

Charlotte's Dynamic Energy Cluster



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Electric Power Research Institute:
Laser profiling a nozzle

Charlotte's Dynamic Energy Cluster

A TRANSFORMATION OF THE ENERGY SECTOR IS IN FULL SWING. CHARLOTTE ENERGY PROFESSIONALS ARE DRIVING THE EVOLUTION IN TRADITIONAL GENERATION, NEW SOURCE GENERATION, ENERGY MANAGEMENT, ENVIRONMENTAL STEWARDSHIP, WORKFORCE DEVELOPMENT AND CONSERVATION.

The proof? In Charlotte ...

- ✓ A global turbine producer located its center of manufacturing excellence and bring on board 1,000 additional employees
- ✓ The nation's premier utility eyes a seven million customer base
- ✓ A former U.S. President announced Charlotte's first-in-the-nation Smart Grid plan to reduce urban energy use by 20 percent
- ✓ The current President tapped a local manufacturer for his nationwide energy policy statement
- ✓ A leading-edge gas company provides CNG filling stations

- ✦ Energy leaders worked together for a newly-funded university program and new 200,000 square-foot building to extend our lead in engineering education
- ✦ Customers of a Smart Grid start-up can measure payback in months, not years
- ✦ More than 5,000 regional energy jobs were announced in four years across a spectrum of energy firms

Charlotte people design energy systems, make the products, drive efficiency, provide the services and deliver megawatts and dekatherms that make industry hum.

The concept is simple: "If everyone is moving forward together, then success takes care of itself," according to Henry Ford. We drive progress by working together.

In fact, Charlotte's collaborative instinct is our most energetic trait. Our energy sector gains steam from our cluster effect. We have singular and strong energy players. Our collective network has a long reach, incredible depth and influence.

Success in the energy industry is built on a foundation of capabilities: An ample and able workforce, reliable and affordable energy resources, inventiveness and a diversified supplier network.

That's why nearly 200 energy companies and some 15,000 employees feel at home in Charlotte.

Charlotte has the "who's who" of energy. Want to be part of this kind of city? You can. Here are some of the players.

"In the 19th century we explored and developed the energy industry's basic resources and technologies. In the 20th century we built energy infrastructure that revolutionized society and our standard of living. In the 21st century we will rely on the synergy of technological innovation and human ingenuity to transform how we produce, deliver and use energy in all its forms."

~ Michael W. Howard, Ph.D., President and CEO, Electric Power Research Institute

Energy Companies Adding to Their Success

Siemens Energy

Siemens Energy, a long-time turbine manufacturing presence in Charlotte, made a significant announcement in 2010: Relocating the manufacture of its 60-Hz large-scale gas turbines from Canada to Charlotte. This decision came as part of an analysis of the company's Americas manufacturing operations, with consideration for the projected market developments for its 60-Hz gas turbines.

The move allows the company to create a U.S. manufacturing hub to take advantage of synergies in transportation, workforce, supply base, research and development and its current expandable site. The existing site manufactures and services steam turbines and generators as part of the energy portfolio.

The gas turbine project on-boards 800 new employees to a 780 employee base. In addition to the 226 engineering and support positions the company announced in 2009, the total employment at the Charlotte site will hit roughly 1,800. There are a million square-feet of manufacturing and office space in the Siemens Energy complex. The new facility in Charlotte is the most modern gas turbine manufacturing facility in the world. The green field project optimizes the entire manufacturing process and incorporates the latest technology.



Siemens Energy: Generator Stator Core

"Our goal is to set new standards for serving the global 60-Hz energy markets, including the U.S., which is among the largest and most important in the world. In addition, this new U.S. manufacturing hub will serve as the worldwide 60-Hz center of excellence and the





Celgard: Lithium battery component maker

export platform to other 60-Hz markets such as Canada, Mexico, Brazil, Saudi Arabia and Korea,” says Mark Pringle, Director of Operations at the Charlotte plant.

Siemens global CEO said he had a choice of “...building our new facility in any of the 190 countries where we operate...” Siemens expanded in Charlotte. “...our investment in Charlotte will pay off. ... When we are looking for a new place to manufacture a product, we take three main considerations into account: First, we want to be close to our customers in the leading markets. Second, many of the positions in our company require highly skilled workers, so we look for areas with a commitment to workforce development and higher education. And third, we look to link our innovation engine to our manufacturing sites, particularly for early stage technologies,” says Peter Löscher, President and CEO of Siemens AG.

There’s more to the Siemens Energy story. A separate division, the company’s instrumentation and control group, relocated to Charlotte in 2010. The group performs all of Siemens’ I&C work for nuclear power plants in North America.

Celgard, LLC

Celgard, LLC is a lithium battery component manufacturer with headquarters located in South Charlotte. Celgard makes a microporous film — known as a battery separator — used in batteries for portable electronics devices, such as laptop computers and mobile phones,

and in emerging applications such as reserve power, grid management systems and Electric Drive Vehicles.

This pioneer in technology has been manufacturing products for the energy sector here in Charlotte for more than 20 years. “Due to this success, we have announced plans for five expansion projects in the region since January 2010, including the construction of a new manufacturing facility in nearby Concord, NC. That totals more than \$300 million in capital investments and creates more than 500 jobs through 2014,” says Celgard President Mitch Pulwer.



Celgard

"Many factors impacted our decision to expand our existing Charlotte facility and build the new facility, including opportunities for synergies with other key players in the energy sector, access to regional academic and government research facilities and the availability of a quality workforce," stated Pulwer. "There is tremendous access to talent in the Charlotte region. We have been delighted with our exceptional employees, and decided to make the investment to continue building in the region in part because of the people that are already here and the caliber of people this area can attract."

ABB

ABB is increasing its capacity to serve the growing global demand for new transmission systems by investing \$90 million in a new world-class, high-voltage transmission cable facility. These high voltage cables will carry electric power underground, for both AC and DC applications, as part of the nation's new Smart Grid. After a competitive site selection process, ABB chose Huntersville and the greater Charlotte metropolitan region.

ABB is a premier power and automation technology company, and the world's largest provider of transmission and distribution solutions and equipment — such as High Voltage Direct Current, Flexible AC Transmission Systems, high voltage cables, power transformers,

high-voltage breakers, switchgear and generators — for the power grid and renewable energy sources.

ABB is also a leading proponent of grid modernization — the Smart Grid — featuring a wide range of new technologies and applications that are transforming today's power system into a grid that is largely automated with greater energy efficiency and reliability.

ABB employs more than 130,000 people in 100 countries and is based in Zurich, Switzerland. ABB's North American operations oversee 18,000 employees and more than \$4 billion in annual revenues. Since 1990 the company has had North American offices in the Raleigh area. ABB now has over 1,600 employees in North Carolina in seven locations.

The Charlotte location is a new-build for ABB. "We selected the Charlotte area for our new high-voltage transmission cable factory because it offers a combination of top-notch engineering talent, training capabilities at local colleges, first-rate transportation and an attractive living environment," said Enrique Santacana, President and CEO of ABB Inc. in North America. "We are also excited to be a part of the Charlotte market's growing reputation as the nation's new Energy Hub."

The new ABB cable facility will employ more than 100 people and opens in 2012.

ABB: Construction of cable plant



HQ — Management Muscle

The Charlotte region is a growing hub company headquarters in the energy industry.

Duke Energy

Duke Energy, a premier electric utility, is headquartered in Charlotte. Charlotte's energy tradition began more than 100 years ago when Duke Energy harnessed the Catawba River to power textile mills. Today the company eyes a \$40 billion market cap serving seven million customers in six states — the largest utility in the U.S.

The company is a best-in-class energy provider. Its service availability is among the highest in the nation — 99.97 percent. Duke Energy Carolinas' average industrial rate of 5.01 cents per kilowatt-hour is one of the lowest in any state touching the Atlantic Ocean or Gulf Coast.

Duke Energy understands there is a different kind of challenge when planning for a future focused on energy efficiency and environmental stewardship. "I've often said that Duke Energy is a technology company disguised as a utility. New nuclear, advanced coal, and renewable energy resources, all seamlessly integrated into a digital grid, will create the

"We are investing in digital energy technologies that have the potential to transform our industry — the way we generate energy, the way we deliver it and the way our customers use it."

~ Jim Rogers, Chairman of Duke Energy

foundation for a future that continues to bring reliable, affordable and cleaner energy to all our customers," says Jim Rogers, Chairman of Duke Energy.

