The Greening of Louisiana’s Economy: the Construction Sector

Louisiana Workforce Commission
www.LMI.LaWorks.net/Green

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In 2009, Louisiana and Mississippi partnered to research economic development opportunities and workforce needs associated with the region’s green economy. Through a $2.3 million grant from the U.S. Department of Labor, a consortium of the Louisiana Workforce Commission, Louisiana State University, Mississippi Department of Employment Security, and Mississippi State University conducted an extensive study of economic activity that is beneficial to the environment. This and other research products were developed as part of that effort.
## The Construction Sector

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On the cover: Construction workers undertaking a coastal restoration project. Photo © Chris Macaluso
According to the North American Industry Classification System (NAICS), the Construction sector, NAICS 23, is primarily made up of establishments that erect buildings or are engaged in engineering projects such as the building of highways. Firms in this sector are not only engaged in new construction but also in additions, remodels, and repairs. Construction projects are often awarded to a general contractor who will then subcontract different components of the project to other firms. The NAICS further divides the Construction sector into three groups: those involved in the construction of buildings, heavy and civil engineering construction firms, and specialty trade contractors engaged in specific fields necessary for construction projects of all types. In Louisiana, this sector employs 131,504 people representing 7.1 percent of total nonfarm employment. In 2009, private entities in the Construction sector were responsible for $11,601 million, or 5.6 percent of Louisiana’s gross state product.

The Louisiana Green Jobs Survey was conducted during the fourth quarter of 2010 as part of this research effort to quantify and characterize the green economy in Louisiana. The survey provides a baseline measure of green employment. The survey results show an estimated 30,205 primary green jobs across all sectors, which represents 1.6 percent of Louisiana’s nonfarm employment. An estimated 67,591 support green jobs raises the total number of jobs involved in green activity categories to 97,796 jobs or 5.3 percent of nonfarm employment. The survey found that Louisiana’s Construction sector accounted for 3,646 primary green jobs and 3,446 support green jobs. These survey results reveal that 5.4 percent of jobs in the Construction sector are green with 2.8 percent primary green jobs and 2.6 percent support green jobs.

A primary green job is defined as one where more than 50 percent of an employee’s time is devoted to one of the seven green activity categories: renewable energy; energy efficiency; greenhouse gas reduction; pollution reduction and clean-up; recycling and waste reduction; sustainable agriculture, natural resource conservation and coastal restoration; and education, compliance, public awareness and training supporting the other categories.

Support green jobs are defined as those essential to an organization’s involvement in one of the activity categories, but not requiring more than 50 percent of an employee’s effort.
Introduction to the Green Component of the Construction Sector

Our homes, offices and other structures are built to last for many years. Unfortunately, they can also draw tremendous resources over their lifespan creating a significant impact on the environment. The construction industry is responding with new products, new techniques and new building designs that are making large improvements to each building’s energy and natural resources footprint. So-called “green building” is also finding favor in the market as the public’s concern for the environment grows and because of their benefits to quality of life and lower operating costs.

Louisiana is in a unique position to benefit from the greening of the construction industry. The destruction from Hurricanes Katrina and Rita in 2005 has forced the state’s residents and business owners to consider how they want to rebuild, which has often brought efficiency improvements through the implementation of new materials, technologies and appliances. Katrina and Rita also sparked changes in the state’s building codes that govern the environmental, performance and safety standards for all future construction. The construction industry in Louisiana is also unique for its role in coastal restoration. Every day Louisiana loses wetlands but with help from the Heavy and Civil Engineering Construction sector, marshes are being restored and in some cases new land is being created.

This report will focus on the greening of the construction industry in Louisiana with an emphasis on green building standards being used nationally and locally to lower the environmental footprint of the built environment, an overview of coastal restoration progress and projects in the state, and a look at how construction firms are taking steps to make their practices and job sites less harmful to the environment. This report will focus on the environmentally beneficial activities of the construction industry in two major areas: goods and services and business practices. Discussions of this industry’s involvement in environmentally beneficial activities will be provided where significant involvement by the industry is found. As with other components of this project, green was defined based on seven green activity categories:

1. Renewable Energy
2. Energy Efficiency
3. Greenhouse Gas Reduction
4. Pollution Reduction and Cleanup
5. Recycling and Waste Reduction
6. Sustainable Agriculture, Natural Resource Conservation and Coastal Restoration
7. Education, Compliance, Public Awareness and Training Supporting the Other Categories

Each activity category includes: the research, development, production and distribution of a final good or service; the supply of unique parts or inputs to a final good or service; and production processes and business practices regardless of the final good or service.
produced. The table below indicates which environmentally beneficial categories will be featured in this report.

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**Green Goods and Services**

The construction of buildings, and even more so, the operation of those buildings throughout their lifecycle is resource intensive. Heat during cold months, air conditioning in the summer, hot water, computers and electronic equipment, appliances, cooking and electricity all add up to 40 quadrillion BTUs of energy use every year in the United States. Together, commercial and residential buildings use more energy than either the transportation sector or industrial sector and account for 40 percent of the nation’s total energy use. Increases in population, economic activity, building size, service demands and energy prices are helping to push that energy use even higher. From 1980 to 2005 the number of U.S. households rose by almost 40 percent and GDP doubled helping to spur a 50 percent increase in commercial floor space over that same period. According to the Environmental Protection Agency (EPA), buildings in the United States also account for 12 percent of total water consumption, 68 percent of electricity consumption, and 38 percent of all carbon dioxide emissions.

In response to the significant size of the ecological footprint of the built environment, building practices that benefit the environment and conserve natural resources are gaining prominence. These so-called “green construction” methods are influencing the design, construction, renovation and demolition of building projects on all scales. By employing green building techniques and designs, environmental benefits such as improved and protected biodiversity and ecosystem health can be achieved. In addition, air and water quality can be improved, waste streams can be reduced, energy demands can be lowered and natural resources can be conserved and restored. Constructing buildings with green design aspects can also help to reduce operating costs, create or shape the market for environmentally-friendly goods and services, enhance productivity for building occupants and achieve greater economic performance throughout the building’s life cycle. Finally, green
buildings can help to protect and enhance the comfort and health of building occupants, increase the aesthetic qualities of the facilities, minimize the burden on local infrastructure systems and improve the quality of life of the occupants and communities.\(^7\)

The contemporary movement to plan and construct buildings with a smaller impact on the environment began to take shape late in the 20\(^{th}\) century. In 1989, the American Institute of Architects formed a Committee on the Environment and published their Environmental Resource Guide in 1992. The EPA and Department of Energy’s ENERGY STAR program was started in 1992 as was the first local green building program, which began in Austin, Texas. And in 1993, the United States Green Building Council (USGBC) and a “Greening of the Whitehouse” initiative of the Clinton Administration were both started. Finally, the USGBC’s Leadership in Energy and Environmental Design (LEED) pilot program was introduced in 1998.\(^8\)

Today there are several green building certification and rating systems to guide and score construction and renovation projects for clearly defined, environmentally preferable practices and designs. Most systems establish certain minimum requirements for environmental performance and award points for additional improvements or design elements. These green building systems account for a range of environmentally-sensitive factors such as energy efficiency, materials choice, site location and preparation, indoor air quality and water usage. Some rating systems only apply to residential facilities while others can be applied to both commercial and residential buildings, and they each maintain different relationships to building codes.

