% conversion rate – an extremely impressive rate by national standards! Completed retrofits have resulted in energy savings totaling 39,319 MMBTUs per year, or 26% reduction in average household energy usage. Home energy audits were performed on 2,899,203 square feet of floor space, with a total of 1,437,747 square feet being retrofitted. To accomplish this, the program has delivered \$842,000 in rebates to homeowners and leveraged \$5.39 million in homeowner investments in energy efficiency measures. Homeowners requested evaluations through the KHP Web site, www.KY-HomePerformance.org. Well over one million visits were made to the website in the past year. During the same time, residential energy savings reported include:

- 2,939 MWh and \$231,915 annual reduction in electricity
- 16.3 mcf and \$299,958 annual reduction in natural gas
- 41,217 gallons and \$86,638 annual reduction in propane
- 17,773 gallons and \$45,924 annual reduction in fuel oil

This is equivalent to the reduction of 10,573 metric tons of greenhouse gases.



To assist with the costs of improvements, KHP offered cash rebates or below-market-rate financing to contractors and consumers to complete energy-efficient improvements and retrofits to single-family residences. Homeowners chose to either receive a rebate up to \$2,000 or qualified homeowners received financing up to \$20,000 at low 4.99 percent rate (rate was for a limited time.)

In the spring of 2011, Governor Steve Beshear and First Lady Jane Beshear participated in KY Home Performance. Their personal home underwent an energy evaluation resulting in implementation of significant energy efficient improvements including air sealing, insulation and the installation of a geo thermal unit by a participating KY Home Performance contractor.

KY Home Performance was the first program to develop and implement a software system to provide all the tools needed for contractors to conduct and manage whole house energy evaluations, free of charge. The on-line system monitors home improvement projects, provides interface for funding and monitors quality assurance. The software systems will ultimately be customized and offered in more than 15 cities across the U.S.

KHP is a partnership between Kentucky Housing Corporation (KHC), Kentucky Department for Energy Development and Independence (DEDI), and Kentucky Finance Administration Cabinet. With support from DEDI, the Finance Administration Cabinet, utility and other partners, KHC administers the program.

Cooperative Extension

The University of Kentucky (UK) Cooperative Extension Service and DEDI began a partnership in 2002 to provide energy efficiency and renewable energy education to Kentucky's consumers. Through a grant provided by DEDI, the UK Cooperative Extension Service provides ENERGY STAR information statewide through its network of county extension agents. DEDI funding also helps the UK Extension Service support the Kentucky State Fair ENERGY STAR exhibit, training Cooperative Extension staff about the display and taking the display to other events across the state throughout the year.

The Kentucky State Fair is the highlight of the UK Cooperative Extension annual schedule. The exhibit includes 3,000 sq. ft. of hands-on materials for attendees to view and interact with. The ENERGY STAR exhibition played center stage in the South Wing "Main Street" pavilion. This year's exhibit showcased the Kentucky Housing Corporation (KHC) with their Kentucky Home Performance Program, which offers state funded incentives to those wishing to improve energy efficiency. Extension and KHC designed the exhibit as a self-guided tour for visitors. Eighteen hands-on stations took people from envelope infiltration reduction to insulation upgrade to HVAC options. The floor show was presented as a very open inviting floor plan surrounded by major traffic walkways [see picture]. Each year a library of fact sheets and publications are available to the public; this year, the assortment of references was updated and vastly expanded. Extension agents, on site at the fair exhibit, are also able to provide hundreds of private consultations with homeowners and contractors. After years of interaction with the Extension resources, many homeowners have developed an allegiance to this nonprofit, non-marketing, unbiased clearinghouse of information and quality coaching.



During the fair, the ENERGY STAR exhibit was viewed by more than 85 percent, or about 320,000 of the 378,735, state fair attendees. In 2011, the exhibit was taken to nearly 40 events across the state, such as home shows, conferences and area fairs. An estimated 33,000 technical assistance contacts were made throughout the year with homeowners, contractors, and others about specific issues of home energy efficiency.

Energy Efficiency Awareness and Action

The Energy Efficiency Awareness and Action (EEAA) program is newly-funded project, with \$242,905 in US Department of Energy grant dollars. EEAA is an out-growth of a long-standing, successful partnership between the Department for Energy Development and Independence (DEDI) and the University of Kentucky Cooperative Extension Service (UKCES). In recognition of Extension's ability to deliver information and services at the community level, DEDI has a long history of working with UKCES. Since 2003 the DEDI and the UKCES have enjoyed a solid partnership that helps educate Kentuckians about energy efficiency and renewable energy throughout the state.

The primary objectives of this project is to expand and deepen the existing DEDI – UKCES partnership by training Extension agents to deliver energy efficiency information and solutions; the focus will be on fostering the adoption of energy efficiency in the residential and commercial building sectors.

Through a four-phase approach EEAA will expand the network of extension agents engaged in energy efficiency actions within the Commonwealth, it will also deepen their technical expertise to meet what is expected to be a rising demand for information on managing energy bills in both the residential and commercial sectors. Further it will introduce to a significant number of 4-H youth the tools they can use to assist their own households to become more energy efficient.

The project will begin by detailing a strategic plan, developing or adapting energy efficiency training curriculum, and conducting outreach and education to foster participation in the program by UKCES agents, 4-H youth other community members.

Next, UKCES agents, as well as 4-H youth in the 120 counties in the Commonwealth, will be trained to use an energy consumption analysis tool on their home. UKCES agents will be trained to use the KY Home Performance Self-Evaluation tool and the ENERGY STAR Portfolio Manager to assess the energy efficiency of their homes and offices, respectively. Opportunities for friendly competition and recognition among the Extension offices will be provided. Integral to these trainings, agents and 4-H youth will also be directed to additional technical expertise and incentives to assist in making energy efficiency improvements.

UKCES agents and 4-H members will then use the knowledge gained from their own experiences to disseminate the EEAA services within their local community. This will include both marketing presentations to the general public, homeowners, youth, landowners, small business, agricultural producers, local government, communities, schools, and community leaders on the benefits of energy efficiency; and trainings offered to these groups on the use of energy consumption analysis tools.

Finally, UKCES will compile the lessons learned from EEAA program implementation and articulate this model program to a national audience with the assistance of and coordination by DOE.

Once this project is completed, there will be a statewide network of extension agents with the capacity to help people answer basic energy questions, evaluate their energy efficiency, access energy management tools and incentives, and locate additional resources within the state, as well as a national model that can be replicated locally.

Kentucky Department of Housing, Building, and Codes

The Kentucky Department for Housing Buildings and Construction received ARRA funding to provide education and training to local and state code enforcement officials responsible for residential and commercial building energy codes as well as funding for inspectors statewide to achieve 90 percent compliance with new energy-efficient building codes within six years. The Commonwealth now requires permits and inspections for all new construction projects and heating, ventilating and air conditioning (HVAC) installations statewide, making it the first state in the nation to do so.

In 2011, Senate Bill 10's statewide HVAC permitting and inspections program was well underway. As of October 30, KDHBC issued more than 4200 residential and commercial HVAC installation permits and totals continue to climb. Those numbers, along with the permits themselves, and all other HVAC-related processes are now more accessible thanks to a program called Jurisdiction Online (JO). With help from federal funding, KDHBC was able to launch this web-based information management program this year. JO enables all divisions: licensing, permitting, inspections, violations or consumer complaints, to conduct work through one central program while maximizing efficiency and accuracy.

KDHBC Training

Throughout 2011, a series of training opportunities were provided to residential and commercial construction and design professionals throughout the state in an attempt to bring together code officials, architects and engineers to create more efficient buildings.

Residential curriculum development was provided by the Alliance to Save Energy. KDHBC will be utilizing this material for future trainings using classroom and web-driven delivery methods.

Commercial training and delivery were provided by the University of Kentucky in conjunction with Pacific Northwest Laboratories. Fourteen sessions were held across the state with 133 code officials and 406 architects/engineers attending. Continuing Education Credits (CEUs) were awarded.

Training programs for local and state building code officials and building professionals scheduled to be launched in early 2012:

- One-day work shops on the International Energy Conservation Codes (IECC) for residential construction
- Two-day workshops on Building Plan Review focusing on energy codes
- Manual J training for Master HVAC Contractors to be held at Kentucky Community Technical College System (KCTCS) campuses across the state
- IECC Certification exams

KDHBC Inspections

In compliance with 815 KAR 8:070 passed in 2007, KDHBC was required to establish a fee schedule, issue permits and perform inspections of all new HVAC installations in Kentucky, starting January 1, 2011. There were no funds appropriated by the Kentucky General Assembly at that time. This federal grant allowed KDHBC to hire and train 16 certified HVAC inspectors on a time-limited basis before the January 1 deadline to assist with the roll-out of the permitting program. The permit fees being collected are allowing the migration of the time-limited inspectors to full-time status. All 16 were permanent state employees by December 2011.

Midwest Regional ENERGY STAR Conference 2011



Building on the momentum and success of last year's event, the third annual Midwest Regional ENERGY STAR Conference returned to the Lexington Convention Center, March 24th and 25th with a packed house. 450 energy evaluators, contractors and utility providers from Kentucky, Tennessee, Ohio, Indiana and Georgia were educated and exchanged information on the energy efficiency home industry. The Home Builders Association of Lexington (HBAL) were once again gracious hosts to national energy efficiency experts, offering courses for home builders, engineers, architects and all who had an interest in efficient home design. The conference showcased cutting-edge energy efficiency innovations through a vendor trade show and offered participants in-service credits for various certifications.

Residential Building Energy Code *Curriculum Development and Training*

The Alliance to Save Energy (ASE) and the Building Codes Assistance Project (BCAP) in partnership with the Kentucky Department for Energy Development and Independence and the Department of Housing, Buildings and Construction is helping develop consumer guides aimed at homeowners. In order to reach consumers, this partnership coordinated an outreach strategy relative to residential building codes; conducted a training assessment, developed curriculum and delivered a pilot training; and developed energy code training enhancements with videos and online training for the residential training and compliance sector.