The Duke Energy Operations Center monitors the grid and its generation, carefully balancing production and energy use for the lowest possible cost of reliable electricity. Says Rogers, "We are investing in digital energy technologies that have the potential to transform our



Duke Energy: Constructed wetlands treatment

industry — the way we generate energy, the way we deliver it and the way our customers use it.”

A smart balance of technology extends to environmental stewardship. “Constructed wetland treatment” is a term that was originally applied to artificial vegetated wetlands used for wastewater contaminant removal. The concept is used here at a local power generation facility.

“We work with nature,” says Dayna Herrick, Carolinas Environmental Field Support Manager. “This technology treats wastewater from the flue gas desulfurization process at the plants. Oxide-forming metals are removed by aeration and precipitation. These systems can treat a wide range of water quality issues and can be more economical than conventional physiochemical treatments.”

Innovation extends to economic development, too. Duke Energy encourages economic growth in the region. For corporate relocation

and expansion prospects, the company sponsors a program to evaluate and improve industrial sites in the counties it serves in North Carolina and South Carolina. The Site Readiness Program helps identify, assess, improve, and increase awareness of industrial sites in the Duke Energy region. This program can increase the inventory of ready sites for new members of Charlotte’s regional business community.

The program includes:

- ✦ Initial assessment of industrial sites (existing or potential) from a top site selection consultant.
- ✦ A “buildability” assessment and development of conceptual plans for the sites by expert land use and site planners.
- ✦ Matching grant possibilities for implementing improvements recommended by the studies for each site validated as viable for a large industrial customer.



Piedmont Natural Gas: LNG facility north of Charlotte

Piedmont Natural Gas

With headquarters located in Charlotte, Piedmont Natural Gas employs approximately 1,800 people and provides natural gas to more than one million residential, commercial and industrial customers in North Carolina, South Carolina and Tennessee.

As part of its commitment to empower individuals and organizations to make responsible energy decisions, Piedmont Natural Gas promotes the direct use of natural gas for homes, businesses and industries as the most efficient use of this valuable natural resource. The use of natural gas for power generation, especially when it replaces high-emitting coal resources, can be a key strategy in reducing emissions.

According to the Gas Technology Institute an increase of natural gas use in electricity production, as well as transportation, residential, commercial and industrial applications can be a major component in reaching a 42 percent reduction in carbon emissions by 2030.



This commitment to efficient energy usage includes pioneering the use of compressed natural gas (CNG) as a superior alternative fuel for transportation. Piedmont is actively marketing CNG, making it more widely available across its service areas with a focus on return-to-base fleets, both large and small.

As the first step in building a network of fueling stations that anyone can use, Piedmont currently has public fueling stations in Charlotte and Greensboro, NC, Greenville, SC and Nashville, TN, with nine additional stations planned in its service territory by 2012.

Piedmont leverages its energy knowledge to diversify its energy portfolio, and in 2011, the company invested in Climax Global Energy, a privately-held alternative energy company that converts landfill-bound plastics into high-value synthetic oil for clean diesel, synthetic-lube and wax markets.

“Charlotte is rapidly emerging as a global energy capital, and we are excited about being a part of that. As a trusted partner to power producers around the world, we are deeply committed to creating a safe, reliable, efficient and abundant energy future for everyone.”

~Chris Kearney, SPX Chairman, President and CEO

SPX

Charlotte pride meets global power at the HQ of SPX, a *Fortune* 500 multi-industry manufacturer. With more than \$5 billion in annual revenues and 15,500 employees in more than 35 countries worldwide, SPX serves a number of markets, including the global power and energy markets, with innovative technologies and products including cooling towers, heat exchangers and a broad spectrum of processing equipment.

SPX's products, technologies and solutions support nearly all sources of power generation, and the company supplies components and pollution control systems critical to building new, more efficient power plants and renovating older ones.

SPX is proud to call Charlotte — America's New Energy Capital — its home and to play a role in the continued growth of its dynamic energy sector.

SPX recently announced a significant expansion of its corporate headquarters in the Ballantyne area of Charlotte. As SPX Chairman, President and CEO Chris Kearney notes, “Charlotte is rapidly emerging as a global energy capital, and we are excited about being a part of that. As a trusted partner to power producers around the world, we are deeply committed to creating a safe, reliable, efficient and abundant energy future for everyone.”

The Babcock & Wilcox Company (B&W)

The Babcock & Wilcox Company (B&W) is a leader in clean energy technology and services, primarily for the nuclear, fossil and renewable power markets, as well as a premier advanced technology and mission-critical defense contractor. B&W has locations worldwide and employs approximately 12,000 people in addition to approximately 10,000 joint venture employees.

B&W is leading the development of new and innovative power generation options and environmental control solutions. From zero-emissions nuclear power and near zero-emissions carbon capture technology to biomass, waste to energy and cutting-edge solar thermal, the company has a broad portfolio of clean and efficient energy technologies.

Charlotte is also the headquarters for Babcock & Wilcox Nuclear Energy, Inc. and Generation mPower™ LLC. B&W Nuclear Energy is responsible for manufacturing, engineering, design, construction, inspection and repair services for commercial nuclear customers. Generation mPower™ was formed by affiliates of B&W and Bechtel and offers a turnkey solution for the design, licensing and deployment of nuclear power plants based on the B&W mPower™ small modular reactor.

B&W selected Charlotte for its corporate headquarters for a number of reasons. One consideration included ease of travel, as B&W operates throughout North America and worldwide. Also, B&W understood that Charlotte's proximity to customers, lenders, shareholders, partners and other key groups would be important for the company's long term success.

"As several energy companies call Charlotte home and with a large, talented workforce, Charlotte is truly an energy hub and is asserting its reputation as the New Energy Capital!"

~ Clarence Ray, Chief Executive Officer of Shaw's Power Group

CoaLogix Inc.

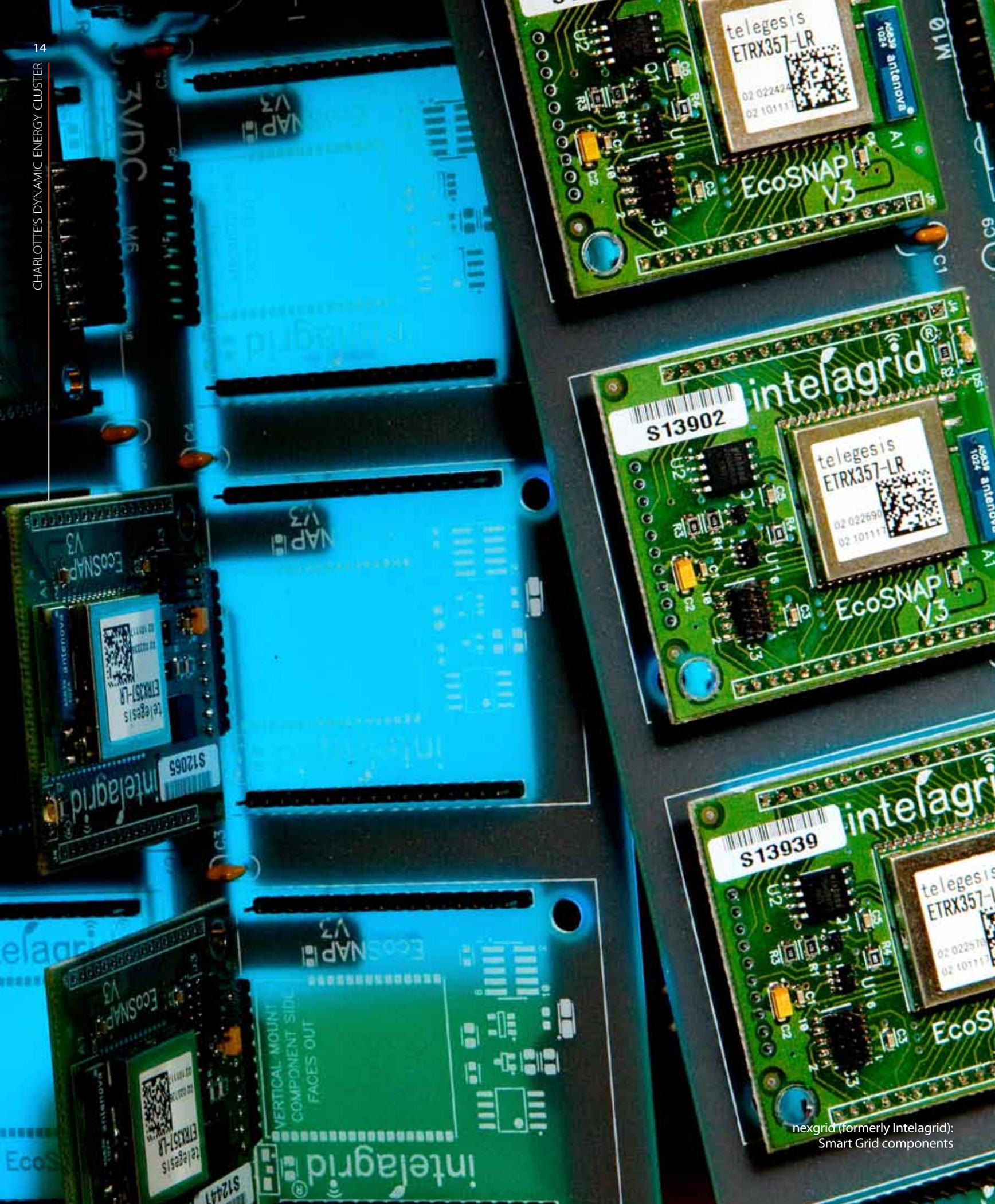
CoaLogix Inc. provides proprietary technical solutions while reducing the environmental carbon footprint of power generating producers using a cost effective approach. Because of CoaLogix's breakthrough technology for cleaner coal and gas-fired power plants, CoaLogix has become the world's leading provider of selective catalytic reduction (SCR) management services and catalyst regeneration technologies to reduce harmful nitrogen oxides (NOx), sulfur-oxides (SOx), and mercury emissions.