Although there are multiple rating systems that are being used by the construction industry to evaluate the environmental benefits of buildings, there is considerable overlap in the design features they use to assign their rankings. These rating systems differ slightly, but generally share an emphasis on energy efficiency, natural resource conservation, pollution reduction, and materials use and disposal. When a construction project qualifies as a “green building” under one of the rating systems to be described below, they are conforming to well-defined criteria for environmental improvement and performance. This research project also operates on a clearly defined set of criteria determining environmental benefit. While there is considerable agreement about what is environmentally beneficial shared between the various construction rating systems and this research project, a few elements included in green construction ratings systems go beyond what is being considered in this project and will not be discussed at length.

**U.S. Green Building Council: LEED**

The green building code with the highest level of name recognition is the United States Green Building Council’s Leadership in Energy and Environmental Design, or LEED. This voluntary certification system can be applied to any type of building at any stage of its lifecycle, but is most commonly associated with commercial facilities. LEED recognizes performance in site sustainability and selection, water efficiency, energy efficiency, materials and resources, indoor environmental quality, access to community resources and transit, environmental education and awareness for building occupants, innovation in design and other regionally-determined environmental concerns.\(^9\) LEED offers four levels of certification for new construction projects that are verified by a third-party called the Green Building Certification Institute that also issues professional credentials like LEED Green Associate and LEED Accredited Professional. Projects can be rated as “LEED certified,” “LEED Silver,”
“LEED Gold,” or “LEED Platinum.” The LEED standard has been applied to several building types each with its own special rating system designed to meet the particular needs of that facility. Building standards differ by category and include specialized construction projects such as schools, retail, healthcare facilities and neighborhood developments.

**National Green Building Standard**

Although LEED certification can be applied to residential construction, the National Green Building Standard (NGBS) developed collaboratively by the National Association of Home Builders Research Center, the International Code Council (ICC) and the American National Standards Institute (ANSI), is the more commonly used standard for residential projects. This voluntary standard provides green guidelines for new residences including single family and high-rise multifamily dwellings as well as hotels and motels; it also offers guides for remodels, additions and site design. The key measures of the NGBS are lot design, preparation and development, resource efficiency, energy efficiency, water efficiency, indoor environmental quality, and operation, maintenance and building owner education. The NGBS rating system offers four levels of certification, Bronze, Silver, Gold and Emerald, that relate to the structure’s performance in relation to the International Energy Conservation Code (establishes minimum energy efficiency requirements for residential and commercial buildings.)

**Green Globes**

A third green building rating system being used in the United States is Green Globes. This system was developed by the Canadian Standards Association and is operated by the Green Building Initiative in the United States. Green Globes is an online, interactive, third-party-verified, low-cost rating system that is being considered for adoption as an official ANSI standard. Because it is an online system, it is easily adaptable as a project progresses providing up-to-date feedback on project outcomes and efficiencies. The environmental areas of concern under the Green Globes rating system are energy, the indoor environment, site selection and development, water, resources, emissions and environmental management for the project as a whole.

**ENERGY STAR**

The partnership program between the EPA and the Department of Energy known as ENERGY STAR is most recognized as a labeler of energy efficient electronics and appliances. However, ENERGY STAR also certifies new homes, commercial buildings and industrial sites for energy performance. For a home to earn the ENERGY STAR rating it must be at least 15 percent more energy efficient than other homes built to the 2004 International Residential Code and include features that typically make them 20-30 percent more efficient than standard homes. To achieve these savings it must utilize effective insulation, high performance windows, tight construction and ducts, efficient heating and cooling equipment, efficient products and third party verification from independent home energy raters. Since 1995 when ENERGY STAR first began labeling homes, more than 1 million houses have been built that have met the certification requirements and this year residents in those homes will save a combined $270 million on utility bills and help limit greenhouse gas emissions equivalent to 370,000 vehicles.

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1 For more information on the different LEED ratings systems see the Appendix.
Interest in green building has been on the rise around the United States and in Louisiana. Since 2005, the number of LEED accredited professionals in Louisiana has increased dramatically from 19 to 497 currently. Of these certified professionals 206 are located in New Orleans, 33 are in Metairie, 115 are in Baton Rouge, and the remaining 143 are scattered across the rest of the state. The number of LEED certified buildings has been slower to respond with only 13 in the entire state registered in the USGBC’s database, but 100 more are in the process of attaining certification. Two high profile examples of LEED certified green building are both in New Orleans’ Lower 9th Ward: Global Green’s Holy Cross Project and the Make it Right Foundation.

The Holy Cross neighborhood development consists of five single-family homes, one 18-unit apartment building and a community center that will double as a sustainable design and climate action center. Photo © Global Green New Orleans.
and climate action center all with the goal of achieving LEED Platinum standards. Through the use of solar panels, efficient design, HVAC systems, energy and resource monitoring systems and efficient appliances, the buildings in this project are aiming to be self-sufficient in terms of their energy needs and carbon neutral. The apartment building will provide 75 to 90 percent lower energy bills and healthy indoor air quality for residents, and the community center will showcase community services and include a visitor’s and green building resource center, an arts component, a rain water harvesting system and solar panels to provide battery charging and drinking water during emergency situations. The Make it Right Foundation has committed to constructing 150 affordable, green, storm-resistant homes in the Lower 9th Ward, a part of New Orleans devastated by Hurricane Katrina. With the development achieving LEED Platinum status, this project will be the largest and greenest neighborhood of single family homes in the United States. By the fifth anniversary of Katrina, Make it Right had completed 50 homes. 

Home Building Associations in Louisiana are also supporting the National Green Building Standard for residential projects. Four builders in Louisiana are identified by the National Association of Home Builders as being certified to build to the NGBS standard: Reve Inc. of LaPlace, Integrity Builders, Inc. of Mandeville, Southern Homes, LLC of Slidell, and Edward Carroll Construction, LLC of Zachary. One high profile example of an NGBS residence in Louisiana is the 2010 Our Lady of the Lake Children’s Miracle Mansion, a 2,300 square foot, four bedroom, three bath home given away as a grand prize in a fundraiser for Our Lady of the Lake Children’s Hospital in Baton Rouge. The 2010 miracle mansion was built to be a NGBS Silver home and features radiant barrier, reclaimed wood flooring, a tankless water heater, low VOC paint, carpeting made from recycled fibers, low flow water fixtures and toilets and a recycling center and compost bin inside the home.

