

CYBER SECURITY

Emerging technologies — regardless of industry — always open new avenues of risk. Duke Energy is continually assessing and improving its security plan to keep pace with growing cyber-threats, regulatory and oversight expectations, and evolving digital grid technologies.

Duke Energy's digital grid components are protected with layers of cyber and physical security:

- The company employs skilled information technology experts who constantly monitor our system's security.
- Our active relationships with manufacturers and regulators help ensure that we have a broad view of real-time cyber-security threats and can respond to them appropriately. We review security as part of the new-technology design process, and include security requirements when procuring new equipment. We also test new equipment, and request upgrades and fixes if problems are identified.
- Our robust cyber-security policies help ensure the safety of our power delivery system, including the digital grid.

Indiana

Duke Energy Indiana's original proposal to install 800,000 smart meters was rejected by the Indiana Utility Regulatory Commission (IURC) in late 2009. But the commission asked us to come back with a scaled-back smart grid rollout plan.

- In April 2010, we filed a plan to install 40,000 smart meters and distribution automation, and to pilot time-of-use rates, electric vehicles, distributed solar generation and stationary battery storage.
- The test area includes 39,000 residential customers and 1,000 commercial customers just north of Indianapolis.
- We will collect pilot data for a year. We then hope to be able to demonstrate to regulators that the programs should be implemented across our service territory.
- Duke Energy presented the plan during an IURC hearing in July 2010. We anticipate a ruling in 2011.

Kentucky and the Carolinas

We're working through the planning process to finalize full-scale deployment plans in Kentucky and the Carolinas. In the meantime, we will use information from our North Carolina pilot programs and our Ohio rollout to enhance the customer experience in our other service territories.

DUKE ENERGY PREPPING FOR ELECTRIC VEHICLES

In late 2010, manufacturers like General Motors and Nissan began deploying their new plug-in electric vehicles (PEVs) in the U.S. Duke Energy is preparing for widespread adoption through a variety of programs and partnerships. Our job is twofold: to maintain a safe and reliable power grid as demand grows for electricity as a transportation fuel, and to ensure a positive experience for our customers.

The benefits of electric vehicles are clear:

Our customers will save money.

Given today's oil prices, "filling up" an electric vehicle is a cheaper alternative to fueling gasoline-powered vehicles.

The environment will benefit.

Widespread adoption of electric vehicles will significantly cut vehicle emissions.

Electricity is a domestic resource.

Electric vehicles reduce our dependence on foreign oil and lead to more local jobs.

A plug-in electric vehicle's impact on greenhouse gas emissions depends on the source of the electricity used to charge its battery. When power is produced by nuclear or renewable energy sources, electric cars reduce emissions dramatically. However, even in regions where most electricity is produced by coal, PEVs still reduce greenhouse gases by 25 to 30 percent over conventional vehicles.

Source: www.GoElectricDrive.com

Pilot Programs

Eligible residential customers will receive electric vehicle charging stations as part of pilot programs in Indiana and the Carolinas. Duke Energy will install charging stations, as well as service the technology for the duration of the programs. When the pilot ends, participants will have the option of purchasing the charging stations at significant savings.

We recently installed electric vehicle charging stations at our Charlotte and Plainfield corporate offices, and plan installations at additional company locations in 2011. Partially funded by the American Recovery and Reinvestment Act, these installations will support pilot programs to evaluate the impact of PEVs on our power grid. For example, our own plug-in electric vehicle deployment project recently enlisted 10 Duke Energy employees to test the new Chevy Volt in North Carolina.

We will use the insights and information we gain from these pilots to design products and services that appeal to PEV owners, and to develop model regulatory frameworks for future PEV deployments.

ITOCHU Partnership

Duke Energy and Tokyo-based ITOCHU Corp. signed an agreement in November 2010 to collaborate on advanced energy technologies, starting with the evaluation and testing of second-life applications for electric vehicle (EV) batteries.

According to some auto industry estimates, EV batteries that can no longer charge to approximately 80 percent of their original capacity may be candidates for replacement. Duke Energy and ITOCHU believe these partially used batteries could live on in other applications, like supplementing home energy supply, storing renewable power or providing a fast-charging power source for EVs. By increasing the total lifetime value of batteries, second-life applications could also help reduce initial battery cost.

This pilot project will help Duke Energy and ITOCHU develop potential business models for future commercialization.

A GREENER UPTOWN CHARLOTTE

Duke Energy, Cisco, Verizon Wireless and Charlotte Center City Partners are collaborating on Envision: Charlotte, announced at the 2010 Clinton Global Initiative. The aim is to reduce energy use in our headquarters city by up to 20 percent among about 70 office buildings by 2016 — avoiding approximately 220,000 metric tons of greenhouse gases. 

Using Duke Energy's Smart Energy NowSM energy efficiency services, Envision: Charlotte will use digital energy technologies to gather data on the buildings' collective energy use. Display screens in participating buildings and throughout uptown will provide near-real-time updates.

Duke Energy is funding 70 percent of the program's cost, with Cisco and Verizon funding the remainder. In February 2011,

the N.C. Utilities Commission approved our ability to recover a portion of our costs under our energy efficiency framework.

ANOTHER STRONG YEAR FOR RENEWABLES

As the economy forces many renewable energy project developers to scale back or delay their plans, Duke Energy continues to build its wind and solar portfolio.

Winds of Change

Duke Energy Renewables, a newly named commercial business unit, added 251 megawatts (MW) of wind-generated capacity in 2010. The 51-MW Kit Carson Windpower Project, completed in November 2010, is the company's first renewable energy facility in Colorado. The 200-MW Top of the World Windpower Project near Casper, Wyo., is our second in the area and fourth in the Cowboy State.



Duke Energy's Kit Carson Windpower Project in eastern Colorado

While we met our goal of adding between 200 and 300 MW of wind energy to our portfolio in 2010, we foresee market challenges ahead. Because wholesale customers are requesting fewer bids, Duke Energy's wind business, as well as the U.S. wind power industry as a whole, may slow in 2011. However, our pipeline of potential development projects — more than 5,000 MW — creates excellent prospects for growth in 2012 and beyond.

In August 2010, Duke Energy canceled plans to erect three demonstration wind turbines in North Carolina's Pamlico Sound, between the mainland and the state's Outer Banks. After a year of in-depth study and collaboration with the University of North Carolina at Chapel Hill, we concluded that the fixed costs associated with permitting, design and construction of the small-scale project would not be economically viable. Our partnership with UNC-Chapel Hill is now focused on studies to enable large-scale offshore wind development on the ocean side of the N.C. coast.

Solar Power Shining Brightly

Proven technology and improved economies of scale helped fuel new investments in solar energy in 2010. Duke Energy Renewables acquired and completed three commercial solar farms — two 1-MW photovoltaic (PV)  projects in North Carolina and a 14-MW facility in Texas. The Blue Wing Solar Project near San Antonio consists of approximately

I'M ACCOUNTABLE

Vincent Davis
Director, Smart Energy Now Community Partnerships
Charlotte, N.C.