The company also provides consulting services, computer simulation, SCR flow modeling, SCR reactor inspections, catalyst testing, ammonia injection grid tuning and operating data analysis to all power producing utilities.



Zachry Nuclear Engineering:
Additional expansion in the works





nexgrid (formerly Intelgrid):
Smart Grid components

"We are the only US-based company with a commercial process capable of fully restoring catalyst activity and NOx reduction performance," says Bill McMahon, CEO. The company services power plants throughout the United States and Canada from its two Charlotte facilities."

Metso

Metso is a leading global supplier of bioenergy solutions for the pulp and paper industry and the power generation markets. The Finnish company's North American HQ is in Charlotte.

Metso has technical expertise in fuel processing at boiler plants from fuel to stack — from fuel receiving, handling and drying, and feeding it on to the boiler. Greener energy is produced through Metso's in-depth combustion know-how in fuel properties, such as bed behavior, corrosion, plugging and fouling. The company's power boilers range from small units to large boilers in the steam capacity range from 10 to 1,000 MW.

Metso is a forerunner in fluidized bed boilers for power plants using the combustion of biomass and other fuels as well as co-combustion. More than 170 Metso bubbling fluidized bed boilers and boiler conversions and more than 70 circulating fluidized bed boilers are in operation. These facilities testify to the company's expertise in fluidized bed technology and in handling demanding fuels. Many of the world's largest biomass power plants use Metso technology.

Metso is an innovator in bioenergy and is developing or commercializing new technologies like LignoBoost (extracts lignin from Kraft black liquor to produce Bio Products), biomass and waste gasification (produces Bio Gas for energy), torrefaction (Green Coal) and pyrolysis (converts biomass into bio-oil for liquid transportation fuels).

Heavy Duty High Tech: Nuclear Energy

Major nuclear energy engineering firms have chosen Charlotte as their home, which underpins an atmosphere of engineering excellence in the region.

The Shaw Group Inc.

The Shaw Group Inc. is a leading global provider of engineering, construction, technology, fabrication, remediation and support services for clients in the energy, chemicals, environmental, infrastructure and emergency response industries.

A *Fortune* 500 company, Shaw has approximately 27,000 employees around the world and is a power sector industry leader according to Engineering News-Record's list of Top 500 Design Firms.

Having first opened its Charlotte office in 2004, Shaw named the city as the headquarters of its Power Group in 2007, and today employs more than 1,100 workers in the Queen City. The company is a leader in the energy sector, particularly in engineering, procurement and construction of new nuclear and fossil facilities, nuclear maintenance

and modifications and flue gas desulphurization (FGD-scrubber) services that assist utilities in meeting clean air emissions requirements. Since mid-2010, all engineering, procurement and construction work for new projects are performed in the Charlotte office.

"As several energy companies call Charlotte home and with a large, talented workforce, Charlotte is truly an energy hub and is asserting its reputation as the New Energy Capital," said Clarence Ray, Chief Executive Officer of Shaw's Power Group.

"Our Charlotte location provides the most flexibility for future growth. This area is conveniently located near the University of North Carolina Charlotte, the Charlotte airport, and is easily accessible for our employees and customers."

~ Tom Franch, Senior Vice President, Engineering and Projects, AREVA North America

AREVA

AREVA is a world leader in design and construction of nuclear power plants, plant modernization, maintenance and repair services, and nuclear fuel manufacturing. AREVA provides renewable energy technologies and provides solutions to nuclear waste and advanced energy challenges to U.S. Federal programs. AREVA has 6,000 U.S. employees; more than 550 people are in the Charlotte area. The firm is located in the University Research Park area of the city.

"Our Charlotte location provides the most flexibility for future growth," says Tom Franch, Senior Vice President, Engineering and Projects, AREVA North America. "This area is conveniently located near the University of North Carolina Charlotte, the Charlotte airport, and is easily accessible for our employees and customers."

AREVA's Charlotte-based employees are engaged in a variety of engineering and project management activities that support the safety, reliability, and effectiveness of the existing fleet of nuclear power plants, the deployment of the next generation of new nuclear power plants in the U.S. and globally, and waste cleanup efforts for the Department of Energy.

In addition, the company is building the Mixed-Oxide Fuel Fabrication Facility through its joint venture Shaw AREVA MOX Services in Aiken, SC, and is involved in the Savannah River Site Liquid Waste Operations Project. Through these combined operations, AREVA employs about 800 people in the Carolinas.

URS Corporation

URS Corporation's Nuclear Center is based in Fort Mill, SC, adjacent to the Charlotte city boundary. The multi-national company provides program management; planning; design; engineering and procurement services; systems engineering and technical assistance; construction and construction management; operations and maintenance; and decommissioning and closure services.

URS Corporation has served the industry since the initial commercialization of nuclear technology in the 1960s. The firm has been the engineer or constructor of more than 35,000 megawatts of nuclear power. The company has been architect, engineer or constructor of record for 49 commercial nuclear generating units — both boiling water reactors and pressurized water reactors — around the world.

URS has provided planning, engineering or construction services for essentially every nuclear power plant operating in the United States today, including environmental studies, siting and licensing services and thousands of life-extension modifications and operations support.

Zachry Holdings Inc.

Zachry Holdings Inc. has more than 85 years of experience delivering engineering, construction and maintenance needs for the world's most sophisticated customers in the power, refining and process sectors. The company opened its Charlotte office in 2008 housing engineering and project management personnel, in addition to a fabrication shop.

In 2010, Zachry Nuclear Engineering, which for 35 years has provided engineering, design and project management support at nearly half of the existing U.S. nuclear fleet, expanded to the Charlotte office by relocating some personnel from its home office in Connecticut.

Zachry's Charlotte facility has expanded from 25 to 62 employees in two years; additional expansion is in the works as new engineering and projects begin with its Southeast clients.

Westinghouse

Westinghouse opened its Charlotte office in 2009. The office focuses on plant and fuel engineering services, reactor instrumentation, and core design and reload safety analyses for nuclear projects. This includes collaborative support with regional customers on its AP1000® reactor plant construction, and plant engineering for the existing fleet.

Westinghouse has Engineering, Procurement and Construction contracts with Southern Company for two AP1000® nuclear power units at the Vogtle site near Waynesboro, GA — the first new nuclear power plant contract in the United States since 1977 — and with South Carolina Electric & Gas Company and Santee Cooper for two units at the V.C. Summer Nuclear Station in Jenkinsville, SC.

"The Charlotte office is ideally located to support the rapidly growing needs of our regional customers as well as the great potential for new plant construction in the southeastern United States," says Pete Harden, VP of Customer Relations.