A grant from the US Department of Energy, under the ARRA, provided \$350,000 to help Kentucky achieve substantial compliance with the new 2009 International Energy Conservation Code. As a condition of accepting ARRA funding, Kentucky was required to provide assurances that these codes would be adopted and would achieve 90% compliance by 2017 for residential and commercial construction

Because of the DHBC role as the primary code enforcement agency in the Commonwealth, their role was to coordinate the consumer awareness and curriculum advisory committee. For the duration of project the DHBC was intimately involved in the coordination, review, and implementation of all aspects of this project. They helped by scheduling and participating in conference calls, and reviewing and commenting all materials. This added greatly to the quality and function of all consumer materials products and ensured they were technically correct.

Various Consumer Guides and Checklists were developed, with the assistance of BCAP and DHBC. The Guides are intended to provide an illustrated overview of the major components of the residential energy code and key elements for compliance for different audience: design professionals, home buyers, and home owners. Additionally, consumer checklists targeted to the same three audiences were produced that guide them through issues to look for in a home to ensure compliance. The checklists provide an example certificate and links for additional information. All of these materials will be made available as pdf download files through the DHBC's web site and printed and used at appropriate forums.

In addition to the printed materials, an eight-hour Power Point curriculum was developed by BCAP. Development included a pilot training session with professional code inspectors to vet the curriculum. The curriculum was organized around the

IECC 2009 code books, complete with illustrations, and speaker notes. BCAP, working with their sub-contractor, video-taped a trainer doing the eight-hour residential energy code training, and superimposed the instructor over the PowerPoint slides. The user can then select to take the online instruction course and complete modules at their own pace. The user is then asked a set of brief questions at the end to measure information retention. The LMS keeps track of the user's progress and quiz scores. One advantage of this system is that the DHBC can allow users to take classes at their own pace, but the agency can also use the Power Point for live workshops, or supplement the live sessions with videos from the LMS. All instruction is augmented by a set of videos, shot on-site, in the field, that focus on specific code details.



The Houseboats to Energy Efficient Residences Project

The “Houseboat Capitol of the World”, Monticello, KY is soon becoming known for building energy-efficient homes. The area that surrounds Lake Cumberland was once a thriving industrial community and factories in Wayne, Pulaski, Clinton, Russell and Adair counties employed an estimated 1000 people, many of them skilled electricians and carpenters. Under a new program, Houseboats to Energy Efficient Residences (HBEER), Stardust Cruisers are using their construction skills to build modular homes that are energy-efficient in addition to houseboats, a market that has suffered during the economic downturn.

This multiyear project was began in 2009 when Monticello (Wayne county) and Whitley County applied for funding under the Department for Energy Development and Independence Energy Efficiency & Conservation Block Grant (EECBG) to build prototypes that would be placed in their communities. Both communities received 125,000 to establish a revolving loan program to manufacture these energy-efficient modular homes.

This project was initiated by Jerry Rickett, president and chief executive officer of the Kentucky Highlands Investment Company (KHIC) and their mission is to increase economic development in a 22 county area in southeastern KY. HBEER is collaboration between KHIC and the University of Kentucky College of Design with assistance from the University of Kentucky Center for Applied Energy Research (CAER). HBEER was designed not only to create jobs for area industry and to utilize materials made in Kentucky, but also to promote energy-efficient homes that would replace energy inefficient mobile homes in Southeastern KY.

The goal of each home is to keep the total cost less than \$100,000 and for the home to operate on an average of \$1 per day for heating and cooling costs. The prototype home in Monticello was placed in August 2011 and features two bedrooms, one bathroom, laundry, living space and a kitchen [see picture]. Additional features of these homes are built-in cabinetry that provides homeowners an opportunity to spend less on dressers and other storage furniture. They will also include GE Energy Star appliances and have ENERGY STAR windows.



“The HBEER project is unique in that it has allowed us to share leading edge techniques in design, energy performance and construction with a region of our state that is well positioned to implement them in a way that will have a very positive and immediate impact on south eastern Kentucky. ”

- Josh Ayoroa, HBEER Project Manager

Industrial & Commercial

Starting in 2010, the Department of Energy Development and Independence (DEDI) started working with its partners to create three programs to help companies cut energy consumption and reduce green house gas emissions in the industrial and commercial sectors. Two of these programs are operated by the University of Louisville's Kentucky Pollution Prevention Center (KPPC): Kentucky Save Energy Now (KY SEN) and the Kentucky Industrial Commercial Sustainability Program (KICSP). Although funded from two different federal grants, both programs support services that promote, implement, and enhance environmental sustainability efforts. The third program, the Kentucky Industrial Facility Retrofit Program, is implemented by the Kentucky Cabinet for Economic Development and provides competitive grant funds for energy-efficiency upgrades in existing industrial plants. Grant funds will be available through April 2012.

Save Energy Now & Industrial/Commercial Sustainability Program

Kentucky Save Energy Now (KY SEN) helps energy-intensive facilities build self-sustaining energy-savings programs using ENERGY STAR's Seven-Step Energy Management Process. Companies that enrolled in the KY SEN initiative in 2009 pledged to adopt a goal to reduce energy intensity by 25 percent or more over 10 years (2.5 per cent per year). To accomplish their goal, companies pledged to complete their activities within 12 months of enrollment; establish an energy use baseline; develop an energy management plan; designate an energy leader or energy manager; take steps to reduce energy intensity and associate carbon emissions; and report energy intensity, energy use data, and achievements annually to KPPC.

Participation in KY SEN has grown in 2011, thanks to industrial and commercial leaders demonstrating their commitment to creating efficient, energy-saving work environments.

One of the most important components to the Seven-Step Process is education. Through KY SEN, workshops were held across the state representing more than 77 unique organizations.

Modeled after the U.S. Department of Energy's Industrial Assessment Centers, the Industrial/Commercial Sustainability Program increased support for KPPC to perform energy analyses at industrial, commercial and institutional firms or organizations. The program also conducted energy efficiency workshops for target groups.

By August of 2011, KPPC's team of engineers have evaluated more than 7.7 million square feet of space in 103 Kentucky industrial, commercial and institutional facilities, and conducted 32 on-site energy assessments, making great strides toward optimizing energy performance. Those assessments identified potential energy savings of 473,065 MMBtu's per year,

KPPC also participated in other training opportunities throughout the year to provide venues for manufacturers and vendors of energy-efficient technology to network and demonstrate successes. "Energy Today and Tomorrow" was the theme of the Kentucky Association of Manufacturers Energy Conference in April. KPPC presented to more than 40 participants outlining the steps to take in starting an industry-wide energy initiative. KPPC also hosted the second Kentucky Energy Alliance meeting, held at the LG&E/KU Power Plant in Trimble County in May of this year. Thirty-five participants attended, representing various businesses and industries from across the state. General Cable, of Lawrenceburg, Kentucky, is one of the many Kentucky companies that has utilized KPPC's services and achieved energy and dollar savings. Jeff Hosp, Maintenance Manager, presented a case study of their successes throughout the past three years which included establishing a baseline of energy usage by KPPC facility assessments, modernizing some of its equipment, and encouraging behavior changes among its employees.

Through an ITP Grant (Industrial Technologies Program, of the US Department of Energy), KPPC was able to hire seven new engineers and purchase equipment, such as infrared cameras, temperature and humidity meters, and combustion analyzers, to conduct energy audits and collect data on-site.

In October 2011, the Kentucky Save Energy Now (KY SEN) initiative recognized companies from across state for their commitment to reducing energy usage.

Topy America and Cardinal Aluminum achieved first-star level recognition for signing the KY SEN pledge and establishing energy use baselines. Hausner Hard Chrome and General Cable achieved the second-star level for instituting energy management policies, establishing cross-functional energy teams and attending energy management training. Republic Conduit received the third star level of recognition by assessing operations for energy saving opportunities and developing an energy action plan which included a 2.5 percent per year minimum goal for energy savings.



Stimulating Energy Efficiency in Kentucky

Through a cooperative agreement with the U.S. Department of Energy, DEDI along with the Midwest Energy Efficiency Alliance (MEEA), have undertaken an initiative that supports Governor Steve Beshear's 7-point strategic energy action plan, Intelligent Energy Choices for Kentucky's Future, that aims to improve the energy efficiency of Kentucky's homes, buildings, industries, and transportation fleet, by at least 18 percent of Kentucky's projected 2025 energy demand.

DEDI announced in March of 2011, the Stimulating Energy Efficiency in Kentucky (SEE KY) initiative to help integrate energy efficiency into Kentucky's economy to achieve an eventual one percent annual energy savings goal. SEE KY is funded by a \$500,000 federal grant from US DOE.

A critical component of SEE KY is an inclusive stakeholder process to allow Kentucky's energy experts to share ideas about how the benefits of energy efficiency can be realized by Kentuckians and to develop an actionable strategy for reaching the one percent annual energy savings goal across the Commonwealth. The stakeholder process combines rigorous data analysis with discussions to identify what is and is not working in Kentucky to deliver the benefits of energy efficiency to Kentuckians.

To date, the SEE KY project team has met with individuals from over 36 organizations representing utilities, government agencies, manufacturers, professional associations and nonprofit organizations from housing, economic development, environment and low income community sectors. The result of these meetings is a summary of issues that key stakeholders have identified as critical to Kentucky's ability to achieve its annual energy savings goal.

Research of Kentucky's existing energy efficiency programs and policies is being conducted by the American Council for an Energy-Efficient Economy (ACEEE). This research will assess the cost effectiveness of a variety of programs in Kentucky and will be used as the basis for discussions with stakeholders. Additionally, a comparison of Kentucky's policies and programs with that of similarly-situated states will produce a catalogue of best practices that can provide valuable options for the Commonwealth.

KY Industrial Facility Retrofit Program

The Kentucky Industrial Facility Retrofit Program, was developed through a partnership between Department of Energy Development and Independence and the Cabinet for Economic Development (CED). This program provides competitive grant funds for energy efficiency upgrades to existing industrial plants. Preference in the award process went to industries that produce 'green' products and create or retain the most jobs. The 2010 ARRA grant recipients included: General Electric Company (GE), in Louisville, Arch Chemicals Inc., in Brandenburg, and International Paper Company, in Henderson, Kentucky.