I'm accountable for Envision: Charlotte, a team effort to create one of the most sustainable and energy efficient urban cores in the U.S. This is an exciting, first-of-its-kind program, and it reflects Charlotte's role as an emerging "energy capital." 

We are starting out by equipping buildings in Charlotte's uptown business area with the latest in energy technologies. We'll be able to use near-real-time energy use data to create awareness and change behavior among building owners and managers, companies and employees. That is really the core of this program — to engage the public in a way that creates actionable behavior.

Helping customers use less energy can delay the building of new power plants, which is good for Duke Energy, our customers and the community. The initiative is also transforming Charlotte into an active learning laboratory for innovative sustainability practices. As we create a model for sustainability, energy efficiency and innovation, we'll become a role model for the country — perhaps even the world.

Envision: Charlotte carries an even deeper, more personal meaning to me. The company's Sustainability Filter asks us to look through the eyes of future generations when we make decisions. I have two children. I want them to thrive in a community that takes responsibility for its actions. We have this unique opportunity to change the way our community uses energy. I have high hopes that this will inspire people to envision their own sustainable future, and join together to make it a reality.





Our Blue Wing Solar Project in San Antonio, Texas

215,000 PV panels, making it the most expansive solar farm in Texas and one of the largest in the country. We are also adding two 5-MW commercial solar farms — one in Florida and another in North Carolina. Both of these projects will be on line by the end of 2011. We expect to complete more solar facilities by the end of the year as well.

Our N.C. regulated utility's \$50 million program to install 8 MW of solar energy capacity on the rooftops and grounds of select schools, commercial buildings and factories in the state is virtually complete. Participating customers receive rental payments from Duke Energy in exchange for hosting our solar panels. The electricity generated through the program — enough to power approximately 1,300 homes — is fed into the power grid that serves all our customers in the state.

Duke Energy also purchases solar power to help meet our renewable energy goals and state mandates. In December 2010, the 16-MW SunEdison facility in Davidson County, N.C., achieved full operation. This PV solar farm, which supplies our N.C. customers, can produce enough electricity to power more than 2,600 homes.

Investing in solar energy and other forms of renewable power creates jobs. Our contract to purchase renewable energy certificates from FLS Energy put 80 people to work in 2010. FLS Energy, a North Carolina company that uses solar technology to produce hot water

at customer sites throughout the state, will need nearly 130 workers by 2012 to fulfill its agreement with Duke Energy.

Biopower and Landfill Gas

Biopower is generated when organic material — often called biomass — is used to create electricity. Many states and electricity providers count on biopower to help meet renewable energy mandates and provide a sustainable alternative to burning fossil fuels.

However, the U.S. market for large-scale biomass projects has been hampered by a lack of clear federal guidance on emission regulations, lower natural gas prices and the weak economy. In early 2011, Duke Energy and AREVA decided to suspend the activities of ADAGE, the biopower joint venture they formed in 2008. ADAGE may resume its efforts when market conditions improve.

Biopower still figures in our N.C. regulated utility's plans to meet the state's Renewable Energy and Energy Efficiency Portfolio Standard. We are co-firing small amounts of biomass with coal at select generation facilities, and exploring the potential retrofit of other units to burn biomass only.

In addition, we expect landfill gas-to-electricity investments to play an important role, and have executed roughly a dozen contracts to buy power from landfill gas projects.

Landfill gas, primarily consisting of methane, is produced when organic materials in large landfills decompose. Methane is approximately 20 times more potent than carbon dioxide at trapping heat in the atmosphere. Capturing methane and using it as fuel to produce electricity is preferable to burning it as a waste product.

I'M ACCOUNTABLE

Melanie Miller
Senior Project Manager,
Global Technology Development
Charlotte, N.C.



I'm accountable for testing digital grid technologies in Charlotte, N.C. Our "test bed" in a south Charlotte neighborhood allows us to try out new technologies and see how customers use them in real-life applications.

There are many moving pieces to each pilot program. We educate our customers on how each new technology will operate and give them more control over their energy usage. In return, customers provide feedback and suggestions on hardware and software upgrades that would improve their overall experience.

Our work allows Duke Energy to better understand how the integration of the digital grid, renewable energy sources, plug-in electric vehicles and energy storage will affect our customers and the operation of the electric system as a whole. At the end of the day, our goal is to effectively lower energy demand and improve power reliability at the least possible cost.

Duke Energy is dedicated to helping customers take control of how they use energy, and the new grid is vital to making this possible. Just as technology has enhanced our lives in countless ways, the digital grid will lead to improvements we are only beginning to envision.

DUKE ENERGY CONTINUES COLLABORATION WITH CHINESE ENERGY COMPANIES

Duke Energy continues to collaborate with some of China's most prominent energy companies to scale up and commercialize clean energy technologies.

In November 2010, we signed an agreement with BYD — a privately held company that makes plug-in hybrid and all-electric vehicles. BYD is the largest Chinese and fourth-largest global manufacturer of rechargeable batteries. Duke Energy and BYD will collaborate on technologies for energy storage, electric transportation and smart grid applications. The two companies will also explore joint business development opportunities.

Duke Energy also has agreements signed previously with Huaneng Group, China's largest electric utility, and ENN Group, one of China's largest privately held, diversified energy companies.

Duke Energy and Huaneng Group continue their collaborative research on capturing and sequestering  carbon dioxide emitted from coal-burning power plants, with joint projects at generation facilities in both nations.

In January 2011, Duke Energy and ENN Group announced a joint effort to develop China's first "eco city" in Langfang, near Beijing. The objective:

create a "city of tomorrow" powered by clean energy, including solar and wind, coupled with advanced energy storage and energy efficiency systems. Duke Energy will apply lessons learned in Langfang to the company's deployment of clean energy technology in its U.S. service areas.

Duke Energy also participates in the new U.S.-China Energy Research Center, a bilateral enterprise established by President Obama and Chinese President Hu Jintao to advance clean energy technologies in the U.S. and China. The consortium will operate with a five-year, \$100-million budget: \$25 million from U.S. members, \$25 million from the U.S. government and \$50 million from China's government.

Duke Energy foresees significant benefits resulting from research and close collaboration with fast-growing China. Among them:

- Accelerated development and deployment of low-carbon technologies in our service areas
- Recruitment of Chinese energy firms into our service areas, to create American jobs and spur economic development
- Access to low-cost Chinese capital to help us fund the investments required to modernize our generation fleet and power grid.

DELIVERING AFFORDABLE ENERGY

Duke Energy currently offers some of the most competitive electric rates in the United States. However, our power plants are aging, as is our transmission and distribution system.