The ENERGY STAR program has only penetrated 3 percent or less of the Louisiana housing market, but has certified 9,931 homes in the state in total with 249 built in 2009 and 52 in 2010. Even at this level of activity, the ENERGY STAR qualified homes built in 2009 eliminated emissions equivalent to planting 202 acres of trees or taking 1,447,437 pounds of carbon dioxide out of the atmosphere. The Baton Rouge Metropolitan Area had the most active ENERGY STAR building partners with 46 qualified homes built from Oct. 2009-Sep. 2010. New Orleans’ 12 building partners registered 14 qualified homes in that period, the Houma-Bayou Cane-Thibodaux area had four ENERGY STAR homes, Lafayette and Shreveport-Bossier both built seven, and Lake Charles built two.

The remainder of the Green Goods and Services section of this report will focus on how businesses in the construction industry are achieving these green building certifications through accomplishments in each of the seven green activity categories in this study. This section will also discuss the expectations of green building certification systems within each green activity category.

Renewable Energy

Construction firms and specialty contractors are helping building owners install renewable energy systems on their existing properties and factoring them into new designs across Louisiana. Thanks to the most generous state tax credits in the country that allow Louisiana residents to get a 50 percent state tax refund on solar systems costing up to $25,000 or a maximum refund of $12,500, specialty contractors in solar installation have become more
common around the state. Despite the strong state incentives, the high price of solar has slowed adoption even with the generous tax credit. New Orleans was awarded a $200,000 Department of Energy “Solar Cities” grant in 2008, half of which was dedicated to public information and workforce training that hopes to quadruple the state’s supply of certified solar installers.29

Solar power systems can be used for hot water and for electricity generation. Under the LEED certification system a new construction project can earn up to seven points by utilizing on-site renewable energy. One point will be awarded for deriving 1 percent of the facility’s energy from on-site renewable sources and seven points for 13 percent.30 By entering into a two or more year renewable energy contract providing at least 35 percent of the building’s power from renewable sources, builders can also earn two points toward LEED certification.31

Energy Efficiency

Reducing a building’s energy consumption can have an enormous impact on the environment and on a building’s operating cost. Typically, energy makes up 30 percent of a commercial office building’s operating costs, which makes energy efficiency one of the strongest selling points for green building practices in commercial applications.32 For home builders, energy efficiency improvements that meet ENERGY STAR specifications can automatically earn a residential project a Bronze rating from the National Green Building Standard.

Other energy efficiency benchmarks used by the National Green Building Standard include the mandatory use of properly sized HVAC systems, sealed duct systems, insulation and air sealing (including the floors), window and door weatherstripping, and ENERGY STAR or equivalent windows and doors.33 LEED building standards from the USGBC also have three prerequisites in the category of energy efficiency that must be included in projects before the other five credit areas can be used to earn points. Prerequisite 1 deals with the commissioning of a facility’s energy systems, prerequisite 2 requires certain minimum levels of energy efficiency and prerequisite 3 deals strictly with refrigerant management in HVAC and refrigeration systems.34

Basic features of ENERGY STAR qualified homes are an efficient home envelope which refers to wall, floor, and attic insulation, air barriers and high performance windows; efficient air distribution which requires ductwork that is insulated and without leaks; efficient equipment for heating, cooling and water heating; efficient lighting; and efficient appliances like dishwashers, refrigerators, and clothes washers.35

Energy efficiency improvements are also a major factor in renovation projects and small scale home improvement projects. Specialty contractors are expanding their services across Louisiana to offer energy efficiency assessments of homes and businesses, sometimes known as “energy audits,” to point out inefficiencies in these structures and recommend improvements that can include changes to HVAC systems, window replacement or new insulation. Energy efficiency is also an excellent way to make progress toward other environmental goals. Because the energy used in buildings often comes from the burning of fossil fuels, reducing energy demands also helps reduce smog, acid rain and greenhouse gas emissions.36
Greenhouse Gas Reduction

In the construction industry, building energy efficient facilities, retrofits, additions and remodels is the best way to reduce greenhouse gases. Currently, buildings account for 38 percent of carbon dioxide emissions in the United States and over the next 25 years, emissions from buildings are expected to grow faster than in any other sector. According to ENERGY STAR, the average home in the United States can cause two times the greenhouse gas emissions of the typical car and each ENERGY STAR qualified home, or its equivalent, can keep 4,500 pounds of greenhouse gases out of the atmosphere each year. The average LEED certified building, according to the U.S. Green Building Council, uses 32 percent less electricity and saves 350 metric tons of carbon dioxide emissions every year than a comparable structure.

In May of 2007, the American Institute of Architects, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Architecture 2030, the Illuminating Engineering Society of North America and the U.S. Green Building Council finalized a memorandum of understanding with the U.S. Department of Energy that established a goal for carbon-neutral buildings by the year 2030. For a building to be carbon neutral it must use no energy from external power grids and can be operated at fair market values.

Pollution Prevention and Cleanup

The construction industry is being presented with new opportunities for pollution reduction through advances in common building materials. At Louisiana State University, pollution-absorbing concrete is being laid and tested for the first time in the United States. Professor Marwa Hassan in the Construction Management and Industrial Engineering Department has teamed with Pureti Inc., a company known for pioneering products that benefit the environment through advances in surfaces and fabrics, to install and monitor photocatalytic pavement. The photocatalytic concrete will absorb pollutants like nitrogen oxides, volatile organic compounds and sulfur dioxide from the air.

Both LEED and NGBS consider indoor air quality that can be compromised when chemicals leach into the air from carpets, paints, sealants and other building materials as a component of their ratings systems. These considerations, however, fall outside of the pollution definition being used in this project.

Recycling and Waste Reduction

For a new home or business building to meet LEED certification requirements it must provide for the storage and collection of recyclables in an easily-accessible, dedicated area. Other credits are awarded for maintaining existing walls, floors, roofs, or nonstructural elements, the management of construction waste during the build, materials reuse, incorporating recycled content, relying on regionally available materials, rapidly renewable materials and certified wood. Under the NGBS scoring system, framing techniques that optimize material usage, and prefabricated floors, walls and roofs are eligible for points. New methods for framing buildings known as “advanced framing” have been employed and developed on Make it Right projects in New Orleans that add strength but require fewer materials.

Another waste reduction project of the construction industry is the use of road debris for oyster and fish habitat. According to Doug Peter, Artificial Reef Coordinator in the Marine
Fisheries Division of the Louisiana Department of Wildlife and Fisheries, road rubble from work on the I-10 and I-12 interstate projects is being used to create hard-bottom habitat that could aid oyster bed development and attract fish. The EPA’s Environmental Technology Verification Program Materials Management and Remediation Center also discussed the beneficial use of road materials from the I-10 Twin Span bridge for coastal shoreline restoration in 2009. Bridge deck, guard rails, piles and pile caps were broken into smaller pieces and used as wave breaks and filler for shoreline projects. The EPA is working to verify that the concrete will not leach any harmful materials into the waterways for future projects. For the Twin Span project, only concrete brought in from other sites would require testing.