Mitsubishi Nuclear Energy Systems (MNES)

Mitsubishi Nuclear Energy Systems (MNES), a U.S. subsidiary of Mitsubishi Heavy Industries Ltd. (MHI), in 2011 located its main MNES engineering center in Charlotte. The company said its initial expectation is to hire 135 engineers.

Toshiba America Nuclear Energy Corporation

Toshiba America Nuclear Energy Corporation announced in 2009 its newly-formed national Project Management and Engineering Center in Charlotte. That group functions as a base for Toshiba's nuclear power business in the U.S.

Shaping Our Energy Future

The world will depend on traditional sources of energy for decades. Charlotte companies make those technologies safe, dependable and clean.

As energy portfolios evolve they will include alternative energies, energy management systems and conservation technologies. New players in advanced manufacturing will enter the picture as they lend their expertise to the evolving energy industry. Capital will be deployed to make these technologies possible.

"The Charlotte office is ideally located to support the rapidly growing needs of our regional customers as well as the great potential for new plant construction in the southeastern United States."

~ Pete Harden, VP of Customer Relations, Westinghouse

Charlotte has dynamic representation in critical emerging energy sectors. These first two companies are additional players in the important energy storage sector:

Rockwood Holdings, Inc.

Rockwood Holdings, Inc., through its Chemetall business unit, is a leading producer of lithium and lithium compounds. In the energy market, lithium compounds are the essential ingredient in the production of high-performance rechargeable batteries for electric vehicles, as well as all portable electronics, such as computers, mobile phones and other devices.

Within the Charlotte area, Rockwood has major investments in production capacity for the battery market, R&D laboratories specializing in lithium-based energy storing materials and its North American headquarters. The location in the Charlotte region provides an excellent



Central Piedmont Community College:
Premier nondestructive examination training



nexgrid: Energy conservation through real-time grid data

lifestyle for attracting talent, a reliable utility infrastructure and an efficient transportation system.

"Development of alternative energy technology will reduce U.S. dependence on foreign oil, reduce greenhouse gases and make more efficient use of finite resources," says Rockwood CEO Seifi Ghasemi. "This is a critical strategic priority which requires a public-private partnership. Charlotte is taking a lead role in the public arena, while Rockwood is leading the way in producing the high-quality lithium battery material to expand adoption of electric vehicles on a mass scale."

FMC Lithium

FMC Lithium, headquartered in Charlotte, is a leading producer of lithium-based products and is recognized as a technology leader in lithium precursors for batteries and specialty organolithium chemicals for polymerization and chemical synthesis. The company serves markets including battery and energy, air treatment, construction, fine chemicals, glass and ceramics, greases and lubricants, pool-water treatment and polymers.

Lithium-ion batteries are a preferred means to power electronic devices and are growing rapidly for power tools, e-bikes and automobiles. FMC developed Stabilized Lithium Metal Powder (SLMP®), which is a safe-to-handle powdered lithium metal that increases the energy density and life of lithium-ion batteries.

In 2010, FMC began a program to scale up SLMP development at its Center for Lithium Energy Advanced Research lab near Charlotte. The company says that new, innovative energy storage applications are poised to grow rapidly within the next five years as demand accelerates in the United States, Europe and particularly in India and China.

nexgrid

nexgrid produces real-time two-way communication to manage, monitor and control the smart electric distribution grid. Organizations with critical energy dependence can anticipate seamless metering, load control, outage and restoration management, smart home, two-way messaging, real-time pricing and even video surveillance.

"Our communication gateways are the foundation for secure management and monitoring of meters and intelligent end devices. Our customers are better informed and able to manage their network in ways never possible before with energy data to make production or budget decisions. We make those decisions achievable," says John Espey, nexgrid COO.

The company's customers include utility companies, consumers, and systems integrators. Regardless of the industries or locations, nexgrid products deliver measurable savings that add up to a return on investment that can be measured in months rather than years.

Here's how nexgrid's performance was described by Gregg Paulson, Deputy Director — Electric, City of Manassas, VA: "The critically hot summer of 2011 was a major test for our grid management. Our system typically calls 12 critical peaks per year. In a recent critical peak event managed through the nexgrid software, we found that we saved enough money in one critical peak to pay for 10 percent of

the incremental cost of the equipment that facilitates the load shed. We actually project a 10 to 12 month payback period on our nexgrid investment in communication infrastructure related to load control!"

SGL Group

SGL Group is one of the world's leading manufacturers of carbon-based products. The company has a comprehensive portfolio ranging from carbon and graphite products to carbon fibers and composites. Products from SGL Group are used predominantly in the steel, aluminum, automotive, chemical and glass/ceramics industries. Due to the paradigm shift in the use of lighter weight materials that possess greater strength and durability, momentum is being gained in the area of material substitution towards new, innovative materials that make significant contributions to decreasing energy consumption, reducing CO2 emissions and preserving natural resources. As a result, there is a growing demand for SGL Group's high performance materials.

"The firm chose Charlotte as its North American headquarters based on the favorable business environment, outstanding workforce availability and the fact that Charlotte is a key growth environment for new energy technologies and development."

~ Scott Carlton, President SGL Group North America

Manufacturers in the automotive, semiconductor, lithium ion battery, solar/wind energy, environmental protection, aerospace and defense industries as well as in the nuclear energy industry also figure among the company's customers.

With 45 production sites in Europe, North America and Asia as well as a service network covering more than 100 countries, SGL Group is a company with a global presence. Scott Carlton, President SGL Group North America says, "The firm chose Charlotte as its North American headquarters based on the favorable business environment, outstanding workforce availability and the fact that Charlotte is a key growth environment for new energy technologies and development."

Jetion Solar (US) Corp.

Jetion Solar (US) Corp. is a subsidiary of Jetion Solar China Ltd., a multinational company with wholly owned subsidiaries in Liechtenstein, Germany, Italy and Luxemburg. After more than two years of extensive research, the company chose Charlotte for its North America headquarters.

The reasons, says Francis Tsai of the company's Charlotte office, "Charlotte's desirable geographic location in the Sun Belt, close access

to the ports of Charleston and Savannah and Charlotte's air hub status, which makes for easy access to all the major cities in the U.S."

Charlotte's moderate climate was also a deciding factor because the assembly facility has to be kept at 72 degrees year-round for its flash tester to function properly.

Jetion Solar is engaged in the research, development, sales and service of its photovoltaic products. All components for the solar modules are manufactured by Jetion Solar from the cell to the finished product, incorporating more than 100 patents developed and owned by the company. Manufacturing of Jetion Solar modules globally should reach 500 megawatts by the end of 2011 with a target for one gigawatt by the end of 2012.

The modules assembled in the Charlotte facility will supply the United States, Canada and Mexico. Jetion Solar (US) Corporation's Charlotte sales and service office opened in May 2011 with production start-up in fall 2011.

The initial workforce is approximately 40 employees. "With its heavy influx of migration from other cities to Charlotte, the city provides for a vast pool of versatile workforce from all backgrounds and work experiences," says Tsai.

"Lime Energy is excited to connect to the emerging energy hub in Charlotte. With the speed of innovation caused by the concentration of focus, investment, technology and partnerships in this area, we will contribute to long term sustainability in North Carolina."

~ John O'Rourke, President and CEO of Lime Energy

General Microcircuits

General Microcircuits is an advanced electronics manufacturing company with a global reach that has emerged as partner for varied energy applications. GMI provides circuit board and integrated assemblies to manufacturers for greater reliability, manufacturability, and testability at a lower landed cost.

GMI produces new products or troubleshoots existing products for customers. Ask FedEx — it was GMI that met the challenge of packaging the first hand-held bar code scanner that tracked deliveries.

In the energy space the company helps manufacturers achieve high-quality products for energy applications. For instance, GMI:

- ✦ Delicately finishes fabrication on LED components to aide integrity in shipping and a long life after installation,

- ✦ Fabricates the electronics for converters in wind energy turbines,
- ✦ Produces multiple internal circuits to monitor energy consumption,
- ✦ Assists pioneering companies with smart grid circuitry for real time smart-metering, and
- ✦ Builds vehicular products to measure fuel efficiency and provide data to forecast preventive maintenance.

Recently GMI increased its manufacturing and quality control space by one-third, adding co-location options for key customers to build even more opportunities for speed-to-market for its products.