Modernizing our system will enable us to provide cleaner and more reliable energy. As we continue to invest in modernization, customers' rates will increase. We intend to file for base-rate  increases in the Carolinas and possibly Kentucky in 2011. If approved, we anticipate the new rates going into effect in 2012.

We minimize rate increases by aggressively managing our costs, and reduce rate impacts by developing new programs and services to help our customers reduce their energy usage.

Ohio Customer Choice

Since 2001, Ohio's evolving competitive electricity market has given customers the ability to choose their supplier for power generation and transmission. This is different from the traditional regulated markets of the Carolinas, Indiana and Kentucky, where customers are served by the electric utility assigned to their area.

Duke Energy Ohio's current rates were approved by the Public Utilities Commission of Ohio (PUCO) in 2008 and set through the end of 2011 as part of our existing Electric Security Plan (ESP). The ESP set a fixed regulated rate for electric generation that was comparable to the then-current market price.

Customer choice wasn't significantly embraced in Ohio until 2009 when power prices plummeted, along with the economy and industrial demand. Competitive retail electric service providers began marketing directly to Duke Energy Ohio customers, offering generation prices lower than our ESP rate. Many large commercial and industrial customers began to switch to other suppliers to take advantage of the price differential. Because of the structure of Ohio's electric market, Duke Energy



WEB EXCLUSIVE CONTENT

- Charlotteans Testing Advanced Energy Technologies
- CFL Giveaways Extremely Popular
- Customers Opt for Paperless Billing
- Surveys Highlight Strong Customer Satisfaction
- Green Power and Carbon Offsets Expand to Kentucky
- Partnering with our Customers
- Advancing Energy Storage
- Video: Developing a Wind Power Project
- Video: Envision: Charlotte

VIDEO

Building Business with China



VIDEO

Smart Grid: Improving Reliability



I'M ACCOUNTABLE

Gianna Manes
Senior Vice President and
Chief Customer Officer

We're committed to helping customers achieve greater energy efficiency. In this Q&A, Gianna Manes talks about our current energy-saving programs and what to expect in the future.

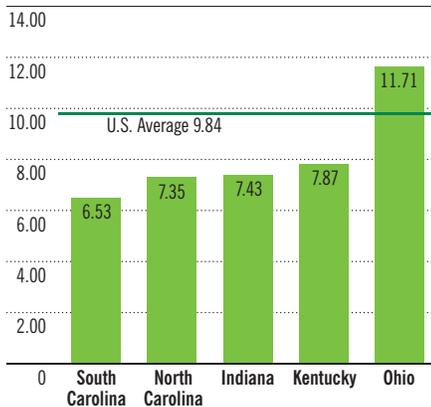
Ohio was no longer able to offer them competitive pricing.

To respond to the competitive market, in 2009 Duke Energy Retail, a nonregulated subsidiary of Duke Energy Corp., began to market to large commercial and industrial customers in Ohio. In mid-2010, we began marketing to residential customers as well.

By the end of 2010, about 65 percent of Duke Energy Ohio's customer load had switched to other retail suppliers who offered generation at lower prices. Duke Energy Retail was able to recover approximately 60 percent of that switched load, while also capturing customer load outside our franchised service area. Duke Energy Ohio continues to serve as its customers' power distribution provider, regardless of which entity they choose for their electric generation.

Late last year, we applied to move toward market-driven rates. The proposed change would have ensured that Duke Energy Ohio customers receive a competitive, reliable supply of electric generation. However, the PUCO did not approve our market-rate application as filed. In light of this ruling, we are evaluating our options and plan to file a revised application.

Duke Energy's Regulated Average Retail Rates (Cents per kilowatt-hour)



Source: Edison Electric Institute Typical Bills and Average Rates Report, Summer 2010; 12 months ending 6/30/2010

What key programs has Duke Energy piloted or offered?

A: For many years now, we have offered products, services and information to help customers save energy and money. We are currently focusing on several new programs, including:

- Home Energy Comparison Report — provides customers information on how their energy usage compares to an average of their neighbors.
- Compact fluorescent light (CFL) bulb distribution — customers can get up to 15 bulbs at a discount or at no cost.
- Home Energy Management — leverages advanced energy technologies to give customers near-real-time energy usage information. Customers also receive tools to control — either at home or remotely — some of their larger appliances in order to reduce their energy consumption during high-demand periods.

How are the programs going? Any lessons learned?

A: Implementation is going well. We've targeted about 18,000 customers in Ohio and South Carolina to receive Home Energy Comparison Reports, and customers are on track to save about 2 percent — about \$20 annually, on average — on their electric bills. We plan to expand this program to other customers by the end of 2011.

In 2010, our CFL campaigns were hugely successful and resulted in the distribution of more than 10 million compact fluorescent light bulbs. By replacing their incandescents with those CFLs, our customers can save enough energy to power nearly 45,000 homes. Building on the success of last year's campaigns, we plan to distribute an additional 10 million bulbs in 2011.

We completed our first Home Energy Management pilot in 2010. Overall, the results and customer feedback demonstrate that customers want to take control of their energy usage and costs. Their participation proved that small changes add up, and can help reduce peak demand.

This pilot has given us valuable insights into the technology and customers' expectations. We are using the feedback to enhance the program and will increase the number of pilot participants in North Carolina and Ohio this year.

Are these programs a win for everyone? How?

A: Energy efficiency is a true win for everyone, and is really a key driver in helping us deliver on our mission of affordable, reliable and increasingly clean energy.

From a customer's perspective, our energy efficiency products and services provide the information and tools they need to take control of their energy usage and costs. When our customers make decisions to reduce their energy usage, and that behavior is sustained, we can begin to count on the savings as the "fifth fuel" in our generation mix. This can reduce our need for peak generation and even delay the need to build new power plants. That will help keep rates affordable for customers, while also reducing emissions. It's a win across the board for our customers, the company and the environment.

For more Q&As with Gianna Manes, please visit the Innovative Products and Services section of our Sustainability Report online. 



ADDRESSING QUESTIONS ABOUT RENEWABLES

As an industry and as a company, we have decades of experience in siting, building and operating coal, nuclear and natural-gas power plants. As we develop renewable energy projects, we are finding that they are not without their critics and challenges.

For example, stakeholders in North Carolina are debating the types of wood

that should qualify as biomass fuel under the state's renewable energy standard. Some believe only wood waste should be allowed, meaning limbs, treetops and other forest management residuals. Others, including Duke Energy, support a broader definition, because there is simply not enough waste wood to fuel the need for biomass renewable energy in the state. Studies show North Carolina's forest inventory can support significant additional

harvesting and still produce more trees than are harvested.

In October 2010, the North Carolina Utilities Commission ruled in favor of the broader definition, but an appeal has been filed with the N.C. Court of Appeals. If upheld, the ruling would allow Duke Energy to continue to consider biomass as a scalable and reliable means of compliance with the state's renewable energy standard. A more limiting definition could significantly reduce the viability of biomass projects across the state.