By the end of 2011, three companies had completed lighting retrofits covering 1,584,429 square feet of industrial building. Florida Tile retrofit two buildings for a total of 636,179 sq. ft.; Montplast of NA retrofit two buildings for a total of 572,250 sq. ft. and GE Aviation retrofit one building for a total of 376,000 sq. ft.

Grant Recipients' Projects



- 1,400 old HID lights replaced with 1,089 fluorescent fixtures (~5,000 bulbs)
- 4,000,000 kWh reduced annually
- 6,600,000 pounds of CO2 reduced annually with reduced energy demand
- 685 equiv. acres of trees that would have the same impact
- 74% reduction in electricity consumption for lighting
- 1.4 years payback of the entire costs from energy savings

- In 2010, Florida Tile teamed up with the Kentucky Cabinet for Economic Development to retrofit 40 year old lighting at their Lawrenceburg campus. The original lighting, installed in the 70's, was dim and expensive. Timers and switches were installed so the lights could be cycled on and off only when needed. Florida Tile invested \$162,500 and it was matched with stimulus funds. The cost to provide lighting has dropped by 74%.



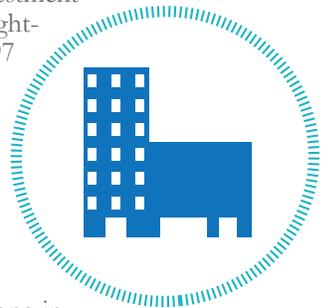
- 14,000 fixtures replaced and 137 LED exit signs installed
- 894 occupancy sensors installed
- Lighting retrofits was across 7 buildings with 851,620 sq. ft.
- Annual electricity reduction of 4.3 million kWh; approx. \$225,000
- 9 month payback on GE's \$194,000 investment

- GE Aviation received ARRA funding to retrofit the Madisonville facility with energy efficient T-8 lights. This project was completed by local electrical contractor and the primary goal of the project was to reduce energy costs while also reducing carbon dioxide emissions. The T-8 lights produce 40% more light, yet cost \$22,000 less per month to operate. The reduction in costs for lighting is exceeding original estimates and production workers at the Madisonville plant are enjoying the improved light quality at their work stations.



- 1,096 400-watt halide fixtures replaced with T54 high output fluorescent fixtures
- 2,600 Kentucky man hours utilized to complete the project
- 6,224,894 Lbs. of carbon dioxide reduced annually
- 320,495 Equivalent gallons of gasoline saved annually
- 3.5 Years to pay back total project cost

- Montaplast of North America, Inc. was selected to receive American Recovery and Reinvestment Act (ARRA) funding for a lighting retrofit project at their Frankfort plant complex. The lighting to be retrofitted was originally installed during Montaplast's 1992 construction and 1997 plant expansion. The project began in the summer of 2010 to replace the existing dim and high cost metal halide lighting with nearly 1,100 new energy-efficient 54 watt fluorescent fixtures in three different warehouse areas and two production plant buildings.



Facility Retrofit

- **Arch Chemicals** (\$450,000 ARRA) Initial start up on the condensing economizer was done in late April with no major issues. CED and DEDI visit Arch Chemicals April 28th to review the project, interview workers to ensure compliance with Davis-Bacon Act, received a facility tour and overall management review meeting, to discuss showcase/case study opportunities and building on this project with sustaining energy efficient actions within their facility. After the condensing economizer was 100% functioning, studies showed water vapor leaving the stacks was found to have increased acidic levels. Arch and their vendor worked to identify the cause and implement corrective actions, which has been implemented with no repeat increased levels.
- **International Paper** (\$400,000 ARRA) The whitewater filtration unit was installed on January 31st. IP is currently working with the whitewater filtration unit manufacturer (Kadant) to address operational design issues regarding pulp fibers clogging system. This type of filtration unit has been used in other industrial settings, but its use in the paper/pulp industry is new. Pulp fibers in the water going through the filtration unit are causing some clogging issues. The unit is operating at 50% of operating capacity as long term solutions are evaluated. Kadant has been onsite working on the problem, and a solution is expected by May 1st. Tim Back (CED) and Robert Duff (DEDI) conducted a site monitoring visit on March 10th. International Paper provided an overview of their project, followed by a facility tour.
- **GE Appliance Park** (\$2,500,000 ARRA) GE implemented lighting retrofits. A site visit was conducted on March 16th with representatives from U.S. DOE, DEDI, CED, and KPPC present. GE provided an overview of their two projects (lighting retrofit and steam plant upgrade) and then led a brief tour. The engineering firm working on the GE Steam Decentralization Upgrade project proposed the use of hot water system in lieu of steam for the front office space in buildings AP1, AP2 and AP3. This proposal also included separate hot water generators that are more efficient (93%) with less transportation loss. This proposal was reviewed by CED and approved. Work has been completed on the front office area. Phase II (process replacement) and Phase III of Steam Decentralization Upgrade project is still on track to be completed and commissioned by end of 2011.
- **Perdue Farms** (\$240,000 ARRA) CED awarded the third request for proposal to Perdue Farms to install a bio-gas engine that will use captured waste gases from a process water lagoon, converting to energy to electricity. The engine will produce 999 kW of power 24 hours a day, seven days a week, and will be available for use on-site or externally via grid connection. TVA will pay Perdue Farms for the green credits. The waste heat from the engine will be used to heat significant volumes of hot water that will be used in production processes during operational hours and will heat the wastewater lagoon during off-hours, which will increase the anaerobic digestion process, producing more gas.

Louisville Energy Alliance

The Louisville Energy Alliance is an excellent example of a public-private partnership. It is an alliance of the Louisville Metro Government with leadership from many local businesses. The Louisville Energy Alliance is a 501(c)3 nonprofit corporation promoting energy efficiency, through ENERGY STAR, in commercial buildings in Louisville. They assist commercial building owners and managers by providing important resources in energy efficiency. The members of this public-private partnership are:

- BOMA (Building Owners and Managers Association)
- Louisville Metro Government
- CCIM (Certified Commercial Investment Member)
- DEDI (Kentucky Department for Energy Development and Independence)

The group sponsors three premier activities each year. The Kilowatt Crackdown is an annual competition between building owners and operators to promote energy efficiency awareness and rewards businesses with the most efficient buildings and businesses with the greatest energy improvements. To compete, buildings must benchmark their facility for a 12-month period, make improvements, and then track their progress over the following year. Over 200 buildings competed this past year with winners being recognized in many categories: Kilowatt Cup, Greatest Improvement in Efficiency, General Recognition, and most Efficient Building or Plant.

The Louisville Energy Alliance sponsors the Commercial Energy Efficiency Expo to help businesses learn more about the practices and products that are available to help them improve energy efficiency. This year's expo took place in October at the Louisville Convention Center.

The Louisville Energy Alliance is also a partner with the federal government's ENERGY STAR program, which provides an abundance of tools and information to help businesses drive down their energy usage. ENERGY STAR's Portfolio Manager Tool, for example, is extremely helpful in evaluating a property's current efficiency and in tracking the property's efficiency improvement progress. It is also used extensively in the Kilowatt Crackdown.

Finally, the Louisville Energy Alliance has served as a mentor with the Lexington-Fayette Urban County Government (LFUCG). Facilitated by DEDI, the Alliance met with LFUCG to share their experience and lessons learned through the Kilowatt Crackdown. Because of this mentoring process, LFUCG is conducting its own competition, administered by the Bluegrass PRIDE.



Commercial Energy Code Training

Commercial and industrial facilities account for half of all energy consumption in the U.S. at a cost of over \$200 billion per year, more than any other sector of the economy. These facilities are also responsible for nearly half of U.S. greenhouse gas emissions which contribute to climate change.

A grant from the US Department of Energy, under the American Recovery and Reinvestment Act, provided \$350,000 to develop curriculum and provide training to help Kentucky achieve substantial compliance with the new 2009 International Energy Conservation Code. As a condition of accepting ARRA funding, Kentucky was required to provide assurances that these codes would be adopted and would achieve 90% compliance by 2017 for residential and commercial construction. The project was implemented as a four-way partnership with DEDI, the University of Kentucky (UK), the Kentucky Department of Housing Building and Construction (DHBC), and the Alliance to Save Energy Building Code Assistance Project (BCAP).

The commercial energy code project was completed by the University of Kentucky Biosystem Engineering Department. They surveyed the commercial design community to determine training needs and developed a two-day curriculum that was reviewed and revised by the DHBC. Workshops were attended by design professional and DHBC code officials. Fourteen workshops were held throughout the state with a total attendance of nearly 600.

Did You Know?

Kentucky's total 2009 energy expenditures were over \$17.4 Billion and were focused most heavily in the transportation sector through the purchase of gasoline, diesel, and jet fuel. Total energy expenditures fell by 24% as a result of falling prices for crude oil and natural gas during this time.

NEED
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State & Local Government



Small Cities & Counties Initiative

To bring energy efficiency and conservation to local communities, the Department for Energy Development and Independence (DEDI) partnered with the Department for Local Government (DLG) to implement projects funded through the Energy Efficiency and Conservation Block Grant Program (EECBG). Designed to invest the cheapest, cleanest, most reliable energy technologies – energy efficiency and conservation – which can be deployed immediately, the EECBG was passed by Congress in 2007 but was not funded until the passage of the American Recovery and Reinvestment Act (ARRA) of 2009.

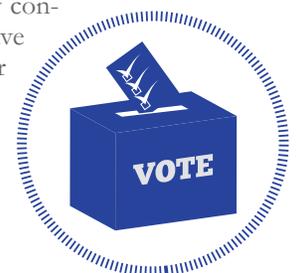
The Kentucky EECBG Small Cities and Counties Initiative, provides \$6.25 million to assist local governments in implementing strategies to reduce fossil fuel emissions, reduce total energy usage, improve energy efficiency in transportation, buildings and other sectors, or to implement renewable energy activities at the local level. The program also spurs economic growth through creation and retention of jobs funded under ARRA. The program provided grants up to \$125,000 per community. Only city and county governments were eligible to apply for the EECBG funding; however, local governments could apply on behalf of non-profit agencies in their communities. Some local communities also submitted applications for multi-jurisdictional projects; recognizing that pooling resources at the local level had advantages for those areas.