CALOR Energy Consulting

CALOR Energy Consulting believes in changing energy: cleaner, greener, more efficient, more profitable. For CALOR partners Lisa Lee Morgan and Rich Deming, Charlotte is the perfect place for CALOR to call home since its launch three years ago. The region offers deep local talent, abundant entrepreneurial drive, and clear community focus on fostering its energy sector.

CALOR specializes in strategies to improve economic and environmental outcomes, developing customized services within four broad categories: Funding, energy services, eco-industrial development, and government affairs.

CALOR helped clients save at least eight billion BTUs of energy, add new green-collar jobs and offset more than 500,000 pounds of greenhouse gas emissions in 2011 alone. A few recent successes include:

- ✦ A high-visibility retro-fit of a vintage 1920s-era 90,000 square-foot building in the heart of Charlotte,
- ✦ A \$600,000 initiative to cut energy use in student facilities at a historically significant urban university, and
- ✦ The innovative use of utility incentives for a community college, saving more than \$122,000 per year.

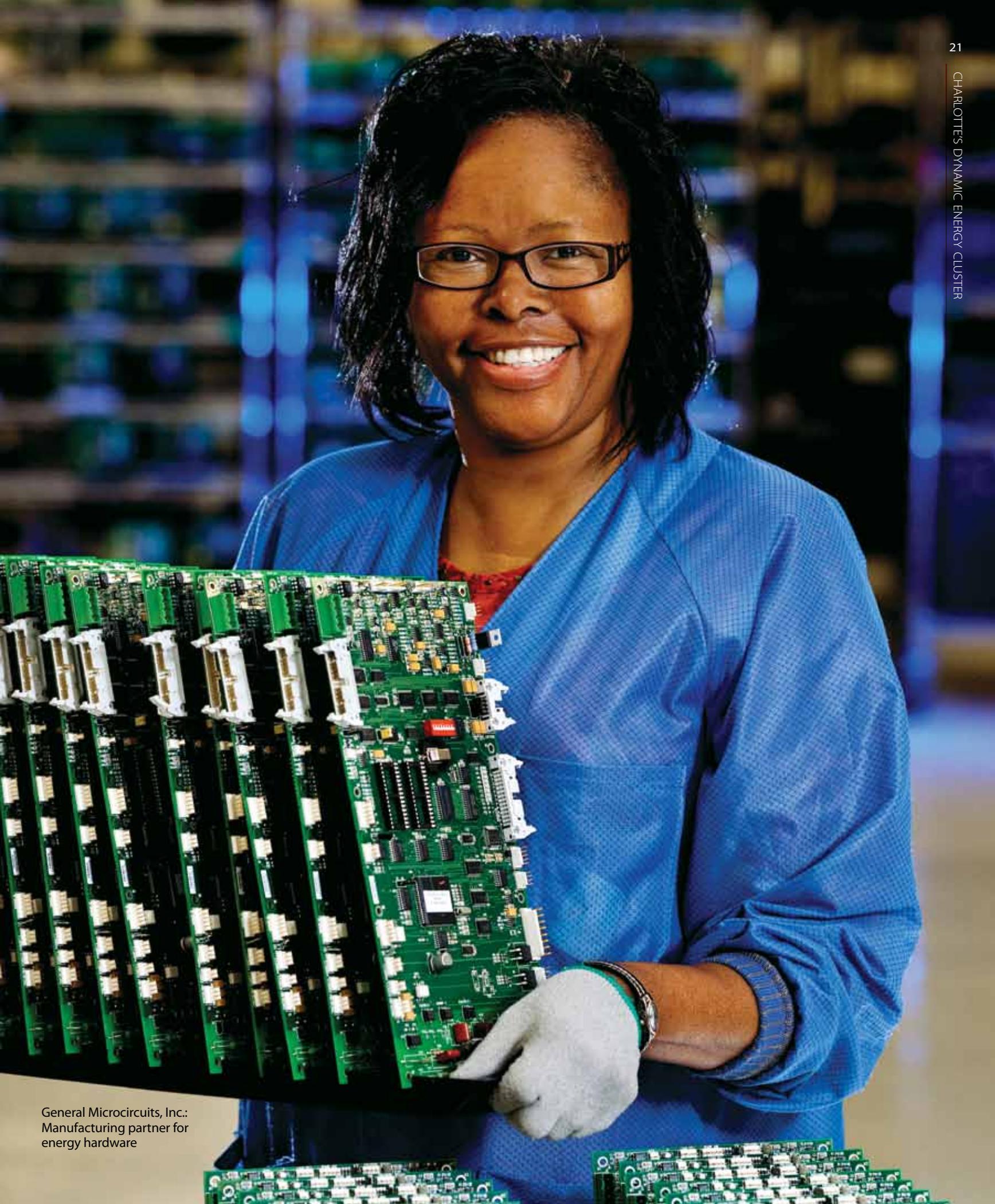
In providing technical energy assistance to 70 local governments, CALOR also helps administer a \$750,000 federal Department of Energy grant to improve energy efficiency for diverse county facilities such as animal shelters, jails, libraries, schools and courthouse offices.

Through its Sustainable Asset Fund, CALOR takes equity positions in green energy companies. "CALOR puts the power of public and private funding into green energy projects," said Morgan. "We make 'green' make sense."

Lime Energy Co.

Lime Energy Co., one of the nation's leading providers of clean energy solutions, brings more than 25 years of experience delivering economically viable efficiency and renewable energy solutions that enhance communities and protect the environment. Today, Lime is redefining the way organizations realize the benefits from clean energy. Lime accomplishes this by reducing and optimizing energy consumption, delivering cleaner ways of producing the energy we need, and uncovering the advantages that real time intelligence can provide from our utility infrastructure.

Lime's platform combines its entrepreneurial culture, proven strategies and implementation capabilities with a pure focus on customer satisfaction.



General Microcircuits, Inc.:
Manufacturing partner for
energy hardware



SAERTEX: Strong, ultra light materials

By design, this solution portfolio meets client's most complex challenges and allows the company to transform traditional energy costs into innovative and strategic competitive advantages for its customers.

"Lime Energy is excited to connect to the emerging energy hub in Charlotte," stated John O'Rourke, President and CEO of Lime Energy. "With the speed of innovation caused by the concentration of focus, investment, technology and partnerships in this area, we will contribute to long term sustainability in North Carolina."

SAERTEX

SAERTEX was founded in Germany, and today is a major world supplier of stitch-bonded fabrics for the composite market. SAERTEX USA was established 2001 and is the second largest manufacturing facility — at 130,000 square-feet — in the SAERTEX group. The company has 180 employees at its facility just outside Charlotte.

SAERTEX USA makes strong, ultra light materials that advance alternative energy technologies. For example, these materials make possible wind energy rotor profiles that were not even conceivable in the past.

SAERTEX USA supplies high quality fabrics to most major rotor blade manufacturers in the wind energy industry.

Besides the producers of rotor blades for wind mills, ship builders, ski producers, automotive and aerospace industries are end customers of SAERTEX. Each industry and end customer has unique needs, so the company has few standard products. Nearly all SAERTEX fabrics are individually developed according to each customer.

SAERTEX USA plans to create an additional 178 new jobs and invest \$6.5 million to expand its facility over three years.

STORM™ Technologies

STORM™ Technologies make power plants more efficient through combustion optimization. Dick Storm's team serves the world with boiler consulting services, technical direction, inspections, performance testing services, pulverizer and burner performance replacement parts, airflow management systems and training for total boiler optimization.

Storm's unique application of specialized test equipment helps the team determine improvements on nearly any steam generator. These improvements include combustion and boiler efficiency, heat rate improvements, environmental compliance and most importantly, reliability opportunities. Beyond optimization, Storm's comprehensive performance review of plant systems and inter-relating variables of fuels quality, reliability and operations is the company's niche.

Strategic Power Systems, Inc. (SPS)

Strategic Power Systems, Inc. (SPS) provides products and services focused on capturing power plant operational and maintenance data used to develop reliability metrics and benchmarks, including some of the most recognized organizations in the global energy market today: Electric Power Research Institute, Sciemus, ALSTOM, Chevron, Rolls-Royce, Iberdrola, GE, Sandia National Labs, Direct Energy, E.on, BP, Mitsubishi and hundreds of gas and steam turbine driven plants all over the world.