Another example is in the Midwest, which has some of the best wind resources in the country. Duke Energy is developing a 200-megawatt wind power project in northwestern Michigan, the Gail Windpower Project. We will commit to building the project once a long-term agreement with a power purchaser — typically an electric utility or cooperative — is in place.

Area residents are largely supportive of the project given the jobs, tax revenues and clean, renewable energy it will provide. Some, however, are concerned about sound and vibrations from the proposed wind turbines, property values, and impacts on the viewshed. We are keeping area residents informed about the proposed Gail Windpower Project through a variety of in-person and written communications.

As an industry, we still have much to learn about renewable energy as well. The Electric Power Research Institute has launched a new research program, "Environmental Aspects of Renewable Energy," to share insights on the siting, building and operation of these important sources of energy, and to address concerns about their development.

SYSTEM RELIABILITY REMAINS HIGH

Power reliability is always a top priority, and we continually work to reduce both the number and duration of outages our customers experience. Our numbers have improved substantially in recent years — mainly due to new and improved reliability programs. But we did not meet our aggressive 2010 goals, which were set according to our historic improvement trends.

Weather, especially lightning, impacted our 2010 performance. Our customers in the Carolinas experienced 80 percent more lightning strikes last year, while our Midwest customers saw a 46 percent increase.

OUTAGE STATISTICS

	2006	2007	2008	2009	2010	2010 GOAL
Average number of outages* (occurrences)	1.30	1.13	1.19	1.04	1.11	1.10
Average time without power* (minutes)	164	133	153	130	144	139

* Longer than 5 minutes; statistics are reported per customer.

Our generation plants met the challenge of increased load requirements resulting from the weather, led by the nuclear fleet's capacity factor of approximately 95.9 percent in 2010. This eclipsed the previous record of approximately 95.2 percent in 2002, and marked the 11th consecutive year that the nuclear fleet had a capacity factor above 90 percent. Our regulated fossil fleet also had an excellent year, with commercial availability of approximately 88.7 percent. Our nonregulated Midwest generation fleet also experienced superior operational results, with commercial availability of 89.7 percent.

GENERATION RELIABILITY

	2006	2007	2008	2009	2010	2010 GOAL
Nuclear Capacity Factor	90.1%	92.4%	91.5%	93.3%	95.9%	93.8%
Regulated Fossil Commercial Availability ¹	—	87.0%	85.3%	89.6%	88.7%	88.3%
Nonregulated Fossil Commercial Availability ²	88.7%	81.0%	84.0%	83.1%	89.7%	87.2%

¹ Systemwide statistic not available for 2006.

² Based on units operated by Duke Energy.

2

Environmental Footprint

CHALLENGES

- Keep rates competitive while making investments to reduce our impact on the environment.
- Monitor, influence and prepare for potential new regulations that could impact our generation fleet.
- Address stakeholder concerns associated with Edwardsport, a first-of-its-scale integrated gasification combined-cycle coal plant.
- Participate fully in industry efforts to understand and learn from the nuclear crisis in Japan.

OPPORTUNITIES

- Reduce our carbon intensity by retiring and replacing older plants with new, cleaner generation.
- Encourage U.S. energy policy that benefits both the environment and the economy.
- Reduce demand through energy efficiency and digital smart grid programs.
- Partner to effectively manage limited water supplies in some regions.

2010 AND EARLY 2011 HIGHLIGHTS

- Made significant progress on building the Cliffside and Edwardsport advanced-coal units.
- Expanded partnerships with leading Chinese energy companies on clean energy technologies.
- Reduced sulfur dioxide and nitrogen oxides emissions 73 and 52 percent, respectively, over past five years.
- Recycled more than 24,000 tons of materials, or about 63 percent of our U.S. solid waste stream.

ADVANCING SOUND ENERGY POLICY

Duke Energy continued to play a leadership role in advocating for sound national energy policy in 2010. Regrettably, Congress failed to enact comprehensive climate legislation, which would have put a market price on carbon and more rapidly moved the U.S. toward a low-carbon future. Congressional action on a climate bill is also unlikely in 2011 or 2012.

In early 2011, the U.S. Environmental Protection Agency (EPA) moved forward with its regulatory strategy to control carbon emissions. The EPA's carbon efforts, along with its numerous regulations governing other emissions, have met stiff opposition in both houses of Congress.

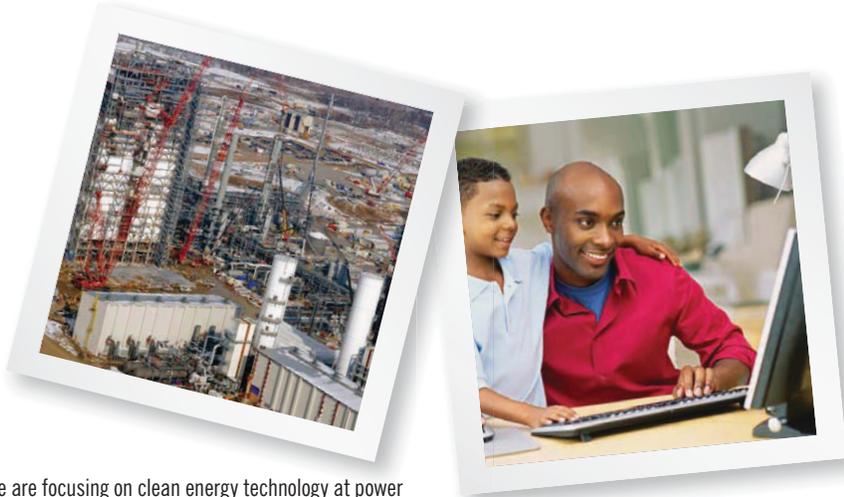
Also in early 2011, the Obama administration and some bipartisan members of Congress urged passage of a Clean Energy Standard to mandate the deployment of solar, wind, cleaner-coal and nuclear power generation. Whether such a technology-focused law could pass both houses of Congress remains an open question. Duke Energy could support a properly constructed federal Clean Energy Standard that advances the deployment of low-emitting energy technologies and meets our criteria of fairness, effectiveness and affordability.

'CLEAN ENERGY STANDARD' VERSUS 'RENEWABLE ENERGY STANDARD'

A federal Renewable Energy Standard would mandate the production of renewable energy and exclude nonrenewable, low-carbon resources such as nuclear power and coal-fired plants equipped with carbon capture and storage. As of January 2011, 29 states have this type of mandate in place, and an additional seven have nonbinding goals. A Clean Energy Standard at the state or federal level would be broader and would include nonrenewable, low-carbon resources.

Even absent a clear national energy policy — an “energy road map” — Duke Energy is moving forward to modernize and decarbonize  its fleet of power plants and plot its own course toward a cleaner energy future.





We are focusing on clean energy technology at power plants like our Edwardsport facility, under construction in southwestern Indiana. We're also using technology to help our customers better manage their energy use.