DLG Small Cities and Counties Initiative Funded Projects

Amount	Local	Amount	
Berea	125,000	Jackson	125,000
Livingston County	125,000	Paducah	50,000
Jeffersonton	125,000	Elizabethtown	125,000
Rowan County	125,000	Estill County	125,000
Madisonville	125,000	Mount Washington	\$125,000
Monticello	125,000	Calvert City	125,000
Whitley County	125,000	Clark County	125,000
Madison County	\$125,000	Daviess County	58,800
Ballard County	\$125,000	Fulton	99,044
Bardwell	\$35,000	Fulton County	\$65,155
Butler County	\$108,688	Greenville	\$125,000
Henderson County	\$125,000	Murray	\$125,000
LaRue County	\$68,000	Olive Hill	\$125,000
Marshall County	\$68,000	Pendleton County	125,000
Mayfield	\$125,000	Winchester	\$56,802
Franklin County	\$125,000	Whitesville	\$75,600
Wayne County	\$35,200	Cynthiana	\$125,000
Caldwell County	\$125,000	Lincoln County	\$125,000
Hart County	\$125,000	Guthrie	\$65,650
McLean County	\$125,000	Central City	\$72,126
Garrard County	\$11,769	Greenup County	\$125,000
Hickman County	\$125,000	Carlisle County	\$101,210
Warren County	\$41,494	Crofton	\$47,450
Danville	\$125,000	Hickman City	\$50,000
Carroll County	\$75,000	Calloway County	\$45,675
Trigg County	\$125,000	Boyle County	\$125,000
Knott			
County/Pippa		Leitchfield/Grayson	250,000
Passes/Hindman	375,000	County	
Warsaw/Gallatin			
County	250,000		

The program also spurs economic growth through creation and retention of jobs funded under ARRA. The program provided grants up to \$125,000 per community. Only city and county governments were eligible to apply for the EECBG funding; however, local governments could apply on behalf of non-profit agencies in their communities. Some local communities also submitted applications for multi-jurisdictional projects; recognizing that pooling resources at the local level had advantages for those areas.

Funding will be provided for approximately 60 projects to implement energy efficiency, energy conservation and renewable energy projects. While the first projects were announced in April of 2010, the bulk of the work on many of the projects took place in 2011. In many instances, the communities found that the original estimates of the projects were high and funds were available to perform more energy savings activities than originally anticipated. The projects varied widely from community to community. Local hospitals in Trigg and Madison counties received funds to make energy efficient upgrades in order to help reduce utility costs. Berea received funds to reduce city-wide energy consumption and create the state's first cooperative solar farm. The first phase of the Berea Solar Farm initiative was a success – with sixty (60) lease contracts received in the first week. The city of Crofton received \$47,450 to help implement energy conservation activities at the local community center.



Drinking and Waste Water Energy Efficiency

The Drinking Water and Wastewater Energy Efficiency Workshops were held throughout the state to educate local officials about opportunity that energy efficiency provides as a means to save on operating costs. Also, to inform local officials of a energy savings performance contracting as a mechanism for financing facility improvement projects. The definition of energy savings performance contracting is the use of guaranteed savings from the maintenance and operations budget as capital to make needed upgrades and modernizations to building or infrastructure systems, financed over a specified period of time. The workshops also educated utilities about nontraditional financial options that they might be able to use to fund future energy efficiency projects. These non-traditional financing options include use of bonds and revolving loan funds.

Other topics covered at the workshops were Fundamentals of Energy Savings Performance Contracting, how performance contracting has benefitted the Commonwealth of Kentucky, energy saving strategies in water and wastewater, financing, and a panel discussion of all topics. Performance contracting was discussed as a way to enhance facilities without having to increase rates. The workshop was designed to give an introductory view of performance contracting and also facilitate networking opportunities.

A pilot Water and Wastewater Energy Efficiency Workshops was held at the Bluegrass Area Development District in Lexington April 7th, 2011. Subsequent workshops were held at the Cumberland Valley Area Development District, in London July 20th, 2011, Pennyriple Area Development District in Hopkinsville July 21st, 2011, Northern Kentucky Area Development District in Florence August 24th, 2011, and the FIVCO ADD in Grayson August 25th, 2011. The primary presenters at these workshops were speakers from members of the Kentucky Energy Services Coalition (ESC), a representative of the Kentucky Infrastructure Authority and a case study from the Finance and Administration Cabinet. ESC is a national nonprofit organization composed of a network of experts from a wide range of organizations working together at the state and local level to increase energy efficiency and building upgrades through energy savings performance contracting.

Green Bank of Kentucky

The Green Bank of Kentucky was created by an administrative order of the Finance and Administration Cabinet (FAC) in July 2009 and is funded by \$14.17 million federal stimulus dollars through the American Recovery and Reinvestment Act (ARRA). Green Bank is administered by FAC through a partnership with the Energy and Environment Cabinet (EEC), Department for Energy Development and Independence (DEDI).

One of the primary purposes of the Green Bank is to offer supplementary financing to traditional sources to make a project go. Initially, the minimum amount that may be borrowed is \$50,000.

Energy loans, including secondary loans, may be used for construction, upgrades or retrofits that are intended to result in reduced energy usage and costs. Loans may also be used to pay for certain administrative costs associated with an energy project. Projects may involve one or more measures for individual or multiple sites.

The Green Bank is a revolving loan fund for energy performance service contracts (ESPC) on state-owned facilities. Since its creation, Green Bank has financed nine projects for a total of \$14.4 million. With the initial balance of funds loaned out, hereafter funds repaid into the Green Bank will be 'rolled over' to finance future energy-efficient improvements in other state buildings on an on-going basis.

Kentucky Green Bank loans given to date:

KY Department of Education - \$1.3M ESPC loan at 3.25% for 14 years

- Kentucky School for the Blind, Louisville
- Kentucky School for the Deaf Danville
- Future Farmers of America Training Camp, Hardinsburg

Department for Veterans' Affairs - \$2.2million ESPC loan at 2.25% for 15 years

- East Kentucky Veterans Center, Hazard
- Western Kentucky Veterans Center, Hanson
- Thomson-Hood Veterans Center, Wilmore

Kentucky Educational Television – \$1.8M ESPC loan at 3.25% for 14 years

- Kentucky Educational Television Network Center, Lexington

KY Finance and Administration Cabinet - \$2.8M

- \$114,000 eSELF loan at 3.25% for 3 years
Old Capitol Campus, Frankfort
- \$171,000 eSELF at 3.25% for 10 years
701 Holmes Street paint shop and office
Fleet Administration and Garage, Frankfort
- 2.6M loan at 2.25% for 14 years

Frankfort Convention Center	Library and Archives
Capitol Plaza Hotel Parking Garage	Kentucky History Center
Capitol Tower Parking Garage	Bush Building
	Public Service Commission
	Surplus Property

Upgrades that were made in the majority of buildings include lighting retrofits; installing all low-flow toilets and sinks;
 * HVAC and BAS control retrofits; programmable thermostats; building envelope improvements.



Commonwealth Energy Management and Control System

In 2008 Governor Beshear unveiled his energy plan for the Commonwealth, Intelligent Choices for Kentucky's Future. The plan has set forth a goal of reducing energy consumption in state buildings 15% by the year 2015 and 25% by the year 2025 with the goal of "leading by example."

In order to meet the goals set forth in the plan, a pilot project, Commonwealth Energy Management and Control System (CEMCS) was introduced by the Kentucky Finance and Administration Cabinet through their Department for Facilities and Support Services and it was created using a \$3.65 million energy management grant from the American Reinvestment and Recovery Act (AARA). The goal of this project is to gain a complete understanding of the energy consumed to operate state facilities each day and the means to manage energy consumption.

Using groundbreaking software that creates data-driven analysis and by implementing low-cost building operation adjustments, more than \$600,000 in annual savings is expected from the pilot of 43 buildings at 23 sites across the state. This software tracks energy usage in state buildings, maintains and monitors building systems, provides electronic audits of current and historical utility bills and generates alerts if usage exceeds parameters for determined energy usage.

CEMCS will provide an opportunity to look at utility usage and billing for each facility and set a baseline for normal use and operating costs. It also provides the means to rank all buildings based on their energy use per square foot and allow for further investigation of facilities that are deemed energy inefficient, thus helping prioritize energy efficiency retrofit projects and expenditures. It will also allow facility managers to make informed decisions about HVAC and light operations, providing the ability to turn off systems when appropriate.

Upon completion of the pilot project, it is expected to be integrated into all state governmental facilities.



<http://kyenergydashboard.ky.gov>

- A public website is available where visitors can learn about each of the buildings involved in the pilot and view the energy unit and dollar savings in real time.

“ This advanced, high-tech system is truly forging the way for how our government will view and conserve energy now and in the future. CEMCS is yet another big boost toward Kentucky’s reputation as a national leader in green innovation and efficiency. The pilot is already saving taxpayer dollars in utility costs and reducing energy consumption. ”

- Kentucky Governor, Steve Beshear

Energy Efficiency & Conservation Block Grants

The Energy Efficiency and Conservation Block Grant (EECBG) program, funded by the American Recovery and Reinvestment Act (ARRA) of 2009, offered a major investment in our local communities. Local and state governments received assistance in developing, promoting, and implementing renewable energy and energy efficiency and conservation programs.

● Direct Formula Grants **INSERT PAGE NUMBER**

In Kentucky, 20 of the states most populated cities and counties received awards directly from the US DOE. These local communities were required to submit a proposed Energy Efficiency and Conservation Strategy which included a proposed plan for the use of the funds, as well as the goals to be accomplished. The proposed strategies had to be approved by US DOE and had to follow DOE's list of 14 eligible activities for the EECBG program. The following local governments received direct EECBG awards totaling \$14,955,500.

● DLG **INSERT PAGE NUMBER**

Funding was provided for 57 projects throughout the Commonwealth to implement energy efficiency, energy conservation, and renewable energy projects. The most any one community could receive was \$125,000, although some communities working together could ask for proposed funding to be combined and go toward a specific project. Total funding being provided to small cities and counties under this program is \$6,302,226. Opportunities to fund additional projects may exist if some projects come in under the estimated budgets.

Along with direct awards to local communities, states also received EECBG awards from with the requirement that at least 60 percent of the state's award had to be made available to the smaller cities and counties that did not receive a direct allocation from DOE.