**Sustainable Agriculture, Natural Resource Conservation and Coastal Restoration**

LEED, NGBS, and EPA program rating systems all recognize natural resource conservation. In addition to ENERGY STAR, the EPA also runs a “WaterSense” labeling program for new homes. Homes with this label can help save an average of 10,000 gallons of water and at least $100 on utility costs each year through the use of specialized plumbing fixtures, efficient hot water delivery systems, water-efficient landscape design and other water saving
Builder specifications for WaterSense homes were issued in December of 2009. Water efficiency also factors into LEED certification. A prerequisite in the LEED system calls for a 20 percent reduction in water usage from baseline buildings and extra points are awarded for efficient landscaping, wastewater and other water savings. Water usage indoors and out is specifically outlined in the NGBS green building guide as well. Points toward higher ratings can be earned through reductions in hot water use, the installation of conserving appliances, showerheads, faucets, toilets and irrigation systems, collecting rainwater, filtering water, and for employing automatic shutoff devices.

The construction industry also provides key services to one of Louisiana’s most grave environmental threats: coastal erosion. Louisiana’s wetland loss accounts for more than 90 percent of all wetland loss in the continental United States and the highest rate of land loss in the world. Louisiana has lost nearly 2,300 square miles of land and continues to lose 24 square miles each year, the equivalent of one football field every 38 minutes. This problem can be exacerbated by hurricanes. In 2005, over just two days, Hurricanes Katrina and Rita returned 217 square miles of coastal marsh to open water. A variety of factors contribute to this incredible loss of wetlands, from natural processes like hurricanes and sea level rise to direct human efforts such as dredging, levee and dam building and the construction of transportation channels for ships and oil and gas pipelines.

Louisiana’s $17 billion investment in coastal restoration and protection efforts has produced tremendous opportunity for heavy and civil engineering and construction firms across the state, particularly for those experienced in installing or removing flood control structures, dredging or building pipeline systems. According to the Coastal Protection and Restoration Authority of Louisiana (CPRA), there has been a 1,500 percent increase in state planning, engineering, design and construction work since 2007. The graph below, taken from CPRA’s Fiscal Year 2011 Annual Plan, shows a noticeable increase in coastal restoration construction projects that can be attributed to the overall growth in state activity. The graph shows a large increase in project completions for 2011 as well as continued high levels in 2012 and 2013.

One of the main activities required for coastal restoration projects being provided by heavy and civil engineering construction firms is dredging. Every year the United States Army Corps of Engineers (USACE) oversees the dredging of 40-45 million cubic yards of sediment from the Mississippi and its channels. Unfortunately, not all of the sediment recovered through dredging is used to build back the coast. Typically, 17 million cubic yards of dredged material is disposed of each year in the Gulf of Mexico where it offers no coastal benefit. When dredged materials are used to provide soil to build up or protect coastal wetlands it is known as “beneficial use.” Under a new rule formulation, the state of Louisiana will require a coastal use permit for any dredging project greater than 25,000 cubic yards in hopes of improving on the 22 percent rate with which dredged sediment is used beneficially. The state has also established programs to clear land in preparation for use in USACE dredging and beneficial use operations.

Other types of work from the heavy and civil engineering construction industry being used to rebuild Louisiana’s marshland include: freshwater diversions, outfall management, sediment diversion, shoreline protection, hydraulic restoration and marsh management. In freshwater diversions, gates or siphons are used to channel freshwater and sediment from nearby rivers or other bodies of water into surrounding wetlands in order to slow saltwater
Project Construction Completion by Calendar year, 1995-2013.

This graph has been reprinted from the Coastal Protection and Restoration Authority of Louisiana's Fiscal Year 2011 Annual Plan: Integrated Ecosystem Restoration and Hurricane Protection in Coastal Louisiana and has been provided by the Office of Coastal Protection and Restoration.

intrusion and promote the growth of new marsh. Outfall management involves the use of gates, locks, weirs and canal plugs; gaps cut into man-made levees can be used to control the flow of freshwater diversions to maximize the benefit to the marsh. In some cases freshwater and sediment is allowed to flow freely from gaps created in levees to replicate the natural land-building process. Another aspect of coastal protection is the prevention of shoreline erosion. Shoreline protection projects involve constructing rock berms, wave damping fences or other obstacles to lower the wave energy hitting the shoreline and promote the buildup of sediment. In hydraulic restoration projects large scale changes are made in order to alter the drainage patterns around navigation channels. For these projects locks or gates must be changed on large scale waterways or dredging canals and levee gaps are blocked. Heavy construction and civil engineering firms can also be engaged in marsh management: the process of controlling water level and salinity in impounded marshes to encourage vegetation growth.62

Education, Compliance, Public Awareness and Training

Both the Make it Right Foundation and Global Green have made contractor education a key component to their rebuilding efforts. They have brought in different contractors and engineers to help them complete their buildings and learn green building techniques in the process. Make it Right has also partnered with the Louisiana chapter of the U.S. Green
Building Council to offer green building seminars. Global Green USA has also established a program to educate home owners on how to rebuild their homes in an environmentally sensitive fashion. “Build it Back Green” is a free service for those receiving Road Home grants to help home owners find the lowest cost way to make their rebuilt homes more energy efficient, use less water, and have higher indoor air quality.

A number of Louisiana colleges, technical schools and training programs offer courses in green construction methods or green building design. The LSU Agricultural Center, for example, has created a research-based show and educational home known as the LaHouse Project to display and teach professionals and consumers about energy efficiency, storm protection, waste management, indoor air quality, termites, and other local and environmental issues. The home features environmentally responsible materials and has been constructed with cutaways for demonstration purposes and features on-site staff and volunteers, seminars, continuing education classes for professionals and print materials.

Another educational and training program in green building was completed by a home builder in the Gonzales area, Roy Domangue. Domangue recently constructed three identical 1,900 square foot houses that vary only in their green construction methods and certification levels. The project, “Going Up, Going Green” is aimed at helping other builders determine the exact cost of attaining green certifications and to showcase green building methods. Several sections of each home are being left unfinished to reveal certain green techniques for use as a teaching tool and tours.

Providing education about energy efficiency, resource conservation and renewable energy technologies is also a key role of specialty contractors. Solar energy systems must be explained to their buyers or leasers and energy audits are most effective when the homeowner is being actively engaged in the inspection process. Plumbers, electricians, HVAC specialists and others must also help their customers understand why certain materials or products are being chosen for their homes.

Green Business Practices

Although they are vital actors in the implementation of green building designs and the active developers of green construction techniques, contractors within the construction industry typically only assume certain roles in the development of green building projects. Architects, designers and engineers are primarily responsible for the adoption of green features and pursuing green certifications for buildings and only seldom include the actual builders in the planning process. Contractors do, however, exert influence over certain project elements that can lead to a greener building and significant reductions in the environmental impact of the industry as a whole. This portion of the report will focus on how the construction industry is lessening its impact on the environment by changing how it builds and how it operates its construction sites.