Ultimately, the path to a cleaner energy future lies with the development and deployment of new technologies. Duke Energy is redefining itself as a technology company, far beyond its role as a traditional utility.

For more information on Duke Energy's political involvement, see the Governance and Transparency section of this report. 

'STROKE OF PEN' RISKS PERSIST FOR GENERATION FLEET

Duke Energy continues to actively participate in the development of federal policy that will shape environmental regulations in coming years. These new rules — what we call “stroke of pen” risks — will likely drive additional power plant retrofits and retirements. While compliance costs are subject to considerable uncertainty and will depend on final rules, our capital expenditures for new environmental control equipment could total approximately \$5 billion over the next 10 years.

Air Quality

In August 2010, the U.S. Environmental Protection Agency (EPA) proposed the Transport Rule to further reduce nitrogen oxides and sulfur dioxide emissions from fossil-fueled power plants in 31 eastern states and the District of Columbia. Phase 1 of the two-phase program would begin Jan. 1, 2012, and Phase 2 would begin Jan. 1, 2014. The

agency expects to finalize the rule in mid-2011.

In March 2011, the EPA released its proposed Toxics Rule to limit emissions of mercury and other hazardous air pollutants from coal-fired power plants across the U.S. Under the proposed schedule, compliance with final emission limits could be required beginning in early 2015. The EPA plans to finalize the rule in November 2011.

Revisions to the National Ambient Air Quality Standards (NAAQS) continue. In 2010, the EPA finalized tighter air quality standards for sulfur dioxide, and is expected to finalize tighter standards for ozone and particulate matter within the next year. As with all NAAQS, state implementation plans will outline how the states intend to implement the more rigorous federal standards.

Water

The EPA issued a proposed rule in March 2011 for existing power plants under Section 316(b) of the Clean Water Act, with the final rule expected in July 2012. The rule's purpose is to minimize impact to aquatic life from the location or operation of cooling water intake structures by using “best technology available,” including additional studies and possibly closed-cycle cooling towers at our larger steam-generating facilities. A widespread requirement to install cooling towers at existing coal and nuclear plants would affect about 40 percent of U.S. generating

capacity, and could have significant cost and supply impacts. Recognizing that water system and ecosystem needs vary, Duke Energy supports the states' continued ability to select site-specific technologies that best suit local environmental and water needs.

The EPA also intends to revise Steam Electric Effluent Guidelines, which could drive more stringent wastewater permit requirements for ash pond discharges and scrubber  wastewater treatment systems. The EPA expects to propose guidelines in mid-2012, with final guidelines in January 2014 and compliance beginning in mid-2017.

Coal Combustion Residuals

An ash dike failure at a Tennessee Valley Authority plant in December 2008 has heightened concerns about dike stability and how utilities manage coal combustions residuals (CCRs), including coal ash and scrubber gypsum. CCR management is currently addressed by varying state regulations.

Duke Energy has a comprehensive monitoring, maintenance and inspection program in place to ensure dike stability, and is committed to managing CCRs in a way that protects human health and the environment. Approximately 9.5 million tons of CCRs were produced at Duke Energy's coal-fired plants in 2010, and approximately half was beneficially used.

A key CCR uncertainty, however, is whether the EPA will seek to reverse its 2000 determination that CCRs are not hazardous waste. The agency's proposed rule in June 2010 sought comments on both hazardous and nonhazardous waste determinations. Duke Energy supports a federal nonhazardous rule, which would protect human health and the environment, while preserving the ability to recycle ash and gypsum into concrete, wallboard and other products.

We also support including structural integrity standards for surface impoundments. We believe the rule should not contain blanket impoundment closure requirements, but rather should base closure on performance standards.

A final rule will not be issued before 2012 and would likely take several years to fully implement.

New Source Review Litigation

In October 2010, the 7th Circuit U.S. Court of Appeals reversed a jury verdict finding that three generating units at our Wabash River plant in Indiana violated the federal Clean Air Act's New Source Review regulations. Duke Energy expects to put the three units back in service once the lower court's "shut down" ruling is vacated.

Duke Energy continues to evaluate plans to convert two units at our Gallagher Station in Indiana to natural gas. A December 2009 settlement between Duke Energy and the EPA, the U.S. Department of Justice and other parties provided that we can either retire two of the plant's four units or convert them to natural gas. Conversion would require installing a 19.5-mile pipeline to bring natural gas to the station. The company is seeking permission from the Federal Energy Regulatory Commission, the Corps of Engineers and the Indiana Utility Regulatory Commission for the project. Duke Energy also installed additional pollution controls and switched to lower-sulfur coal on the two remaining coal units, as agreed, and those systems are operational.

Litigation over alleged violations of NSR regulations at our coal-fired plants in the Carolinas is pending, awaiting further court action.

Mountaintop Mining

The practice of mountaintop-removal coal mining — a form of surface mining where entire coal seams and the earth above them are removed from the top of a mountain — continues to be very controversial.

Due to our location, most of the coal we buy for our Carolinas plants comes from Central Appalachia, where an estimated 20 to 25 percent of the coal mined comes from mountaintop-removal mines.

Because of the legislative, regulatory and legal challenges to

mountaintop-removal mining, we would prefer not to purchase coal from mountaintop mines. However, to help keep costs low for customers, we are required by state utility regulations to purchase the lowest-cost fuel available to run our power plants.

In 2009, we convened an internal task force to research this issue. In June 2010, we asked suppliers to offer Central Appalachian coal that does not come from mountaintop mines. We learned that very limited volumes of that coal can be purchased without a premium. Given this, we have started buying mountaintop-mine-free coal whenever we can do so without paying a premium.

We are also beginning to test-burn coal from other basins in our Carolinas power plants. Because these plants were designed to burn coal from Central Appalachia, test burns are required to

determine the tolerance level to different fuels. Several test burns will be conducted in 2011.

GENERATION FLEET MODERNIZATION IN FULL SWING

Our generation infrastructure is aging. By 2050, we expect to replace most of the power plants currently on our system with cleaner, more efficient generating facilities.

Our efforts to replace and retrofit older, higher-emitting units with advanced technologies are well under way. These major construction projects not only modernize and decarbonize  our generation fleet; they also put people to work.

Cleaner Coal Becoming a Reality

Our 825-megawatt (MW) clean-coal unit under construction in North Carolina

I'M ACCOUNTABLE

Terry Moore | Reactor Systems Engineer
McGuire Nuclear Station

I'm accountable for the safe storage of used fuel at McGuire Nuclear Station. Primarily, I'm responsible for the management of dry cask storage.

McGuire, like many nuclear stations across the country, stores used fuel in pools and dry casks. Dry casks are above-ground storage units that safely and securely house the station's used fuel. These casks are rugged containers made of steel and concrete, which will protect the fuel under extreme conditions such as earthquakes and floods. They are monitored and licensed by the U.S. Nuclear Regulatory Commission.