DEDI partnered with the Department for Local Government (DLG) to administer that portion of the funding reserved for the smaller cities and counties. DLG issued the Request for Proposals (RFP) and received and reviewed applications from local governments to perform activities based on the 14 criteria outlined in the federal funding opportunity announcement. DLG received approximately 120 applications totaling more than \$12 million.

● Net Zero **INSERT PAGE NUMBER**

Warren County School District received \$1,422,588 from EECBG funds to partially match existing school funding to bring Richardsville Elementary School to net-zero or near net-zero energy use. Detailed information is provided in the Energy in Education Collaborative section of this report.

● KDHBC: Training & Inspections **INSERT PAGE NUMBER**

The Kentucky Department for Housing Buildings and Construction received ARRA funding to provide education and training to local and state code enforcement officials responsible for residential and commercial building energy codes as well as funding for inspectors statewide to achieve 90 percent compliance with new energy-efficient building codes within six years. The Commonwealth now requires permits and inspections for all new construction projects and heating, ventilating and air conditioning (HVAC) installations statewide, making it the first state in the nation to do so.

In 2011, Senate Bill 10's statewide HVAC permitting and inspections program was well underway. As of October 30, KDHBC issued more than 4200 residential and commercial HVAC installation permits and totals continue to climb.

Those numbers, along with the permits themselves, and all other HVAC-related processes are now more accessible thanks to a program called Jurisdiction Online (JO). With help from federal funding, KDHBC was able to launch this web-based information management program this year. JO enables all divisions: licensing, permitting, inspections, violations or consumer complaints, to conduct work through one central program while maximizing efficiency and accuracy.

Throughout 2011, a series of training opportunities were provided to residential and commercial construction professionals throughout the state. Residential curriculum development and training delivery were provided by the Alliance to Save Energy. And commercial training and delivery were provided by the University of Kentucky in conjunction with Pacific Northwest Laboratories.

KDHBC Inspections

In compliance with 815 KAR 8:070 passed in 2007, KDHBC was required to establish a fee schedule, issue permits and perform inspections of all new HVAC installations in Kentucky, starting January 1, 2011. There were no funds appropriated by the Kentucky General Assembly at that time. This federal grant allowed KDHBC to hire and train 16 certified HVAC inspectors on a time-limited basis before the January 1 deadline to assist with the roll-out of the permitting program. The permit fees being collected are allowing the migration of the time-limited inspectors to full-time status. All 16 should be permanent state employees by December 2011. Direct formula grants are listed below. DEDI did not administer or manage these grants, they were managed by U.S.DOE.

City	Amount	County	Amount
Bowling Green	585,600	Boone	368,100
Covington	188,500	Bullitt	289,900
Florence	126,400	Campbell	351,600
Frankfort	132,100	Hardin	426,500
Henderson	123,100	Kenton	465,200
Hopkinsville	143,600	Laurel	246,000
Lexington-Fayette	2,753,800	McCracken	289,900
Louisville-Jefferson	7,000,400	Oldham	222,200
Owensboro	557,200	Pike	282,800
Richmond	145,600	Pulaski	257,000

QUOTE



Agriculture

On-Farm Energy Efficiency Initiative

In October, 2009, Governor Steve Beshear announced the availability of stimulus funds for on-farm energy efficiency improvements in Kentucky. On-Farm Energy Efficiency & Production incentive grants were created as a result of the partnership between the Governor’s Office of Agricultural Policy (GOAP) & the Kentucky Department for Energy Development & Independence (DEDI), with funding from the American Recovery & Reinvestment Act (ARRA), through the U.S. Department of Energy (DOE). Recipients of these energy stimulus incentives have received 25% reimbursement of the actual cost of a federally qualified energy savings project up to \$10,000. The grants have provided enormous benefit to Kentucky’s farm families and positioned Kentucky agriculture as a leader in on-farm energy efficiency.

There have been three funding cycles with awards totaling more than \$1.4 million. The types of producers that have taken advantage of this program are primarily poultry, grain, and dairy. Horticulture and farm shops have also received funding for energy efficient upgrades.

“ An audit helps the farmer identify where their energy dollars are going and what they can do about it. Our On-Farm Energy Efficiency & Production grant has enabled farmers to accomplish their energy efficiency goals while reducing environmental impact. Thus, allowing Kentucky agriculture to become more sustainable and lucrative. ”

- Governor’s Office of Agricultural Policy, Angie Justice

Though the number of grain applications has steadily increased over the course of the three-year cycle, poultry applications have surpassed all other enterprises. In 2009, only six poultry applications were funded. That number dramatically increased to 43 applicants in the 2011. Dairy applications have also increased with each funding cycle. As well as, farm shop and horticulture upgrades.

With the prices of fuel and utility costs continually escalating, more farmers are seeking alternate ways to save energy and money. There are many energy efficiency options that make farming operations less energy exhaustive and more profitable. By controlling energy costs, our farmers can start saving significant revenue, and can reinvest resources in their families and operations. Farmers can have energy audits conducted to help determine how much energy and savings are possible with upgrades to specific equipment, usage patterns, and costs.

Dairies are one of the most energy intensive farm industries. An average dairy uses between 800-1,200 kWh’s of electricity per cow annually. William Crist operates Crist Dairy in Metcalfe County. Mr. Crist is one of many dairy producers who, after making energy efficient upgrades, can testify to dramatic energy savings. Mr. Crist states, “I am already seeing a \$1,500 reduction in our electric bill each month.”

Crist Dairy has 500 lactating cows that are milked 3 times a day. He received funding(\$10,000) that helped him purchase and install: automatic take-off's which preset the flow level at which milking claws are removed, preventing over-milking and reducing the run-time of the vacuum system.

● Energy Efficiency in Poultry

As little as 50 years ago, birds were heartier and could withstand temperature fluctuations more easily. Modern birds are unable to cope with temperature swings, thus a birds environment must be carefully monitored at all times. Fortunately, technology has improved dramatically in 50 years enabling growers to raise successful flocks of birds. It is a major role in Kentucky's agricultural economy. The fact that it is a \$900 million industry is proof that it is a positive economic engine for the state. Poultry ranks as Kentucky's no. 1 agricultural commodity and is the no. 1 food commodity.

Poultry growers generally use a lot of energy, often second only to dairy. They have ample opportunities to reduce their energy use. Often, upgrades can have a payback period of just a few years. The installation of ventilation fans provide viable ventilation, especially during warm months when the right mix of air is critical.

Mr. Lewis said, "Knowing that this grant was available and that I qualified definitely motivated me to do the upgrades. I lost 26,000 chickens due to the extreme heat last summer. The new ventilation system will help prevent this type of loss in the future."



The net result is reduced heat stress, increased animal comfort, and the ability to maintain productivity in hot weather.

Allen Creek Poultry's project was completed in August, 2011. An energy audit conducted by George Stamper, Certified Energy Manager, indicates an estimated annual energy savings of \$10,647. Mr. Lewis has already seen an 80% reduction in his energy bill and is saving 575,240,000 BTU's of energy.



“ Various energy efficiency improvements are eligible under the On-farm Energy Efficiency Program, funded by ARRA. A primary economic benefit in poultry energy efficiency upgrades is the reduction in heating fuel consumption, usually propane or natural gas. ”

- Governor's Office of Agricultural Policy, Angie Justice

● Efficient Grain Drying



Many of Kentucky’s grain producers are incorporating energy efficiency by purchasing and installing energy efficient grain drying systems on their farm.

“With prices for most energy sources up significantly, grain producers are looking for ways to reduce the cost of drying grain on the farm,” said Angie Justice, governor’s Office of Agricultural Policy.

The dryer that Mr. Garnett replaced was inefficient by today’s standards. The old drying system, although it used low temperatures, dried grain over a period of “weeks” instead “hours” like the new system does.

Mr. Garnett’s project total cost was \$199,994. An energy audit performed by Bruce Everly, Certified Energy Manager, estimates a projected annual natural gas energy savings of \$110,629. His farm operation will be saving almost 6 billion BTU’s each year.

All heat from the cooling grain is recycled resulting in a very efficient dryer operation. Computerized controls greatly reduce over drying of corn and the tower system also promotes more even drying, higher test weights, and also helps reduce operating costs by up to 30%. More efficient burners make the actual combustion of fuel more efficient.

● Greenhouse Energy Efficiency Improvements

Greenhouse gardeners are just as concerned about using less energy as the dairy, poultry, and grain producer. Energy efficiency upgrades to greenhouses are essential to keep operating costs at a minimum. Heating and cooling system upgrades are very common. Also, irrigation system improvements and insulation are common upgrades. Converting to a drip irrigation or linear/pivot system can help save both water and energy by applying water to field crops more efficiently and reducing the amount of evaporation.

Proper insulation is an essential part of the energy-efficiency formula, lowering costs and providing comfort year round while saving energy, reduces heating and cooling costs. Greenhouses can be made efficient in the colder season by using heaters that provide the required higher temperature for the growth of heat sensitive plants. The owner of Cook’s Greenhouse in Daviess County can attest to this statement.

James Cook decided to replace 2 older natural gas furnaces with newer models. He received funding during the 2011 cycle of the On-Farm Energy & Production Program. When asked why he decided to upgrade, Mr. Cook reported “The older furnaces had a lot of normal wear and degradation which was decreasing efficiency.”

The new furnaces that Mr. Cook installed are equipped with a power exhauster feature and the exhaust routing is expected to vent inside the greenhouse (versus outside for the older model). This feature raises the furnace efficiency to 93%. Mr. Cook’s total project cost was \$1,740. His energy audit predicts a 16% energy cost reduction of \$160 annually in natural gas savings. Cook’s Greenhouse is saving 1,012,000,000 BTU’s each year due to this upgrade.

Commonwealth Agri-Energy

Commonwealth Agri-Energy, LLC is wholly owned by the 2300 members of the Hopkinsville Elevator Company Cooperative. Being 100% farmer owned gives the ethanol plant the unique ability to provide value added income to the patrons of the elevator based on the bushels delivered. The facility is located adjacent to the Casky Branch of Hopkinsville Elevator on Pembroke Road in Hopkinsville, Kentucky and is one of 204 ethanol plants in 29 states across America.