How SPS does this:

- ✦ Collecting and analyzing operating, failure, and maintenance data from power plants all over the world,
- ✦ Ensuring data completeness, accuracy and timeliness, and
- ✦ Providing unbiased meaningful performance benchmarks of reliability, availability and maintainability ... identifying best-in-class performance through its ORAP® products and services.

Salvatore DellaVilla Jr., CEO of SPS, made the original decision to move the business from Upstate NY to Charlotte in the mid-1990s. "Making the choice to locate SPS in Charlotte was an easy decision once I understood and appreciated the commitment that the business and city leaders, and the Chamber of Commerce, made and continue to make, to bring business into Charlotte. The vision of growth was evident, and the belief that Charlotte was the place to nurture a small business was abundantly clear. Today, with the vision of a connection to the energy industry, and the nurturing of new energy talent from the surrounding colleges and universities, it is easy to see that the vision for Charlotte continues. I am happy that we are a part of it."

SPS is located in the Ballantyne area of Charlotte and has 30 full time employees.

Electric Power Research Institute, Inc. (EPRI)

The Electric Power Research Institute, Inc. (EPRI) conducts research and development relating to the generation, delivery and use of electricity for the benefit of the public. An independent, nonprofit organization,

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~ Salvatore DellaVilla Jr, CEO, SPS

EPRI brings together its scientists and engineers as well as experts from academia and industry to help address challenges in electricity, including reliability, efficiency, health, safety and the environment. EPRI also provides technology, and economic analyses to drive long-range research and development planning, and supports research in emerging technologies.

In 1980 EPRI opened in Charlotte the world's first facility for researching and demonstrating technologies for the nondestructive evaluation of power plant components, and for training engineers and technicians in the use of these technologies. In the years since, EPRI has expanded its University Research Park campus to include laboratories focusing on nuclear and fossil generation, renewable energy and power delivery.

EPRI's research and development programs are conducted with a high degree of collaboration, and in 2010 EPRI hosted in Charlotte more than 2,000 global leaders from the executive, technical and management ranks of utilities, research organizations and stakeholder groups associated with the electricity sector.

With 360,000 square feet of laboratory, office and conference space on 45 acres, EPRI's Charlotte campus equips the institute to continue to expand its research, development and demonstration programs and to serve its member companies, which represent more than 90 percent of the electricity generated and delivered in the United States, and whose participation extends to 40 countries. EPRI is headquartered in Palo Alto, CA; with offices and laboratories also in Knoxville, TN and laboratories in Lenox, MA.

Energy Efficiency Through Collaboration

Envision Charlotte is a first-of-its-kind initiative to create a networked urban center to leverage digital energy technologies and business partnerships. Energy use data will be gathered, transmitted and displayed near real-time. The system was started in the fall of 2011 with key participants including Duke Energy, Charlotte Center City Partners, Cisco, Verizon and more than 98 percent of the building managers in Uptown Charlotte.

"As cities all over the world experience significant population growth, the need to sustainably balance social, economic and environmental resources becomes even more paramount. ... this public-private collaboration between Duke Energy, Cisco, the City of Charlotte and others demonstrates how we can change energy use habits and consumer behavior through innovation and operational excellence," says John Chambers, Cisco Chairman and CEO.

Creating a more sustainable, energy-efficient city is good for people and the planet. Charlotteans plan to save a significant amount of energy in the Uptown business district. Here's how:

- ✦ **Deploy technology** — The buildings in Charlotte's uptown are equipped with digital energy technologies. These technologies provide the ability to gather and display energy usage data.
- ✦ **Create awareness** — The technologies will connect, aggregate and share the buildings' collective energy use data on digital displays in all office building lobbies and other public spaces throughout the Uptown area.



Electric Power Research Institute:
High Voltage Insulator Testing



The University of North Carolina at Charlotte: Home of the Energy Production and Infrastructure Center (EPIC)

Change behavior — Envision Charlotte will use the latest in behavioral science and data visualization to engage the public through digital communication media. Energy usage data will be used to drive awareness among building owners, property managers and occupants.

At the heart of the initiative is the community goal to reduce energy use by up to 20 percent among some 70 office buildings — about 21 million feet of office space — by 2016. This will avoid approximately 220,000 metric tons of greenhouse gases or, simply put, save enough energy to power 40,000 homes. Uptown Charlotte can become the most environmentally and economically sustainable urban core in the USA, and maybe the world.

Envision Charlotte can significantly advance the way business and communities collaborate about energy. “This is an unprecedented plan to align business interests with smart grid technology . . . Envision Charlotte is one of the most forward-thinking projects on the East Coast,” says Michael Regan, Environmental Defense Fund’s Southeast Energy Director and Former EPA Energy and Air Policy Manager.



General Microcircuits, Inc.

Energetic People Power Charlotte’s Energy Industries

An ample and superior workforce is one reason why energy companies locate in Charlotte. Underpinning the pipeline of abundant skills is the university and technical educational system.

Central Piedmont Community College (CPCC)

Central Piedmont Community College (CPCC) serves more than 70,000 students annually at six local campuses. It’s industry’s ‘go-to’ place for workforce development. The energy sector is a key focus of CPCC.

The growing demand for energy across established power generation, non-traditional sources of power and in sustainable industries, drives an increasing demand for craft-level industry workers. To fill this need CPCC partners with industry leaders to develop specialized programs

to fit residents with the knowledge and skills to work within the energy sector.

Through partnerships with energy firms, specialized curriculum, and programs that benefit both existing and emerging workers, CPCC responds to the ever-changing workforce development needs of the community. “CPCC knows what it takes to develop a strong energy workforce and strengthen our position as the nation’s New Energy Capital,” says CPCC President Dr. Tony Zeiss.

That commitment goes beyond training and deep into community communications. For the past two years before fall semester CPCC has hosted “Energy Careers for a Bright Future.” Teaming up with the HR managers of area energy companies, the event showcased the workforce needs of the energy industry and provided information about the skills needed to work in one of the fastest-growing job sectors in Charlotte.

Energy Production and Infrastructure Center (EPIC)

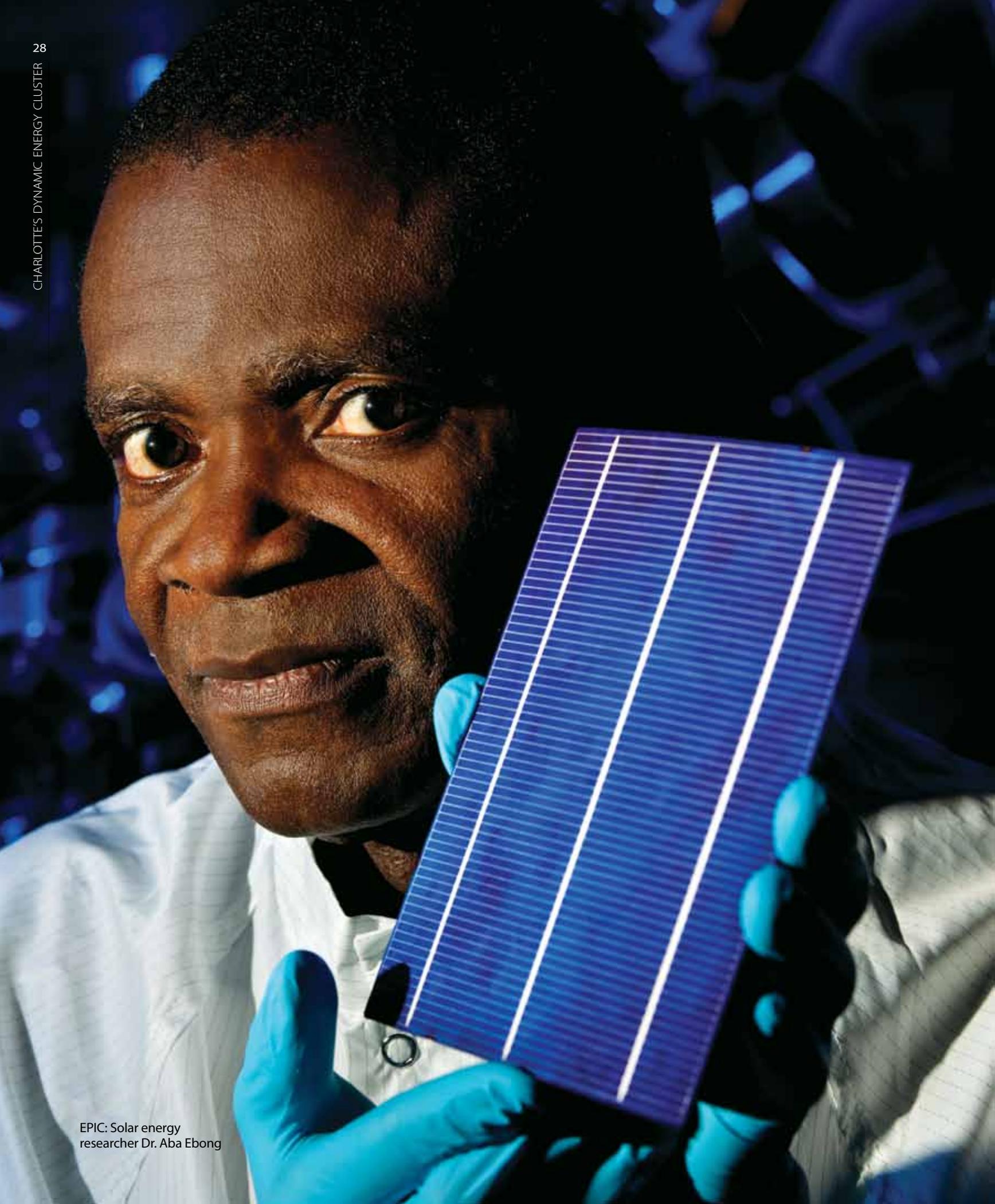
The Energy Production and Infrastructure Center (EPIC) at the University of North Carolina at Charlotte is a collaborative industry/education effort to produce a high-quality energy engineering workforce and be a partner in technology research for the global energy industry. This cross-discipline initiative in The William States Lee College of Engineering includes Mechanical Engineering, Electrical and Computer Engineering, Civil and Environmental Engineering and Engineering Technology.