The used fuel is moved to dry casks after it has been safely stored and cooled in deep pools for several years. These pools, located in reinforced concrete buildings, are steel-lined, concrete vaults filled with water, providing protection for the fuel assemblies. My responsibilities include technical support for loading the casks and overseeing the fuel handling equipment, which loads the fuel and transports the casks from the used fuel pools to the dry storage area on site.

I have written more than 100 pages of procedures on loading the casks. Loading used fuel into the dry casks is a detailed, methodical process that involves welding, draining and drying the casks, and operating high-tech machinery. This process is well coordinated and safely performed by well trained and highly skilled workers.

Helping McGuire to safely manage its used fuel is one way I have helped Duke Energy operate more sustainably during my 30 years of service.



ELECTRICITY GENERATION TRADE-OFFS

Every generation technology — coal, natural gas, nuclear, hydro, wind, biomass and solar — has advantages and disadvantages. The Electric Power Research Institute (EPRI) summarizes those trade-offs in its recent assessment of different generation technologies. This EPRI chart illustrates the importance of having a diverse generation portfolio.

GENERATION TECHNOLOGY REFERENCE CARD

Assessment of relative benefit/impact	Coal	Coal w/CCS*	Natural Gas	Nuclear	Hydro	Wind	Biomass	Geo-thermal	Solar Photo-voltaic
Construction cost New plant construction cost for an equivalent amount of generating capacity	●	●	●	○	●	●	●	●	○
Electricity cost Projected cost to produce electricity from a new plant over its lifetime	●	●	●	●	●	●	●	●	○
Land use Area required to support fuel supply and electricity generation	●	●	●	●	●	●	○	●	●
Water requirements Amount of water required to generate equivalent amount of electricity	○	○	●	○	●	●	○	●	●
CO₂ emissions Relative amount of CO ₂ emissions per unit of electricity	○	●	●	●	●	●	●	●	●
Non-CO₂ emissions Relative amount of air emissions other than CO ₂ per unit of electricity	○	○	●	●	●	●	●	●	●
Waste products Presence of other significant waste products	○	○	●	●	●	●	●	●	●
Availability Ability to generate electricity when needed	●	●	●	●	●	○	●	●	○
Flexibility Ability to quickly respond to changes in demand	●	●	●	●	●	○	●	●	○

* CCS: carbon capture and storage More Favorable ← ● — ● — ● — ● — ● → Less Favorable

is more than 80 percent complete and on budget.

Scheduled to begin operation in 2012, unit 6 at Cliffside Steam Station will be one of the cleanest and most efficient coal units in the country. It will emit 30 percent less carbon dioxide per megawatt-hour generated than older units.

Retirement of four older units at Cliffside, plus 800 MW of older, less efficient coal-fired generation elsewhere on our system, combined with other efforts, will make Cliffside unit 6 carbon-neutral by 2018.

The new unit will have state-of-the-art air emission controls to remove 99 percent of sulfur dioxide emissions, 90 percent of nitrogen oxides emissions and 90 percent of mercury emissions.

The 618-MW Edwardsport integrated gasification combined-cycle (IGCC) facility in Indiana is also more than 80 percent complete, and is scheduled to begin service in the fall of 2012.

The plant will convert coal into a synthetic gas that's processed to remove pollutants. It will be the first major new coal-fired power plant constructed in Indiana in more than 20 years. We will retire existing units at the site — built between 1944 and 1951.

The new plant will produce 10 times as much power as the older units and will emit less sulfur dioxide, nitrogen oxides and mercury. It will also emit more than 40 percent less carbon dioxide per megawatt-hour. We're studying the potential for carbon capture at Edwardsport and have a request pending with state regulators to study carbon sequestration.

In April 2010, we updated the plant's cost estimate from \$2.35 billion to \$2.88 billion, due to the project's scale and complexity. The revised cost is being reviewed by the Indiana Utility Regulatory Commission.

In March 2011, we filed a proposal with the commission to cap the project's construction costs to be passed along to customers at \$2.72 billion, excluding financing costs on that amount. Duke Energy is also proposing adjustments to lower the average rate increase related to

I'M ACCOUNTABLE

Janice Hager
Vice President, Integrated
Resource Planning and
Regulated Analytics

We must act today to ensure an affordable, reliable, and cleaner energy supply for our customers in the future. In the following Q&A, Janice Hager talks about the Integrated Resource Planning process that we use to determine the best options to meet those long-term energy needs.

the project, from approximately 19 percent to about 16 percent for customers overall. The impact to the average residential homeowner would be about 14 percent.

With commission approval, this would effectively bring the project's near-term rate impact to approximately the same level as under the currently approved \$2.35 billion cost estimate.

In addition to our investments in new coal units, we have spent approximately \$5 billion over the last decade to install emissions control equipment on many of our coal plants. As a result, we have reduced our sulfur dioxide emissions by 73 percent, and nitrogen oxides emissions by 52 percent, over the past five years.

Natural Gas Picking Up Steam

Lower prices and relatively lower emissions are sparking renewed interest in natural gas as an alternative fuel for electricity generation. Shale gas extraction has boosted production in recent years, but environmental concerns about the shale fracturing process persist — in particular the amount of water and chemicals required. Duke Energy continues to monitor developments related to shale gas.

Meanwhile, we continue to include natural gas as part of our diverse generation portfolio.

We are building two 620-megawatt natural gas-fired combined-cycle  generating units in North Carolina: one at Buck Steam Station and one at Dan River Steam Station. These cleaner-burning units will enable the retirement of older, less-efficient coal units at each site.

The Buck project is more than 75 percent complete and is expected to be in service during 2011. Construction recently began on the Dan River project, which is expected to be completed in 2012.

In Peru, Duke Energy International (DEI) completed its Las Flores thermoelectric power plant in 2010. This highly efficient 198-MW gas-fired turbine is DEI's third natural gas power plant.



How does the process work?

A: Because power plants and other energy infrastructure take years to license and build, we must anticipate our customers' energy needs 10 or 15 years into the future. The Integrated Resource Planning (IRP) process uses both quantitative and qualitative analyses to determine when additional resources will be needed. These resources could include, for example, new nuclear, natural gas-fired or renewable energy, or additional energy efficiency. We use these analyses to develop resource plans for meeting near-term and long-term customer needs — while maintaining flexibility to adjust to evolving economic, environmental and operating circumstances. These plans are also submitted to our state regulators. While the plans can't predict the future, they do help us prepare for what the future may hold.

How are sustainability considerations addressed?

A: Balancing the need for affordable, reliable and cleaner energy for the 21st century represents an important leadership opportunity for our company and our country. Despite the complexity of that challenge, Duke Energy's commitment to sustainability is leading to decisions that are good for today, and even better for tomorrow. As part of our 2010 Carolinas IRP process, for example, we sought stakeholder feedback on what is important to them. To ensure our planning was consistent with our sustainability goals, we evaluated alternatives based on the following criteria: affordability, reliability, environmental impacts and job potential. We plan to explicitly incorporate these sustainability considerations into resource plans for other states.