In the EPA's sector report for the construction industry several suggestions were made on how contractors could reduce the greenhouse gas emissions on building projects. Contractors have great control, the report indicated, over their equipment and maintenance, the fuels used in that equipment, electricity use and materials recycling. Contractors can
also be influential when it comes to material selection, materials shipment and delivery, employee commuting and site preparation. The Associated General Contractors (AGC) of America also supports certain actions by their members to minimize the environmental footprint of the construction process. AGC supports the recycling and reuse of construction and demolition debris, the limiting of hazardous materials on the jobsite, protections for existing vegetation and donating cleared trees or mulch for use on site. The AGC also supports environmentally friendly purchasing decisions and efforts to reduce particulate matter and nitrogen oxide emissions from existing equipment when possible.

**Renewable Energy**

Renewable energy resources are available to the construction industry that can help reduce their reliance on fossil fuels. Mobile solar panels attached to trailers can be used on construction sites to reduce or eliminate the dependence on diesel-powered generators and can be rented or purchased from a variety of companies.

**Energy Efficiency/Greenhouse Gas Reduction**

In the construction industry, fuel efficiency, pollution reduction and greenhouse gas emissions are closely linked to the types and amount of equipment and vehicles used on site. Measures for 2002 indicate that the construction industry released 100 million metric tons of carbon dioxide from fossil fuel combustion (largely from vehicles and equipment) and 31 million metric tons of carbon dioxide related to electricity purchases. One way contractors can reduce their greenhouse gas footprint and cut back on pollution is to improve their equipment, vehicles and generators through fuel efficiency enhancements and pollution reducing technology. Improving fuel efficiency can bring reduced fuel costs and can be achieved through a variety of means: maintenance, reducing idling time while waiting to load or unload, driver training and equipment replacement. In some cases fuel efficiency, pollution and emissions can all be addressed by a change in fuel type. By switching from a diesel-powered generator to one driven by natural gas or propane, for example, air pollution and greenhouse emissions can be lowered. Cutbacks on diesel fuel use by 10 percent in the industry could save 6.73 million metric tons of carbon dioxide emissions each year.

The EPA has established grant programs to encourage industries to transition to cleaner burning diesel fleets. The National Clean Diesel Funding Assistance Program is accepting proposals for projects that will demonstrate large reductions in pollution from diesel engines. The program is flexible in how lower emissions are achieved: add-on/retrofit technologies, idle reduction technology, cleaner fuels, engine repowers and upgrades, vehicle and equipment replacement and financing programs can all qualify for awards. Although this grant covers equipment and vehicles used by the construction industry, individual firms are not allowed to apply alone; they must partner with government or nonprofit organizations to be eligible for funding. In Louisiana, the Office of Management and Finance was awarded funds through this program in 2008, and in 2009 with funding from the American Recovery and Reinvestment Act the state received $1.73 million under the State Clean Diesel Grant Program. The National Clean Diesel Funding Assistance Program also provided $1.05 million for the Regional Planning Commission for Jefferson and Orleans Parishes to replace one diesel locomotive engine with multiple GENSET engines.
Pollution Prevention and Cleanup

Storm water runoff can transform construction sites into point sources of pollution. Storm water can carry sediment, chemicals and construction debris into sewer systems or nearby bodies of water that can harm fish, wildlife and habitat. The National Pollutant Discharge Elimination System, operated by the EPA, establishes mandatory permitting and rules for construction sites one acre and larger. Permits require six control measures for pollution: public education and outreach regarding the impacts of storm water, soliciting public participation, illicit discharge detection and elimination, storm water control measures, post-construction storm water management in new developments or redevelopments and good housekeeping to prevent pollution in municipal operations. In order to obtain a permit through the National Pollutant Discharge Elimination System, construction professionals must submit a storm water pollution prevention plan. The EPA offers templates and sample storm water pollution prevention plans to assist the industry with the proper avoidance of pollution resulting from storm water runoff.

Recycling and Waste Reduction

Construction, renovation and demolition projects produce nearly 25 percent of the total solid waste volume for the United States. Of the 170 million tons of construction-related waste generated in 2003 in the U.S., 48 percent was recovered and 62 percent was sent to landfills. Over the next twenty years it is estimated that 27 percent of the existing buildings in this country will be replaced increasing the need for enhanced recycling and reclamation efforts in the industry to reduce waste. In addition to implementing effective recycling and waste reduction efforts on site, construction firms can also make improvements in this activity category by purchasing materials made from recycled content.

Sustainable Agriculture, Natural Resources Conservation and Coastal Restoration

No evidence of significant involvement for this activity category was found in the construction industry.

Education, Compliance, Public Awareness and Training

The Associated Builders and Contractors, Inc. (ABC), a national association of construction and construction-related firms, recommends that their members take certain steps to learn more about green building techniques. According to the ABC, employees in management and staff positions should consider National Center for Construction Education and Research (NCCER) programs, Green Advantage, LEED Green Associate or LEED Accredited Professional certifications. Journeymen and foremen should participate in ABC “green toolbox talks,” Green Building Basics, Green Advantage Certification, LEED Green Associate, NCCER courses on “your role in the green environment” and “supervising green construction projects,” as well as other formal and informal trainings.
Economic Factors

While today’s green building is often defined by recently developed or improved building products and business practices that benefit the environment, the economic forces underlying their adoption have been influencing construction for many years. The long-run cost of operating facilities has long been a consideration in the design and construction of buildings and the selection of certain materials can help reduce electricity usage or improve energy efficiency. As the cost of energy rises, these up-front investments will become relatively more attractive. In addition, consumer preferences toward environmentally beneficial construction also encourage activities in this sector, even in some cases where the financial considerations alone would not be sufficient to support the more environmentally beneficial option.

These economic factors have supported interest in green building despite the downward turn in the broader construction sector over the last few years. Green building was called “a bright spot in a down market” by the National Association of Home Builders in May of 2009. A report by McGraw-Hill Construction also found that green construction grew by 50 percent during the last two years and will account for 25 percent of all new building activity in 2010. The report went on to forecast a tripling of nonresidential green building by 2015, giving it 48 percent of the market share. For large projects valued at over $50 million, the LEED standard was mentioned or adopted 71 percent of the time. According to the report, green builders are expanding in efforts to differentiate within the market, appeal to growing public awareness of the methods, and help reduce the operating costs and boost building values for their customers. According to a 2009 economic impact study sponsored by the USGBC, spending for green building supports more than 2 million jobs and generates over $100 billion in gross domestic product and wages and its impact on the economy is expected to grow to support almost 8 million jobs, $400 billion in wages and $550 billion in gross domestic product.