The Lee College of Engineering student enrollment surpassed 3,000 in fall of 2010, up 32 percent in five years, marking exceptional growth in these critical professional disciplines.

“We have a mission to enhance the available technical workforce, advance energy technology, and facilitate strategic industry-university collaboration for the global energy industry while supporting the Carolinas’ economic and energy security development.”

~ Johan Enslin, director of EPIC

Students are hands-on in their academic careers and with prospective employers. The College of Engineering’s active Senior Design Program most recently saw almost 100 projects involving almost 300 students. Through industry partners the projects provide students and faculty with real-world design, engineering and project management experience. These projects provide valuable R&D opportunities and build important ties between the university, students and employers.



EPIC: Solar energy researcher Dr. Aba Ebong

Johan Enslin is an energy entrepreneur who is now director of EPIC: “We have a mission to enhance the available technical workforce, advance energy technology, and facilitate strategic industry-university collaboration for the global energy industry while supporting the Carolinas’ economic and energy security development.”

EPIC has defined key research thrusts, which include grid management, advanced sensing, manufacturing issues associated with large power generation equipment, renewable energy generation including photovoltaics, wind, geothermal and biofuels, and environmental improvements on fossil generation. Educational thrusts emphasize the application of engineering and business skills in the infrastructure; building and maintenance of power generation and distribution systems; technical aspects of certifications for the NRC and EPA; and environmental monitoring, maintenance and sustainability.

The new 200,000 square-foot EPIC building designs-in labs, offices and classrooms, with a 4,000 square-foot clean room, 3,500 square-foot material growth lab and high-bay research area.

Industry leaders Duke Energy and Siemens Energy made early, multi-million dollar commitments to EPIC’s future.

EPIC researchers at the Siemens Large Manufacturing Solutions Laboratory will focus on the unique challenges of building large-scale and high-precision components. The electric power industry relies on large turbines powered by gas, steam, or wind that drive massive generators. “Manufacturers of these systems are challenged by low unit volumes, increased sensitivity to thermal and gravitational effects, difficulties in logistics and part handling during assembly and high

capital equipment requirements. The Siemens Large Manufacturing Solutions Laboratory will research tools and methods for large part machining, metrology and assembly,” says John C. Ziegert, leader of the lab and Professor, Department of Mechanical Engineering and Engineering Science.

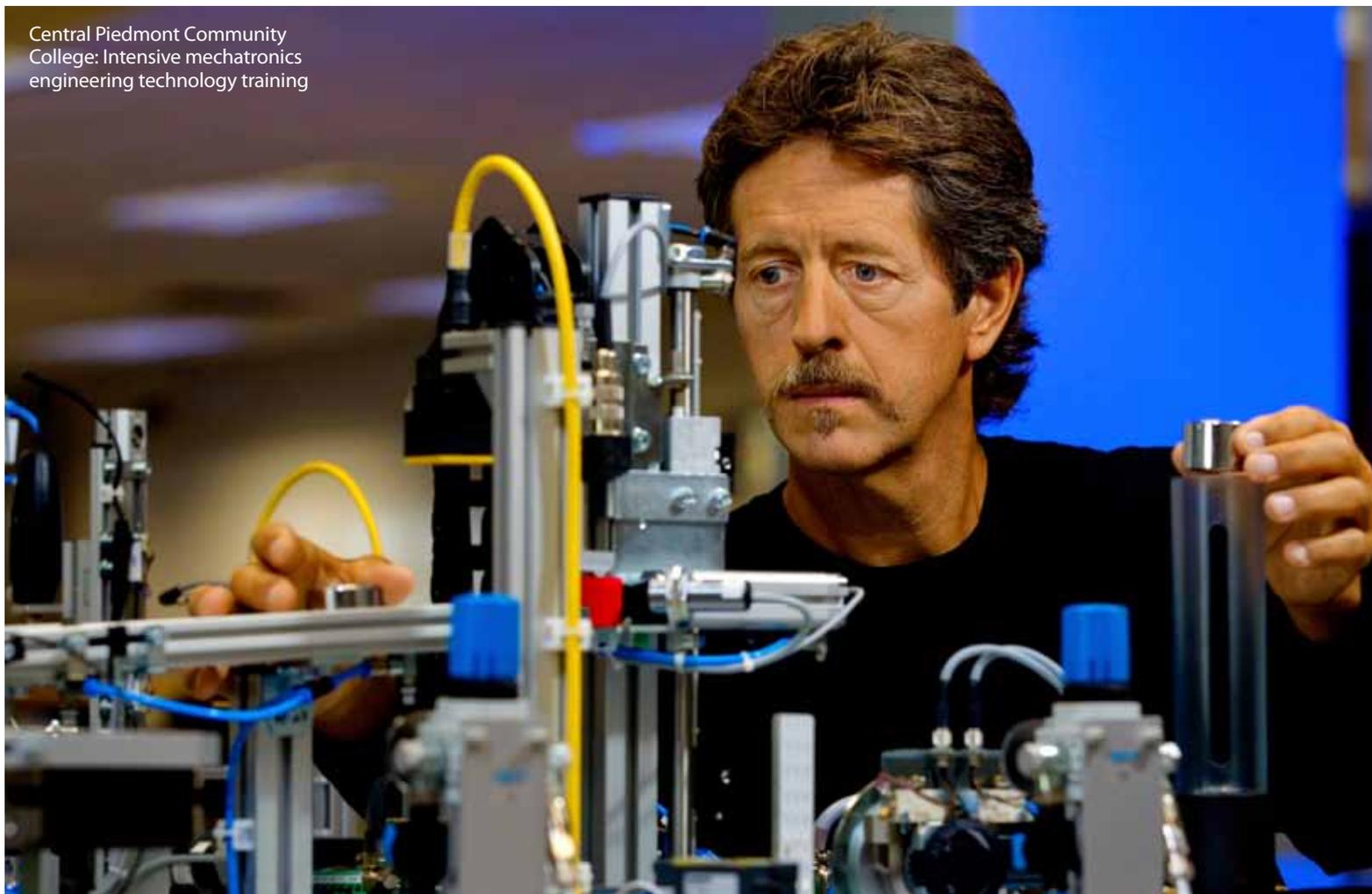
EPIC’s Duke Energy Smart Grid Laboratory intends to lead the nation in modernizing electric power production and infrastructure, a major national priority. “Research at EPIC is focusing on a smarter grid with a power-system infrastructure that accommodates all generation, T&D, end-use and storage options. The benefits — optimize energy assets and operational efficiency, motivate consumers to reduce energy consumption while ensuring a reliable power supply resistant to attack,” says Enslin.