Does the IRP still support the Edwardsport integrated gasification combined-cycle (IGCC) project in Indiana, given higher cost estimates?

A: Yes, our analysis continues to show that, despite increased costs, completing the Edwardsport IGCC project is in the best interests of our customers. The state-of-the-art plant will replace 60-plus year-old units and ensure that we can meet our customers' demand for energy. It will also be one of the cleanest coal-fired power plants in the world.

What's the current projection for coal plant retirements?

A: Existing, pending and expected environmental regulations will likely result in retrofits, retirement or conversion to other fuels for most of Duke Energy's coal-fired generation fleet. Since retrofits will not be economical for many of the smaller, older coal units, we will likely retire those units or convert them to burn natural gas in the 2015 time frame. We currently anticipate retiring or converting to another fuel (natural gas or biomass) about 2,400 MW of older coal-fired generation, and we're evaluating options for another 1,300 MW.

Duke Energy's IRP process takes into account these likely impacts on resource needs, as well as other considerations.

In light of the crisis in Japan, and given the sluggish economy, has the outlook on new nuclear changed?

A: As a major part of Duke Energy's diverse power generation mix for almost 40 years, nuclear energy has provided significant benefits for our customers. Going forward, our analyses show new nuclear generation as the best option for meeting Duke Energy's long-term baseload generation needs in the Carolinas. Our focus in nuclear operations has always been on safety. That will never change. We will learn from the events in Japan and apply those lessons to ensure that safety remains our top priority, now and in the future.

I'M ACCOUNTABLE

Dhiaa Jamil
Group Executive,
Chief Generation Officer
and Chief Nuclear Officer

A hallmark of the nuclear industry is working cooperatively to improve performance and safety. In this Q&A, Dhiaa Jamil provides the company's perspective on the implications of the nuclear crisis in Japan.

What are the industry and Duke Energy doing to respond to the crisis in Japan?

A: As this emergency event unfolded, all U.S. chief nuclear officers participated in twice-daily phone conferences to understand what was happening in Japan, and what actions might be needed to ensure the continued safe operation of our nuclear plants. We have also worked through national and international industry agencies to support our counterparts in Japan.

Our industry takes very seriously our commitment to the safe operation of nuclear power plants. As an industry, we agreed early on to take the following short-term actions at U.S. nuclear plants:

- Reverify our capability to maintain safety during severe adverse events, including the loss of significant operational systems caused by natural events, fires, aircraft impact or explosions.
- Reverify our ability to respond to a loss of electric power by confirming that we have adequate materials and procedures in place.
- Reverify our ability to respond to floods, including their impact on systems inside and outside the plant.
- Perform walk downs and inspections of important equipment needed to successfully respond to fires and floods.

What measures are in place at U.S. nuclear facilities to ensure public safety?

A: Nuclear power plants are designed for safety, with multiple barriers and redundant and diverse safety systems. The ability to withstand natural events, such as earthquakes, tornadoes, floods and hurricanes, was incorporated into the design of all U.S. nuclear plants. Plant designs also include additional "margin" above design requirements. Seismic hazards are based on plant location and geology, and the maximum predicted earthquake.

In addition, all U.S. plants are designed to withstand a station blackout — the total loss of all alternating-current power. Duke Energy plants have on-site power sources beyond the regulatory minimum to provide additional safety margin. This includes, but is not limited to, diesel and steam-driven generators/pumps, batteries, and independent support facilities that can be used in the event of an emergency. Post-Sept. 11 measures require U.S. nuclear plants to also be able to cope with significant destruction due to fires, explosions and aircraft impacts. Additionally, U.S. nuclear power plant operators have guidelines to follow in the unlikely event that a severe accident results in fuel damage, and we regularly practice our response to various severe accidents in emergency preparedness drills.

Will the events in Japan affect the future of the U.S. nuclear industry?

A: It's premature to draw conclusions about the impact of the Japanese nuclear crisis on the U.S. The events in Japan will be thoroughly analyzed in the coming months. The nuclear industry regularly studies and learns from shared operating experience. We will incorporate lessons learned from this event into the operation of our existing plants, as well as future plants, and continue to do whatever is necessary to ensure the safety of our communities.

Nuclear energy has been and will continue to play a key role in meeting America's energy needs. Duke Energy is continuing with development activities for our proposed Lee Nuclear Station in order to make safe, reliable and affordable electricity available for our customers for years into the future.



Nuclear Remains an Important Resource

Affordable, reliable and clean nuclear energy has been part of our generation mix for nearly 40 years. And, with zero carbon emissions, it is an important clean-energy resource for the future.

Safety has always been the highest priority in our nuclear operations. Along with the entire nuclear energy industry worldwide, we are engaged in the events in Japan. Our industry will work together to clearly understand the effects of the earthquake and tsunami on the Japanese nuclear plants. And, we will incorporate lessons learned from that experience into our current operations — as well as into our planning for new nuclear units — to further ensure the safety of our plants, our employees and our communities.

Duke Energy remains committed to pursuing a combined construction and operating license (COL) for the proposed Lee Nuclear Station in South Carolina. The COL application to the U.S. Nuclear Regulatory Commission is for two Westinghouse AP1000™ reactors, which have highly advanced technology to ensure plant safety and reliability. We anticipate receiving the COL in the 2013 time frame.

If approved and built, the 2,234-megawatt facility will significantly reduce the company's carbon footprint. Lee Nuclear Station would also help stimulate the region's economy through job creation and tax revenues, while meeting customers' need for clean, affordable and reliable electricity.

Increasing Hydroelectric Capacity

We continue to enjoy the environmental and peaking-power benefits of our company's oldest generation type — renewable hydroelectric power.

Duke Energy's Jocassee Pumped-Storage Hydroelectric Station is replacing two turbines to increase capacity by 50 megawatts by summer 2011. These are the first upgrades to Jocassee units 1 and 2 since they began commercial operation in 1973. Units 3 and 4 were upgraded in 2006 and 2007.

DEI Brazil is building two small hydroelectric plants (16 MW each), expected to be complete in the 2011-2012 time frame. The Retiro and Palmeiras plants are located on the Mirim Sapucal river in Sao Paulo State.

Read about Duke Energy's use of renewable energy in the *Innovative Products and Services* section of this report. 

ALGAE CARBON CAPTURE TESTING SHOWS PROMISE

Partnering on research and development is one way to accelerate the development of cleaner and more affordable energy technologies.

In 2010, Duke Energy and ENN Group, one of our Chinese partners, conducted a joint study to test the ability of various strains of algae to remove carbon dioxide (CO₂) from coal-fired power plant emissions. This was the first study to use CO₂ from power-plant flue gas instead of pure CO₂.