The plant produces approximately 33 million gallons of ethanol, utilizing 33,000 bushels of corn per day, and 12 million bushels per year. The business also produces about 97,000 tons of DDGS (Distillers Dried Grain & Solubles), 75,000 tons of CO₂ (captured and sold), and 3,000 tons per year of animal feed grade corn oil.

The Quarry Lake Water project was conceived as a way for Commonwealth Agri-Energy, LLC to reduce energy consumption and be more competitive by reducing its costs per gallon of ethanol produced.

Commonwealth Agri-Energy applied for funding under the “Multi-County Agricultural Energy Initiative” as a way to help finance the project. The multi-county initiative is a partnership between the Governor’s Office of Agricultural Policy and the Department for Energy Development and Independence that encouraged regional collaboration by providing a 1:1 match with American Recovery & Reinvestment Act (ARRA) funds and state Agricultural Development Funds for agriculturally related renewable energy projects.



The Quarry Lake Project was designed to use the cold water from the onsite quarry lake to replace water from the cooling tower previously used in their production process. [see image 1] A new 5,000 gpm pump was installed, with sufficient pipeline to bring the 50 degree water from the lake into the ethanol production facility.

The costs in equipment and installation for the project exceeded \$500,000. Total outside funding, including the ARRA, state, and local funds from Christian and Trigg, and Todd counties totaled \$220,000. The annual savings after project completion is calculated to be over \$100,000 per year as electricity savings, mostly in the summer months.

“The Quarry Lake Project was a valuable addition to our plant this long, hot summer,” stated Mick Henderson. “We were able to lower our electricity costs in the highest priced season of the year.” After seeing the results of this energy efficiency project, the facility is considering additional projects in the future. Potential modifications for yield

and efficiency improvements in fermentation, heat recovery, and evaporation are being researched, as well as a new boiler and electric generator to reduce our electricity requirements. Investigation is underway on the potential costs and returns to add product storage and a plant expansion from 33 to 48 million gallons per year is in the planning stage utilizing new technologies. Biomass to displace natural gas is being investigated along with cellulosic processes that may work within the facility.

This project could not have been accomplished without the availability of the ARRA funds through the GOAP/DEDI partnership, coupled with the Kentucky state funds and the local county funds. Thanks to this funding, the facility was able to achieve the goal of lowering energy and therefore productions costs to produce ethanol in a highly competitive marketplace.

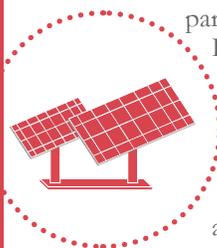


Utilities

Smart Grid

As energy demand is increased by our industry, homes and devices, state and national policy makers are working with utility companies to invest in what is referred to as smart grid technologies. The goal of both public servants and utility distributors is to create a smarter, more efficient power grid that has the capability to keep up with our ever-rising energy needs.

Six electric cooperatives: Warren RECC, Jackson Energy Cooperative, Owen Electric Cooperative, Blue Grass Energy, Nolin Rural Electric and Hickman-Fulton Counties Rural Electric, have accelerated the modernization of electricity delivery in Kentucky as part of the DEDI Utility Smart Grid Initiative. These cooperatives received smart-grid grants funded by the American Recovery and Reinvestment Act, and distributed through the US Department of Energy.



The ultimate goal of the smart grid initiative has been to promote the modernization of the grid, thereby providing long-term, significant energy and cost savings for Kentucky rate-payers. Throughout the past year, these companies have installed advanced meter infrastructure allowing customers to see and control their own real-time energy usage from an in-home display, and distributed automation equipment to reduce system energy losses and improve reliability.

Specific programs and energy savings are discussed below.

Smart Grid Awardees-Project Descriptions

Warren REEC

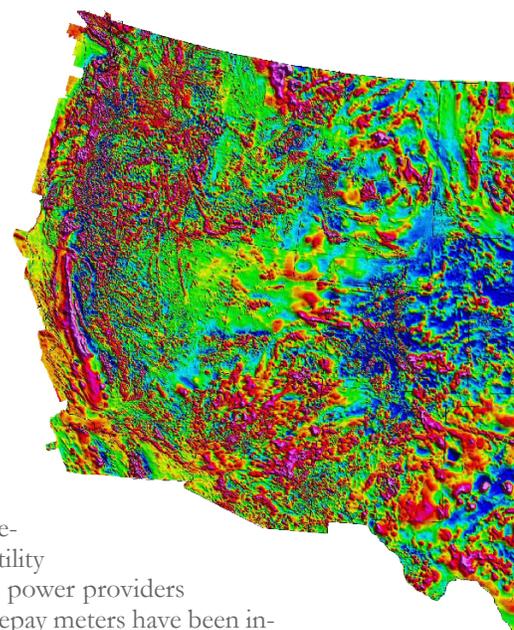
Warren County RECC installed and upgraded communications equipment, including 14 miles of fiber optic cable throughout its distribution system, to enable the operation of advanced meter infrastructure. This has allowed customers to see their own real-time energy usage from an in-home display and reduced the number of times utility staff had to visit customer homes.

Blue Grass Energy

Blue Grass Energy installed distribution automation and installed in-home displays on a pilot basis. The system has cut electric losses and improved reliability through adaptive recloser controls, optimized feeder voltage profiles during normal operation conditions, and reduced load demand through voltage optimization. The project has increased customer awareness of energy usage and enabled them to monitor and control their total energy consumption.

Hickman-Fulton RECC

Hickman-Fulton installed 200 smart meters capable of recording and transferring demand side end-use data back to a central office server. The information allowed the utility to be better prepared for more efficient retail rate and pricing designs as wholesale power providers move toward more time-dependent demand and charge structure. Fifty prepaid meters have been installed allowing customers to monitor and control their own energy consumption, reduce security deposits, eliminate reconnection charges and reduce energy consumption.



Owen Electric Cooperative

Owen Electric Cooperative created the Penn Station Self-healing Project in Scott County, by installing voltage regulators, switches, controllers, monitors, and communications equipment. The Coop also established a voluntary peak load-reduction program called, 'Beat the Peak' that alerts customers when systems are operating at 'peak' conditions.

Nolin RECC

Nolin RECC implemented a prepaid electric meter program to give customers control of their energy usage, reduce security deposits, eliminate reconnection charges and reduce energy consumption.

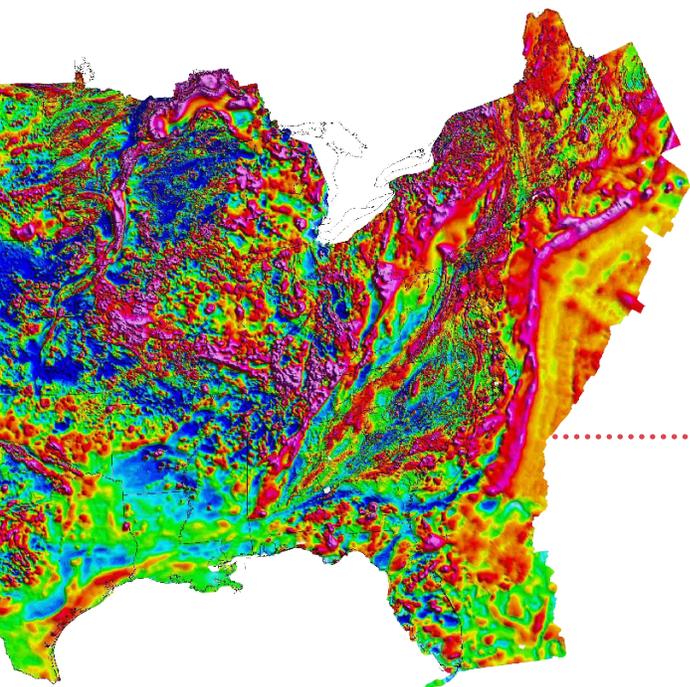
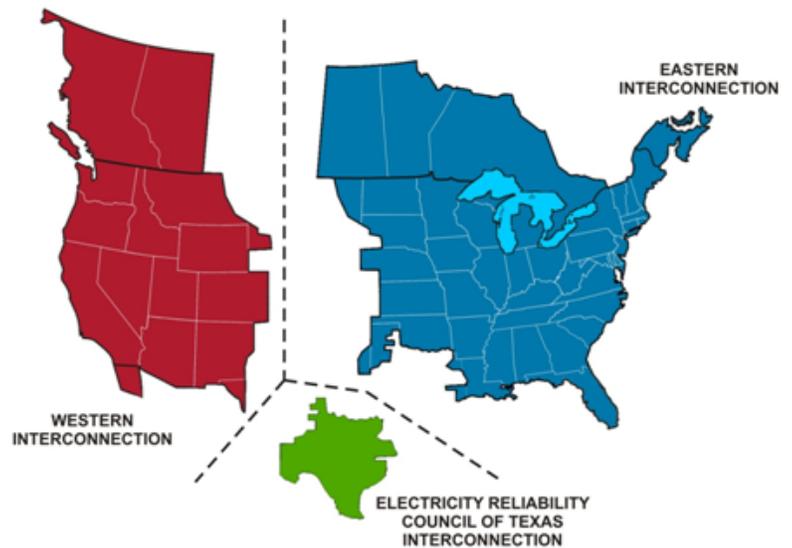
Jackson Energy Cooperative

Jackson Energy Cooperative also implemented a pre-pay electric meter program to give customers control of their energy usage, reduce security deposits, eliminate reconnection charges, and reduce energy consumption.



The continuous U.S. power grid consists of three loosely connected parts, referred to as interconnections: eastern, western and Texas. Within each, high-voltage power lines transmit electricity from generating sources such as coal or hydroelectric plants to local utilities that distribute power to homes and businesses.

North American Electric Reliability Corporation Interconnections



Public Education on Coal Issues

Kentucky Revised Statute 132.020(5) authorizes funding to the Energy and Environment Cabinet from the un-mined minerals tax collected each year for the purpose of public education of coal related issues. DEDI has the responsibility to solicit proposals each year from non-profit agencies having the experience and expertise to successfully conduct programs or activities. The department selected six projects for 2010, which are highlighted in the table below.