One of the primary economic factors that has limited the growth of green construction is the higher initial cost to build in an environmentally beneficial way. The average additional cost to building to LEED standards, for example, can be an additional 0-2.5 percent for certified projects, 0-3.5 percent for a Silver rating, and 1-5 percent for Gold certification. In Louisiana, Domangue’s green building demonstration project in Gonzales for residential construction showed that building to the NHBA Silver level added a $5,455 premium (after tax rebates from the state) over building to the Bronze standard, and that building to the Gold certification level added $11,035 after state and federal incentives were factored into the costs. While the higher initial costs may be worth it for items with the greatest long-run cost savings, for other components, only those individuals with the strongest preferences toward green building or those businesses whose customers place the most value on those characteristics have undertaken these projects. Over time, however, technology will advance and wider adoption of these materials will create cost-savings through returns to increasing scale. These gains will lower the upfront costs, leading more individuals and businesses to choose green building options.
Federal incentives play an important role in decisions regarding green construction. One of the most prominent ways that the federal government incentivizes investment in energy efficiency is by offering tax benefits to individuals and corporations that implement certain green technologies. However, federal standards for federal buildings also encourage the use of energy efficient materials in new and existing federal buildings.

Green activities in the construction industry have been given a boost by the federal stimulus package. The American Recovery and Reinvestment Act of 2009 (ARRA) has directed funds to state and federal departments of education, energy, housing and urban development, labor and transportation as well as the U.S. General Services Administration for construction projects, many of which have a green emphasis. Construction-related awards from the stimulus bill were detailed by the United States Green Building Council.

In Louisiana, this Department of Energy ARRA funding helped create a series of programs through the state Department of Natural Resources called “EmPower Louisiana” that has been both directly and indirectly beneficial to the construction industry. EmPower Louisiana includes the Home Energy Rebate Option Program (HERO) which has offered rebates for new homes that are built to be energy efficient, rebates for existing homes that improve their energy efficiency and rebates for commercial facilities that undergo a retrofit to improve their energy efficiency. EmPower Louisiana also administers the Energy Efficiency and Conservation Block Grant Program that includes public building projects to enhance energy efficiency, implement renewable energy technologies and adopt green building codes.
Transportation Efficiency and Alternative Fuels Program to complete work on infrastructure upgrades and replace traffic signals and the State Buildings Lead by Example program through which energy efficiency and conservation projects are being installed throughout state buildings.

Louisiana has also adopted several pieces of legislation over the past few years that have stimulated the construction industry and supported improvements to energy efficiency and environmental protection. The Louisiana legislative session of 2007 was landmark for promoting green technologies that also impact the construction industry. Senate Bill 2240 mandated energy efficiency measures in the construction and renovation of major state-funded building projects. Under the law, projects must exceed the requirements set out by the state energy code by at least 30 percent on all new projects larger than 15,000 square feet through the end of 2009. The law was later expanded to cover smaller projects and renovations in 2010 and 2011. Also in 2007, ACT 371 was passed which established the state tax credit for wind and solar energy systems. On top of the 30 percent federal tax credit, the state's generous 50 percent tax credit on solar and wind systems costing up to $25,000 has invigorated solar energy system contractors in the state.

In 2009, two other bills passed the state legislature that benefited specialty trade contractors within the construction industry. House Bill 858 expanded eligibility for the wind and solar energy tax credit on residential properties and Senate Bill 224 allowed for the creation of sustainable energy financing districts by local governmental subdivisions and bonds for property assessment programs for solar energy and efficiency projects.

Green building in Louisiana also received a significant boost when the Recovery School District and the Orleans Parish School Board finalized its "School Facilities Master Plan." The detailed plan for rebuilding New Orleans' schools after Hurricane Katrina included the specification that all public schools would be built to a minimum of LEED Silver certification and a requirement to reduce energy use by 30 percent. This green building effort led to a partnership with Global Green USA to provide technical expertise and a $300,000 grant to develop Andrew H. Wilson Elementary School into the first official "Model Green School" that showcases high performance green schools. By 2013, 17 new and 13 renovated LEED schools are expected to be open in New Orleans. In 2010, the United States Green Building Council recognized the Recovery School District and the Orleans Parish School Board with its Leadership Award for its rebuilding effort, and the federal government granted the New Orleans public schools a $1.8 billion FEMA grant to fund the master plans' building targets.

Environmentally efficient building has also been encouraged through changes to the state’s building codes. In the aftermath of Hurricane Katrina, the Louisiana Legislature created the State Uniform Construction Code, which encompassed the International Codes or I-Codes, thereby including several international building standards as well as local plumbing and national electrical standards. The residential version of the code incorporated a number of environmental and energy efficiency standards including resistance to heat transfer (R-values), thermal conductance (U-factor) and solar heat gain coefficients. By implementing these changes, the Louisiana Department of Natural Resources Technology Assessment Division estimates that home owners could expect to see an initial cost of $618 per house that would be recovered in an average of three years through lower energy use and lower utility bills. In January 2007, statewide use of the 2006 I-Codes took effect, helping to guide
the restoration efforts and preserve residential and commercial infrastructure in the event of future natural disasters.

## Coastal Restoration

Coastal restoration efforts in Louisiana are affected by their own set of economic realities and policies. While there are a number of projects deemed “ready-to-go” and there have been encouraging investments into coastal restoration projects in the last few years, firms in the heavy and civil engineering construction industry must be aware of this green activity’s dependence on governmental action and funding. The high cost and complex agency regulation of coastal areas prevent nearly all restoration projects from being undertaken solely by nonprofits, private firms or municipal governments. Instead, development of coastal restoration projects is driven by state processes and a combination of state and federal money. In a July 14, 2010, press release from Gov. Bobby Jindal entitled, “Agenda for Revitalizing Coastal Louisiana,” the total cost of replacing all of Louisiana’s historic wetland losses was estimated to be as high as $96 billion. Although that level of funding or sustained restoration effort likely will never be a reality, there are positive signs that coastal restoration projects will be sustained by continued influxes of money.

The Coastal Protection and Restoration Authority’s *Fiscal Year 2011 Annual Plan* indicates that project spending and implementation over the next three fiscal years will be dominated by construction spending. The plan projects $417.5 million in construction spending for fiscal year 2011, $238.6 million in construction spending in fiscal year 2012 and $358.1 million to be spent on construction efforts in fiscal year 2013.

In 2006, the Gulf of Mexico Energy Security Act (GOMESA) initiated a significant increase in federal funding for coastal restoration projects. Beginning in 2017, GOMESA will channel 37.5 percent of all federal revenue from new offshore drilling leases on the outer continental shelf to four Gulf of Mexico states for coastal restoration projects. Because it is home to the most oil and gas production activities of the four Gulf states, Louisiana can expect to see the largest share of GOMESA money. Estimated contributions to coastal restoration from these offshore leases range from $80 to $300 million dollars per year. There is a chance Louisiana will not have to wait until 2017 to benefit from federal offshore leasing revenue. Sen. Mary Landrieu has introduced legislation to allow Louisiana to begin to receive this funding immediately, and the state is contemplating bonding part of the GOMESA funds for near-term work, or borrowing money from the federal government.