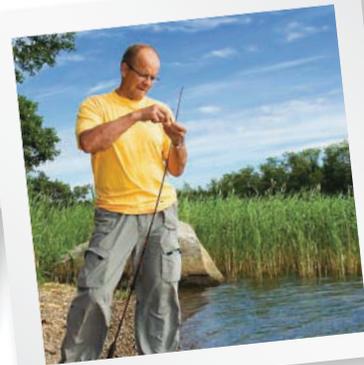
Using a mobile algae unit that was designed and built by ENN Group, we set up a test site at Duke Energy's East Bend Station in Kentucky to conduct the three-month study. Since algae, like all plants, use CO₂ in photosynthesis, carbon emissions can serve as feedstock for the plant's growth. Workers piped in controlled amounts of flue gas from the plant stack emissions directly into a series of large test tubes containing different algae strains and various sources of station water. The next phase of testing will study the potential use of the algae in products such as animal feed and fertilizer.

The team of scientists found that several strains of algae grew just as well using flue gas instead of pure CO₂, an important indicator that these strains could be a good fit for potential CO₂ mitigation. Further research will help determine if algae can become a low-cost solution to absorb a portion of flue gas CO₂. To that end, we have submitted a large-scale demonstration project for funding by the U.S.-China Energy Research Center.

This joint study is one of several carbon-capture technologies Duke Energy



Duke Energy's Jocassee Hydroelectric Station, a pumped-storage facility in Upstate South Carolina



Recreational use is just one reason to protect our valuable water resources.

is pursuing in our efforts to reduce carbon emissions.

WATER: A LIMITED RESOURCE

Water is a critical resource to Duke Energy and the communities we serve. Rivers and reservoirs serve as the backbone of our generation fleet by providing hydro-power and cooling water for our nuclear and fossil plants. At the same time, these water resources also support public water systems, industries, wildlife and recreation.

In 2010, demand for water continued to rise, and drought conditions returned to portions of Duke Energy's service territory. With limited opportunities to develop additional reservoirs, Duke Energy continues to work with government, community and private-sector partners to effectively manage water resources in the following three areas:

Managing Water Supplies

- In early 2010, the Catawba-Wateree Water Management Group (CW-WMG) won a matching research grant from the Water Research Foundation  to explore ways to enhance water resources in the basin. The Foundation convened a panel of world-renowned experts to study the safe yield of the Catawba-Wateree River Basin and how it compares to similar basins around the world. Further study will take place in 2011. The CW-WMG is a nonprofit corporation composed of Duke Energy Carolinas and 18 public water system

owners in the Catawba-Wateree River Basin.

- The Keowee-Toxaway Hydroelectric Relicensing Project  got under way in 2010, using a stakeholder-driven process similar to what was used for the Catawba-Wateree Hydroelectric Project  relicensing effort. Duke Energy has updated a U.S. Army Corps of Engineers reservoir operations model and conducted a water supply assessment in the Upper Savannah Basin as part of preliminary relicensing work.
- The South Carolina Surface Water Withdrawal Permitting bill was passed into law in 2010. This new legislation requires most surface water intake owners to obtain a permit from the state environmental agency before withdrawing water — helping ensure appropriate allocation of future water use. Duke Energy provided valuable leadership during the stakeholder negotiation process associated with this legislation.

Managing Water Demand

- In 2007, the Supreme Court agreed to hear a case filed by South Carolina against North Carolina for equitable sharing of water resources in the Catawba River. The court allowed Duke Energy to participate as an intervenor in the case. In 2010, the case was settled by the parties and dismissed by the Supreme Court. The Comprehensive Relicensing Agreement

(CRA)  for Duke Energy's Catawba-Wataree Hydroelectric Project was used as the basis for the settlement. The CRA, which was signed by 70 stakeholders in 2006 after three years of negotiation, includes procedures for conserving water during droughts and studying future water demands. This settlement has been called a model for how states should work together to preserve shared natural resources.

- The Catawba-Wataree WMG commissioned a survey of demand-management best practices across the U.S. Survey results have been used to identify measures that will be implemented by public water systems in the basin.
- Duke Energy and the Catawba-Wataree WMG are jointly funding a three-year study by N.C. State University to assess "smart" irrigation technologies that could help lakeside residents better manage their lawn watering systems. Year three of this effort is getting under way in 2011.

Managing Drought

- The Catawba-Wataree Low Inflow Protocol (LIP), established during Duke Energy's efforts to relicense its Catawba-Wataree Project, helps the company and other major water users in the basin conserve water supplies during droughts. This protocol is being implemented on a voluntary basis until the Federal Energy Regulatory Commission issues a new license. It is also being evaluated for potential improvements, based on lessons learned during the record-breaking drought in 2007-2008. In 2010, Stage 1 of the LIP was implemented as drought conditions returned to the basin. This stage recommends voluntary conservation by water users across the basin.
- Work continues on the installation of a network of gauges in the Catawba-Wataree Basin to better understand how groundwater affects surface water availability during droughts. The project is scheduled for completion in 2012.

SIGNIFICANT POWER SAVINGS AT DATA CENTERS

Due to their rapid growth and considerable energy consumption, data centers have an increasingly large carbon footprint.

In November 2010, Duke Energy and the Electric Power Research Institute (EPRI)  released preliminary results of a pilot project showing that data centers operating on direct current (DC), rather than alternating current (AC), can cut their power usage by 10 to 20 percent. And, those figures could double when the added energy savings due to lower cooling requirements are taken into account.

Most large data centers run on AC power — creating inefficiencies as power is repeatedly converted back and forth from AC to DC. Those conversions also generate heat — resulting in increased air conditioning costs in order to maintain the servers and other equipment.

Working with EPRI, we converted part of a Duke Energy data center in North



We are finding ways to make our customers' and our own data centers more energy efficient.

Carolina to operate only on DC power. The servers and storage banks operated normally with approximately 15 percent less power.

Because DC equipment can be retrofitted for use with existing equipment, DC power is not limited to new or large enterprise operations. That's good news for the more than 2.5 million smaller data centers across the United States looking for inexpensive ways to cut costs. Based on federal projections, EPRI says that reducing those data centers' energy consumption could save up to 25 billion kilowatt-hours of energy annually.

The use of DC power is just one approach Duke Energy is exploring to reduce data center energy use and costs. Other key strategies include HVAC air optimization, data center consolidation, server virtualization and replacing older equipment with more efficient computer hardware.



WEB EXCLUSIVE CONTENT

- Greening Our Vehicle Fleet
- Reducing Landfill Waste
- Moving to a Culture of Less Printing
- Restoring Forests in Brazil
- Climate Change Adaptation Research Gaining Ground
- Duke Energy Gives Endangered Mammals a Platform for Survival
- Preserving Argentina's Paleontological Heritage
- Environmental Leadership Recognition

VIDEO

Algae Carbon Capture Testing