EPIC researchers are hard at work. For example:

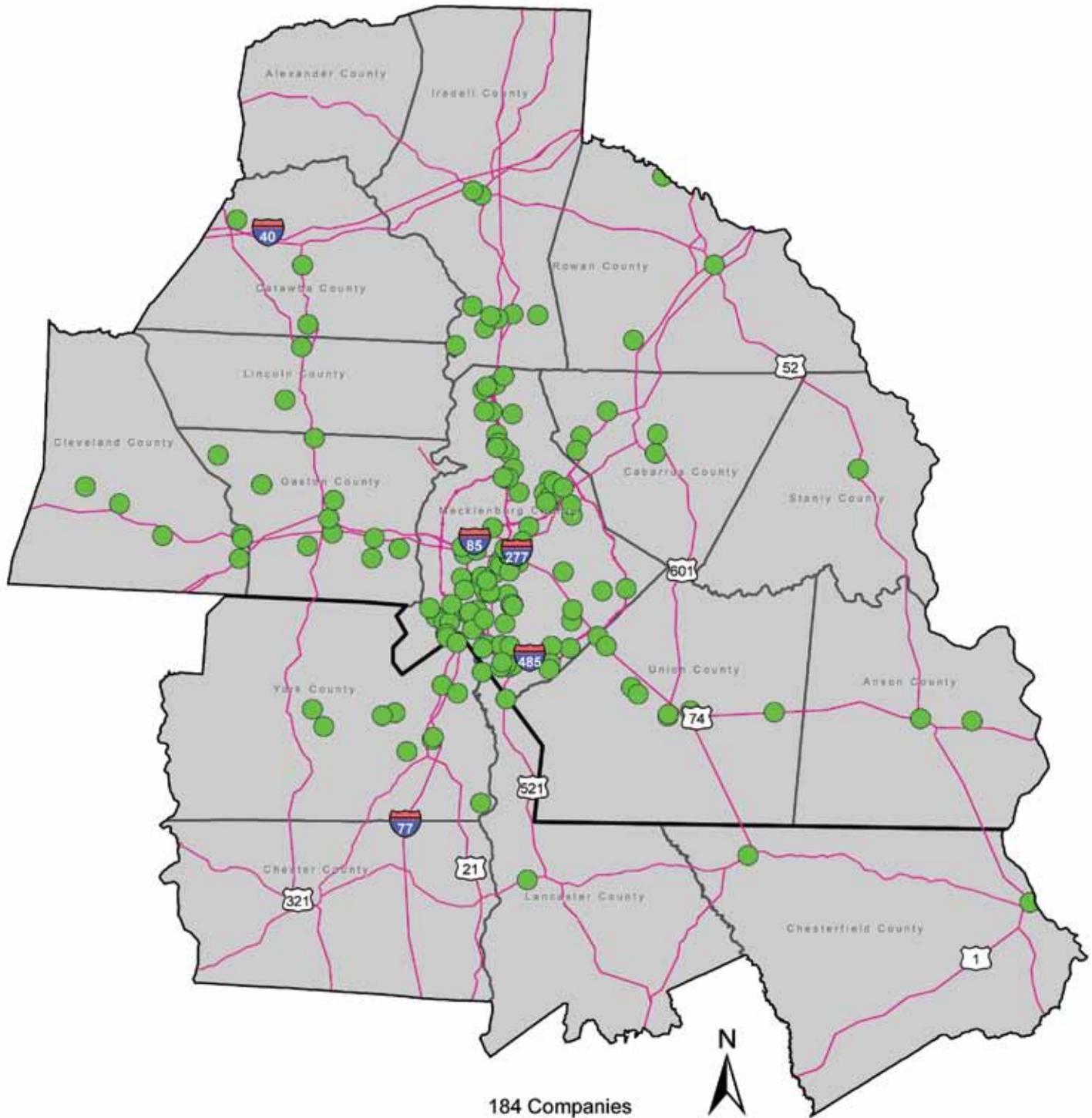
Dr. Aba Ebong and his team focus research on the design, modeling, fabrication and characterization of low-cost, high-efficiency and high-throughput solar cells. Aspects of bi-facial PV cell development and low cost manufacturing are investigated to provide grid-parity solar solutions in the short-term. This enables UNC Charlotte to take a leading role in the field of sustainable energy production.

Drs. Sukumar Kamalasan and Valentina Cecchi are developing a team around system aspects of a smarter grid. In the Smart Grid Laboratory the research concentrates on developing, testing, and analyzing real-time algorithms, models and devices that can be used in a smarter and intelligent electric power grid. Some of the major projects include: Renewable energy resource modeling and grid integration, system

Central Piedmont Community College: Intensive mechatronics engineering technology training



Energy Companies in the Charlotte Region



level studies such as active and reactive power management, stability and reliability in the presence of higher penetration of distributed power generation, distribution system automation, reconfiguration and transmission level studies that include wide area monitoring, analysis of system using Phase Measurement Units and power system security.

At Home: The Energy Industry in Charlotte

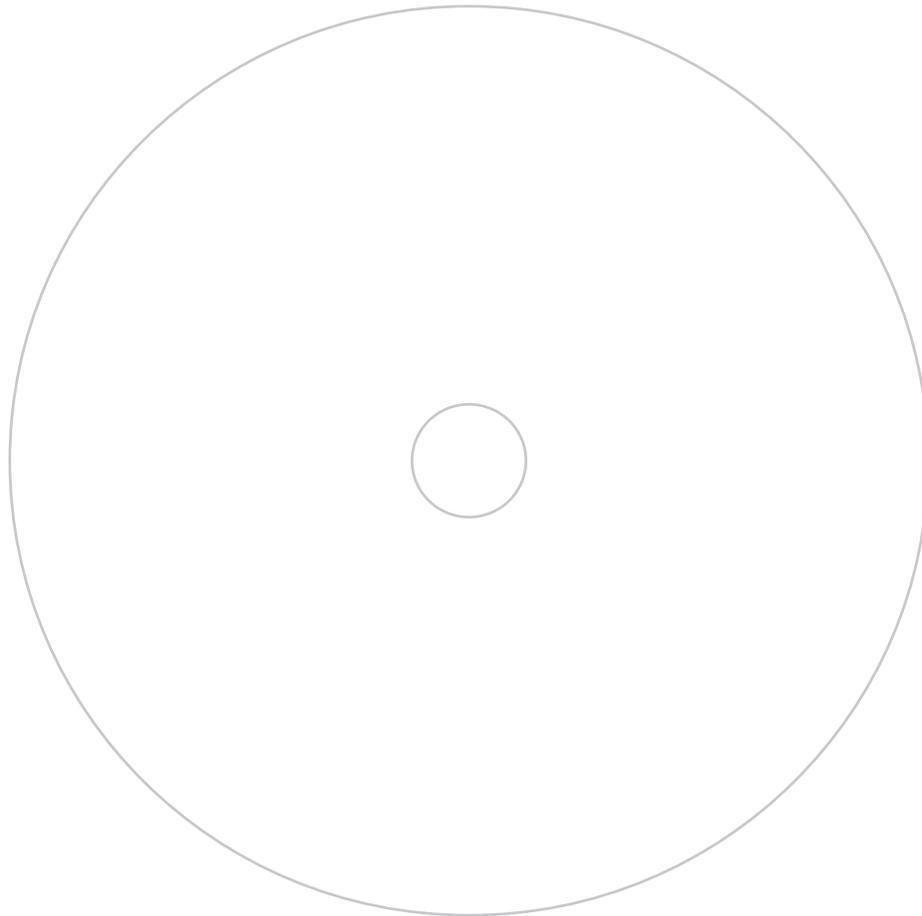
The U.S. government's head of the Advanced Research Projects Agency—Energy recently framed energy challenges like this: "We are bright and we need to make ourselves brighter in a sustainable way. But there are many parts of the world where people have not yet turned on the lights. If we can enable them to turn on the right kinds of lights, that is the biggest business opportunity..."

Those of us in Charlotte agree: The world is hungry for energy. Smart solutions are needed to sustain our world. New energy markets are ready to be served.

Charlotte energy experts are already out there. In action.

We serve those energy needs locally and multi-nationally. At the end of the day when our professionals touch down again along the runway lights at Charlotte-Douglas International Airport, they know they have arrived home, where the juice is always on, in the New Energy Capital.

Want to be part of Charlotte? You can.



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