In the future, the Gulf of Mexico Energy Security Act of 2006 (GOMESA) will play a prominent role in the continued funding of coastal restoration and protection projects by replacing the uncertain dividends from various state and federal efforts with a stable source of funding. Once revenues from new offshore oil and gas leases begin to flow to the Gulf States, Louisiana can begin to use its portion of the revenues for conservation, restoration and hurricane protection. In response, representatives from both the environmental advocacy community and the construction industry expect strong growth in the heavy and civil engineering construction industry.

In the meantime, there are significant planning and training efforts underway to ready the state for action once the GOMESA money becomes available. Many international engineering firms have developed a presence along the coast in preparation for the influx
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of projects expected from the 2017 increase in funding. Locally, firms located in New Orleans, Houma and Baton Rouge are being contracted by the USACOE with even big players like Shaw breaking into the field over the past six to eight years.

Other potential sources of funding for coastal restoration projects in Louisiana stem from the BP Oil Spill in the Gulf of Mexico. BP will have to pay fines under the Clean Water Act for each gallon of discharged oil. Landrieu is working to direct much of that funding to coastal restoration projects along the affected Gulf Coast. Because of the Oil Spill, Louisiana is also involved in a Natural Resources Damage Assessment (NRDA) process. For the NRDA process, a collection of state trustees will conduct studies to identify the full extent of damages to public resources, the best ways to restore those resources, and the type and amount of restoration required. The NRDA process involves three steps: preliminary assessment of injured resources, quantification of natural resources damages and restoration planning, and the implementation of restoration efforts. Although the NRDA process is expected to take years, BP has already agreed to fund $1 billion in early restoration projects across the gulf. Eventually, the NRDA process will likely lead to significant additional funding for the construction of coastal restoration projects.

Technology

Along with building design and construction techniques, technology is a driving force for green building. Technology encourages green activity in the construction sector through the development of new products that consumers may opt to install. Technological improvements also can cause a shift of general activities in the construction sector into green activities as new products provide more environmentally beneficial options for consumers and businesses to deploy.

Many aspects of building construction have benefited from technological advances that are helping to produce facilities with a smaller environmental footprint. Solar and wind technology is being combined with advanced utility meters to help buildings be more energy independent. Plumbing fixtures are designed to rely on less water yet provide the same level of service. New types of insulation are being made to be more heat resistant and being made from sustainable sources. Gray water systems and rain collection systems are being installed to help homes and businesses conserve water. Radiant heat barrier and efficient windows and doors are helping moderate indoor temperatures without relying on heating and air conditioning systems. Permeable concrete is being used to minimize storm water runoff. Paints, adhesives, sealants and architectural coatings that are engineered to emit low or zero levels of volatile organic compounds are being applied. Roofing materials are being made to be more durable. Appliances and HVAC systems available for installation in building projects are more efficient than ever.

Job Growth and Workforce Development
Considering primary and support jobs, green employment in the Construction sector is expected to grow by 12.4 percent over the 10-year period from 2010 to 2020. However, that growth will not occur gradually over the forecast horizon. Fueled by continued spending on green stimulus projects and construction related to several large economic development projects, green employment is expected to jump up from 7,092 in 2010 to 9,167 in 2011. As the effect of the stimulus wanes, green employment in construction is expected to drop to 8,744 in 2012 and fall to 7,369 by 2015. At that point the temporary boost from the stimulus will have ended. However, by 2020, green employment will have returned a long-run trend of positive growth as the decreasing cost of green technologies increases demand for installation or construction services to deploy those technologies. In addition, the long-run planning for coastal restoration activities in the state implies a larger share of funds dedicated to the construction phase of those projects by 2020. Green employment in construction is projected to reach 7,970 by 2020.

The long-term outlook for green employment in the Construction sector bucks the broader Louisiana trends for the Construction sector shown in the most recent employment projections, which imply a slight decrease of about 1.6 percent over the 10-year period from 2008 to 2018. Those 2018 projections were revised in 2011 to reflect new information available since the initial projections release, including new developments identified through the Green Jobs Consortium research effort. Because of this dynamic, it is essential for training providers to consider the outlook for occupations requiring specialized skills when developing curricula. Specialized training as a green builder or as a specialty contractor with knowledge of green building techniques or technologies is required for some projects and can help builders distinguish themselves in the market and meet growing customer demand.

The oldest green certification program for the construction industry is Green Advantage (GA). It was established collaboratively by the EPA, the Nature Conservancy, the Science Applications International Corporation and the University of Florida. GA offers three certifications: one for commercial builders, one for residential builders and one that is a joint commercial and residential certification. Certification under the GA system requires demonstrating mastery of six green building topics: the rationale for building green and sustainable site and land use, water, energy and atmosphere, materials and indoor environmental quality. GA was designed to be complementary to other professional certification systems like LEED. In fact, practitioners certified under Green Advantage can help projects seeking LEED certification earn innovation points.111

The United States Green Building Council also offers its own certification credentials for the LEED rating system. LEED professional accreditation is run through the Green Building Certification Institute (GBCI), an independent organization that also measures green building performance and determines or verifies LEED certification levels for building projects. Three levels of certification are available through the GBCI: LEED Green Associate, LEED AP and LEED Fellow. These certifications not only demonstrate an understanding of green building principles and best practices but the LEED Rating system in particular.112 All projects hoping to achieve certification under one of the LEED rating systems will have to rely on LEED certified professionals for project leadership.

The National Center for Construction Education and Research (NCCER), a non-profit educational and training foundation for the construction industry, also supports training for certain techniques that are used in green building. Weatherization technician courses and trainings are offered that include materials and techniques used in sealing homes from heat
Photovoltaics courses and trainings provide basic knowledge and application of solar systems. A course titled “Your Role in the Green Environment” provides an introduction to green building for entry-level workers. Although based out of the University of Florida in Gainesville, assessments are offered at a variety of locations in Louisiana.

Finally, it should be noted that the anticipated employment growth of green jobs in the Construction sector will be comprised of a combination of the creation of new green jobs and the gradual greening of existing jobs. While the contribution of each factor has yet to be determined, training providers should consider the unique training needs brought on by each of these changes. For some green occupations, existing workers will need training to enhance their skills. For other occupations, curricula may be needed to provide a more comprehensive training for new workers or those entering a new occupation.