Coal Education Grants

Awardees	Amount	Project Description	Start Date	End Date
Southeast Education Foundation	\$115,000	The SE Education Foundation will enhance the visitors' experience and advance the educational benefit of the Coal Museum and Portal 31 in eastern Kentucky.	7/1/2011	6/30/2012
Coal Education Development and Resource (CEDAR)-East	\$85,000	CEDAR will use its grant to develop coal educational materials and sponsor a coal fair for K-12 students in 12 eastern Kentucky counties.	7/1/2011	6/30/2012
Coal Education Development and Resource (CEDAR)-West	\$50,000	CEDAR will use its grant to develop coal educational materials and sponsor a coal fair for K-12 students in 6 western Kentucky counties.	7/1/2011	6/30/2012
University of Kentucky Center for Applied Energy Research and the Visualization Center	\$120,000	Two University of Kentucky Centers will collaborate to produce 7 coal education videos for students in K-12 to expand their awareness and knowledge of coal issues	7/1/2011	6/30/2012
Kentucky Mining Institute	\$30,000	KMI will continue the project of updating and revising the Coal Mining Reference Book. This is an essential text for mining foremen and supervisors.	7/1/2011	6/30/2012
University of Kentucky Gatton School of Economics	\$150,000	Two University of Kentucky Centers will collaborate to produce 7 coal education videos for students in K-12 to expand their awareness and knowledge of coal issues	11/1/2010	12/31/2012

Awardees	Amount	Project Description	Start Date	End Date
University of Kentucky Center for Applied Energy Research (CAER)	\$172,000	CAER will continue the development of the energy education club at the University of Kentucky and charter clubs at other interested Kentucky colleges and universities. The clubs' goal is to attract and motivate students about energy careers.	8/1/2010	6/30/2012

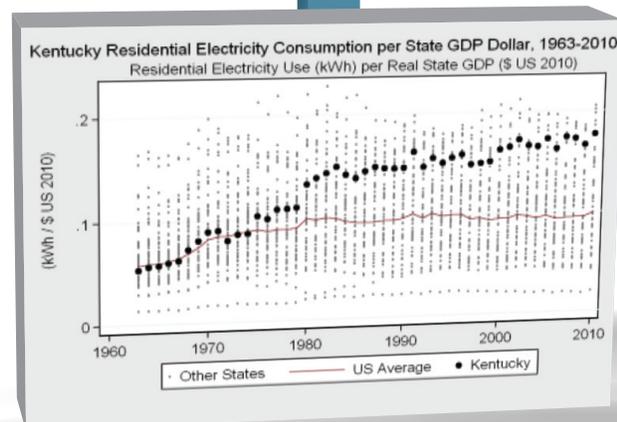
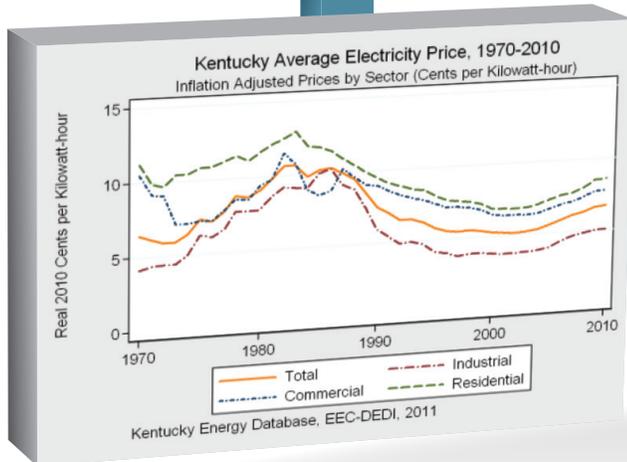
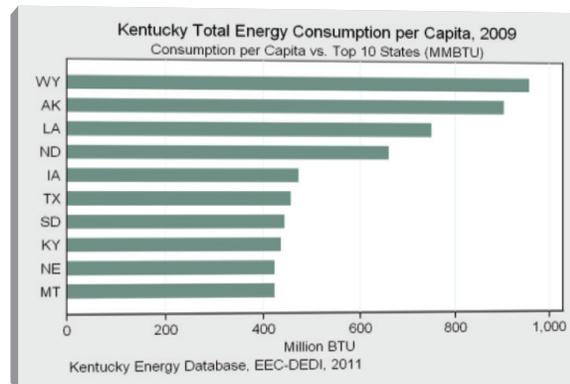
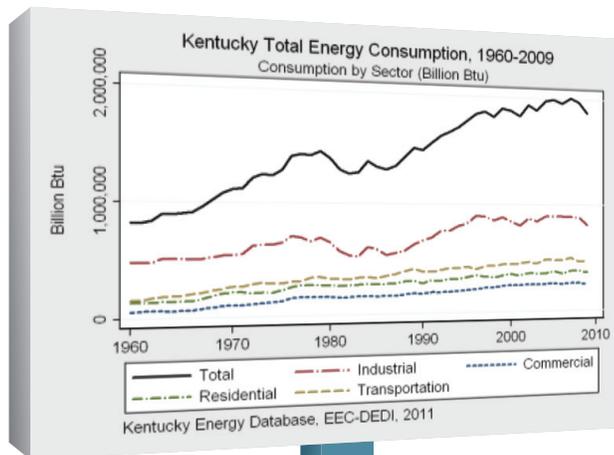
Energy Commercialization & Research Grants

Under the enacted biennial budget, DEDI received appropriated funding from the general assembly to support research projects relating to; clean coal, new combustion technologies, thin-seam coal extraction, safety, tracking and communication devices, coal slurry disposal and synthetic natural gas produced from coal through gasification processes, and the development of alternative fuels produced by processes that convert coal or biomass resources or extract oil from oil shale and other coal research. These research dollars are used to provide benefits to Kentucky's Local Government Development Fund eligible counties. The supported projects are explained in the table below.

Awardees	Amount	Project Description	Start Date	End Date
ecoPower Generation	\$350,000	ecoPower Generation is completing engineering design and procurement of a 50-megawatt biomass-to-electricity plant in Perry County. The total value of the plant will be over \$150 million and it is projected to create 40 new full-time positions.	7/1/2011	6/30/2012
University of Kentucky Center for Applied Energy Research (CAER)	\$1,000,000	The Carbon Management Research Group is an industry-university-government consortium dedicated to developing a cost-effective and efficient flue gas CO2 capture process for coal-fired utility plants. This grant is matched with \$1,200,000 from industry. In 2011 the group received a \$14 million grant from DOE for a demonstration facility.	7/1/2011	6/30/2012
University of Kentucky Center for Applied Energy Research	\$200,000	CAER is developing a coal-to-liquid research and demonstration facility that is matched with \$1.9 million in federal grant funds.	8/1/2011	6/30/2012
University of Kentucky Center for Applied Energy Research	\$762,000	CAER is developing an algae-based process for CO2 mitigation from coal-fired power plants. The project will move into a slip-stream demonstration phase at a working power plant.	7/1/2011	6/30/2012
Ecopower Solutions, Inc.	\$200,000	Ecopower Solutions will use the grant funds to enhance the operation and monitoring of its COMPLY 2000 demonstration units. These units effectively remove pollutants from flue gas to improve coal-fired utilities' compliance capability and economics.	7/1/2011	6/30/2012

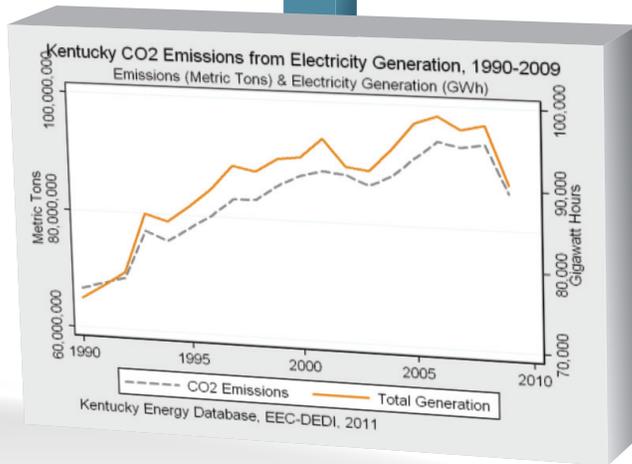
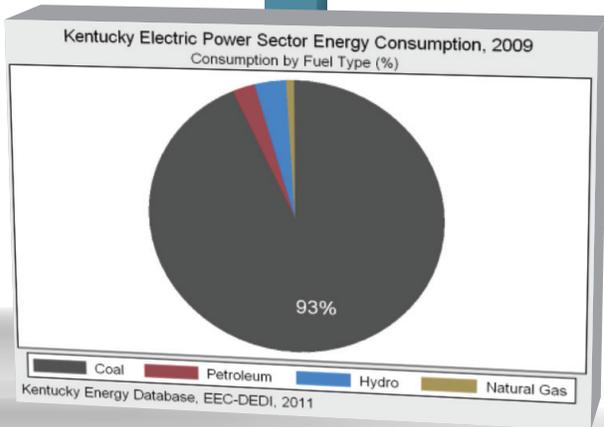
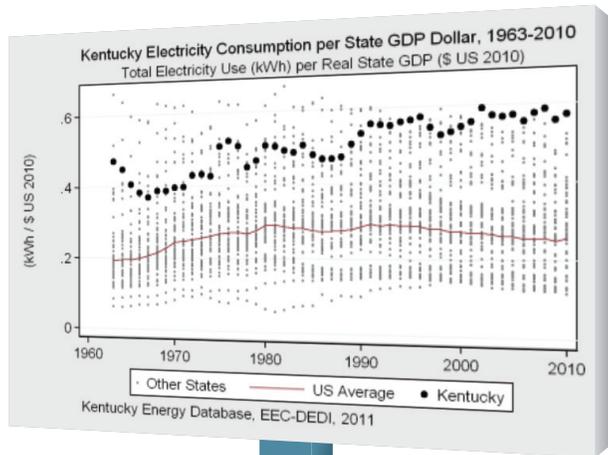
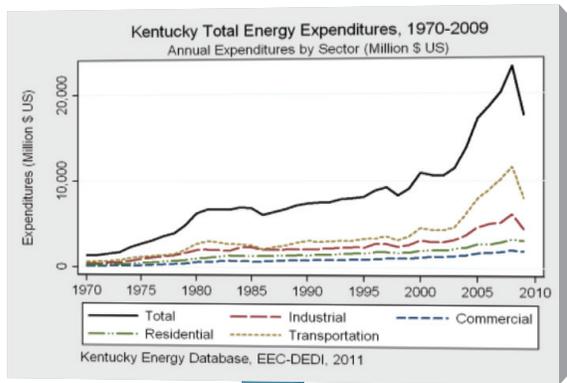
Awardees	Amount	Project Description	Start Date	End Date
University of Kentucky Department for Mining Engineering	\$200,000	The department will conduct an in-depth study of coal mine respirable dust, including a statistical analysis, to determine the impact of a proposed respirable dust rule on coal mine operations and miner safety.	7/1/2010	6/30/2012
University of Kentucky Department for Mining Engineering	\$210,000	The department will design and test the use of polycarbonate materials for the construction of coal mine safe havens that are safer and more effective during coal mine emergencies.	7/1/2011	6/30/2012
Kentucky Geological Survey	\$53,000	KGS will study and map Kentucky's resources of metallurgical coal. This material, prevalent in eastern Kentucky, is used in steel production and has a high value and demand.	7/1/2011	6/30/2012

Kentucky Energy Snapshot - 2009



In 2009, energy consumption in Kentucky totaled just over 1.8 Quadrillion Btu and placed Kentucky 8th highest for total energy consumption per capita. This amount reflected a 5% drop in statewide energy consumption compared with 2008 resulting from the national economic slowdown. Kentucky's total 2009 energy expenditures were over \$17.4 Billion and were focused most heavily in the transportation sector through the purchase of gasoline, diesel, and jet fuel. Total energy expenditures fell by 24% as a result of falling prices for crude oil and natural gas during this time. Even with lower expenditures Kentucky is positioned 7th highest in terms of energy expenditures required to produce \$1 of state GDP.

Kentucky enjoyed the 3rd lowest average price of electricity in the country. This inexpensive electricity led residential consumers to have the 6th highest electricity consumption per capita, while Kentucky maintained the single most electricity-intensive economy in the United States [electricity per GDP dollar]. Additionally, the generation of electricity in Kentucky was fueled almost entirely (93%) by the combustion of coal, while total electricity generation and electric power carbon dioxide emissions fell by 7% and 8%, respectively, for the year.



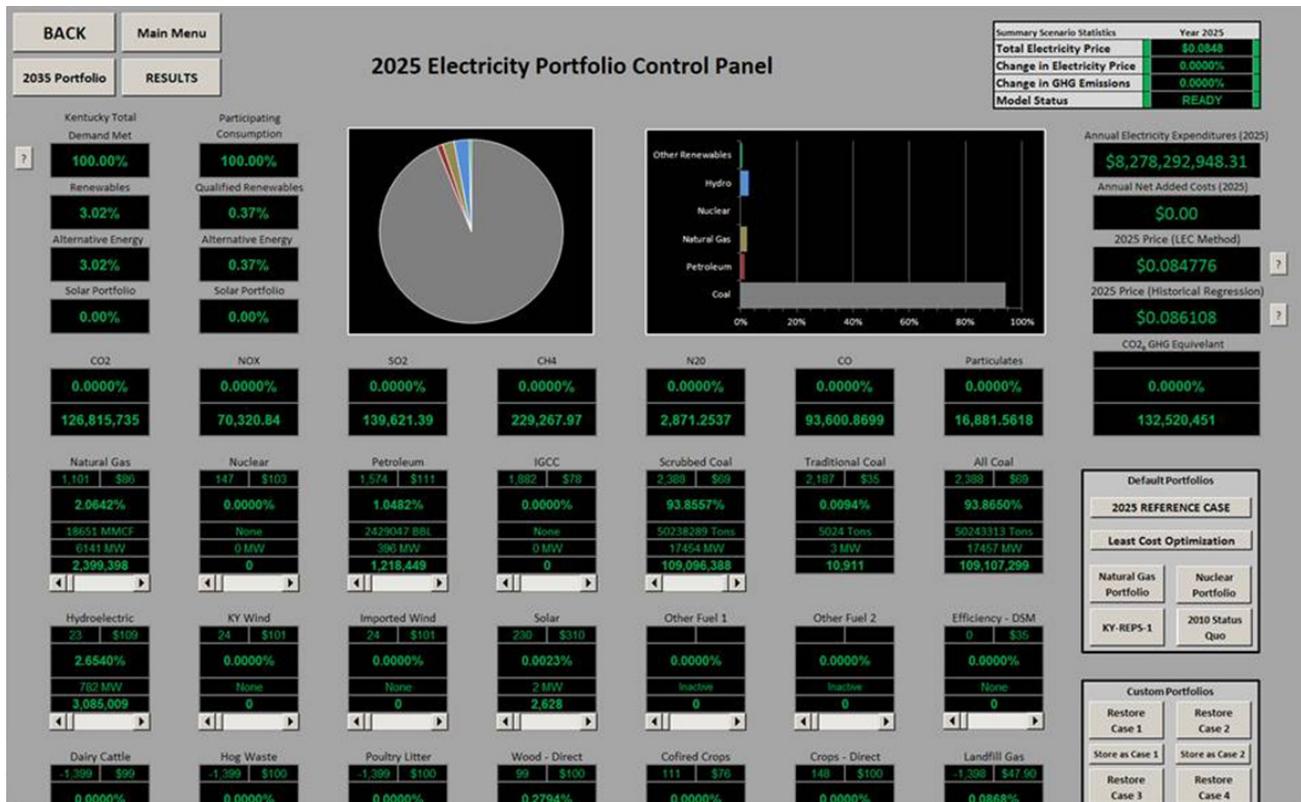
Kentucky was a net exporter of energy resources in 2009. Driven overwhelmingly by coal mining - predominantly in Eastern Kentucky - along with natural gas drilling, renewable energy production, and crude oil extraction, the Commonwealth produced over 2.8 Quadrillion Btu for the year. This represents a 10% decrease in energy production compared with 2008, however, this amount places Kentucky 5th nationally in terms of total energy production, and qualified Kentucky as the third largest producer of coal behind Wyoming and West Virginia.

Did You Know?

In 2010, mining accounted for 2.7 percent of the Commonwealth's GDP while manufacturing represented 17.1 percent of total GDP.

The Kentucky Electricity Portfolio Model

The Kentucky Electricity Portfolio Model is an interactive computer model developed by the Kentucky Department for Energy Development and Independence to analyze macro level implications of changing the Commonwealth's electricity generating portfolio under a variety of conditions.

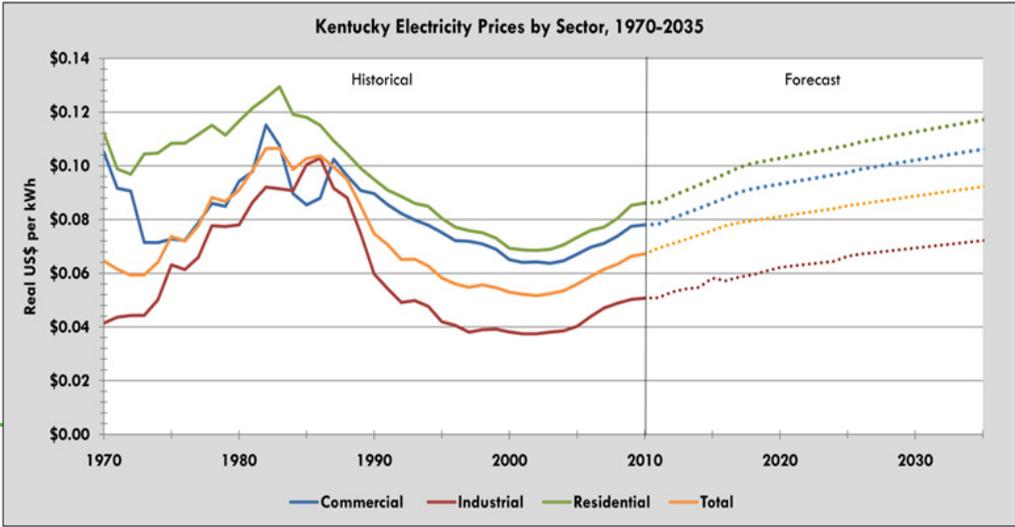


From the model's control panel, users can interact with Kentucky's 2025 electricity generating portfolio by moving toggles that reallocate the proportion of electricity being produced from each energy resource. For example, while Kentucky has historically met electricity demand using Kentucky coal, users can change the energy mix for electricity generation to other energy resources (natural gas, renewable energy, efficiency, etc.). The model provides the user with instant visual feedback on the costs, air emissions, and fuel consumption requirements associated with the changes the user has made. The user can also see the potential impact that a portfolio standard requirement, like a renewable portfolio standard, might have on electricity price and demand. The model is also capable of optimizing the generating portfolio to identify the least-cost means of meeting electricity demand under a given set of parameters.

The model's dashboard is designed to be quick, flexible, and educational. To this end, department staff have pre-loaded the model with default values for all relevant variables; however, users can themselves view and modify all underlying assumptions including future electricity demand by economic sector, consumer sensitivity to changes in price by sector, environmental regulations, generating costs, fuel prices, carbon penalties, and emissions factors.

The model processes user changes to the generating portfolio and other assumptions to forecast long-term electricity demand, price, price volatility, as well as generation capacity requirements, fuel consumption, and air emissions — including greenhouse gas emissions — from the year 2011 to 2050 for the Commonwealth as a whole. The model relies upon the Kentucky Energy Database, which was developed to supply the historical time series necessary to build and calibrate the algorithms in this model.

Kentucky Electricity Portfolio Model, like all models, can not predict the future with certainty; however, it does provide the capability to analyze trends and potential outcomes that result from changes in our electric generation energy mix. It is designed to help Kentucky's leadership make better and more informed decisions about our future.



“We have developed a unique capability to help us analyze the economic and environmental impacts that may result from changes in our electric power generation profile. . . [this model] will serve us well as we address the new challenges and opportunities that lie ahead.”

- Secretary Len Peters, EEC