Key Players

**Green Building Certification Institute (GBCI):** Provides third-party certifications of projects seeking LEED status and professional credentials LEED Green Associate, LEED AP and LEED Fellow. www.gbci.org

**ENERGY STAR:** Government-sponsored program run by the EPA and the Department of Energy aimed at protecting the environment and helping consumers save money through energy efficiency improvements. www.energystar.gov

**Louisiana Home Builders Association:** Louisiana-based advocacy group for home builders and safe housing. www.lhba.org

**National Association of Home Builders:** Trade association made up largely of home builders and remodelers advocating for housing-related issues. Developed the National Green Building Standard and National Green Building Program in 2007 and 2008. www.nahbgreen.org


**Coastal Restoration**

**Coastal Protection and Restoration Authority of Louisiana (CPRA):** Created in 2005 with the passage of Act 8 of the Second Extraordinary Session of the State Legislature, CPRA is the state body charged with the articulation of priorities and focus for the development and implementation of comprehensive coastal protection and restoration projects for Louisiana. Each year CPRA develops a coastal plan with a comprehensive list of ongoing and future coastal projects and their implementation schedules. CPRA is composed of 20 representatives from state agencies, regional levee districts, coastal parishes, and regional representatives and legislators and is currently chaired by Garret Graves, the director of the Governor’s Office of Coastal Activities. This agency works with the state legislature and the governor’s advisory commission on coastal protection, restoration and conservation groups.
Governor’s Advisory Commission on Coastal Protection, Restoration, and Conservation: advises the governor and the Office of Coastal Activities on the status and direction of the state’s coastal protection program and assists the state with the development and implementation of its coastal plan. It reviews programs, trends and scientific findings in order to make recommendations and resolve conflicts between the different stakeholders involved in restoration projects.

Governor’s Office of Coastal Activities (GOCA): The Governor’s Office of Coastal Activities’ mission is to provide leadership and support to the Coastal Protection and Restoration Authority of Louisiana. GOCA also serves to provide balance between the development interests and conservation/restoration interests of Louisiana’s coastal resources through the encouragement of multiple use projects within the coastal zone. www.goca.state.la.us

Louisiana Applied Coastal Engineering and Science Division (LACES): Scientific advisory component of OCPR to contribute scientific expertise to projects. Contributions from nongovernmental organizations, academics, government agencies and others help target areas of greatest needs and apply the most up-to-date technical knowledge to decision-making. LACES also oversees the monitoring and modeling processes to demonstrate project performance.

Louisiana Department of Natural Resources Office of Coastal Management (OCM): The Office of Coastal Management is tasked with the protection of the state’s coastal wetlands through the regulation of land use in the coastal zone, especially those which have a direct and influential impact on coastal waters. The permits/mitigation division attempts to protect, develop and restore coastal zone resources by issuing “coastal use permits” to those wishing to use state wetlands. All dredging and fill work, bulkhead construction, shoreline maintenance and other development projects must obtain a coastal use permit before beginning activity. The OCM also has an advisory branch to assist parishes in the development of coastal lands in accordance with local coastal programs, to determine consistency between state and federal coastal zone management issues, to educate the public regarding resource management and pollution, to protect estuary waters and to plan Natural Resource Damage Assessments of oil spills occurring in the coastal area. http://dnr.louisiana.gov/crm/

Louisiana Department of Wildlife and Fisheries (LDWF): The primary mission of the Louisiana Department of Wildlife and Fisheries is to manage and protect the state’s natural resources. This mission can be broken down to include the maintenance of coastal wildlife areas and refuges, oil spill risk management and mitigation (due to extraction on LDWF lands) and habitat conservation for threatened and endangered species. Generally, the LDWF only commits to coastal restoration projects when they are related to existing wildlife management areas, refuge habitat or LDWF-owned or -managed land. LDWF also reviews and comments on oil and gas permits as they relate to environmental impacts, but holds no enforcement authority. http://www.wlf.louisiana.gov/

Office of Coastal Protection and Restoration (OCPR): OCPR is the implementation arm of the Coastal Protection and Restoration Authority of Louisiana (CPRA). The Office of Coastal Protection and Restoration combines staff from the Department of Natural Resources,
which directs coastal restoration activities, and the Department of Transportation and Development, which coordinates coastal flood control measures, to plan, design, operate, construct, maintain and monitor all CPRA activities. http://dnr.louisiana.gov/crm/ocpr.asp

**United States Army Corps of Engineers (USACE):** The mission of the Army Corps of Engineers is to provide public engineering services in both peacetime and wartime to fortify national security and the economy and to reduce risk from disasters. The USACE administers and tracks projects approved through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) and constructs the projects as well when it is the lead agency. The Army Corps is also a key player in coastal restoration projects as the agency responsible for maintaining navigation through the nation’s waterways and the construction of flood control measures such as the levee system, two systems intertwined with coastal restoration efforts. www.usace.army.mil/
The Greening of Louisiana’s Economy

Appendix: U.S. Green Building Council
LEED Rating Systems

The Leadership in Energy and Environmental Design (LEED) ratings systems devised by the U.S. Green Building Council provide a framework for identifying, implementing and measuring “green buildings.” All LEED ratings systems evaluate the sustainability of projects along seven or eight main criteria:

1. Sustainable Sites—Where and how a facility is constructed.
2. Water Efficiency—How facilities use water and create wastewater.
4. Materials and Resources—Reducing waste, promoting recycling and the use of recycled materials and environmentally preferred purchasing.
5. Indoor Environmental Quality—Air quality and ventilation, daylighting and thermal systems.
6. Innovation in Design—Room to exceed or reinvent design criteria in other categories, geographic sensitivities.
7. Regional Priority—Zip code-based credits based on relevant environmental concerns.
8. (Education and Awareness)—not included in all systems. Points awarded for educating occupants and visitors about the environmental and design features of the facility.

These criteria evaluate performance differently based on the rating system used. For example, LEED for New Construction awards points under “sustainable sites” for construction activities and limited disruption to the surrounding environment while LEED for Existing Buildings measures landscape and hardscape impacts under the same “sustainable sites” category.
New Construction and Major Renovations

Originally developed for use in the construction of new commercial office buildings, this rating system has also been applied to other building types, including high-rise residential, government, institutional (churches, museums, etc.) and recreational buildings as well as manufacturing plants and laboratory settings.

Existing Buildings: Operations & Maintenance

Performance standards for the operation and upkeep of existing commercial, institutional, high-rise residential or government buildings. The main focus is on the sustainable operation of buildings, but is also useful for upgrades to building processes such as minor facility alterations or additions, space-use changes, or HVAC or lighting systems changes. Alterations affecting more than 50 percent of the building floor area or more than 50 percent of the regular building occupants are not eligible under this rating system. At minimum 5 percent of the building floor space must be affected to qualify under this rating system.

Commercial Interiors

Designed as performance standards for tenant spaces for office, restaurant, healthcare, hotel/resort and education buildings. This rating system is ideal for tenants who lease their space or do not occupy an entire building. Works hand-in-hand with LEED for Core & Shell.

Core & Shell

Used to certify the design and construction of commercial, institutional and high-rise residential buildings. This system recognizes the limited decision-making power given to developers in speculative building developments—projects in which teams do not control all aspects of construction. Included in the Core and Shell designation are mechanical, electrical, plumbing and fire protection systems. This rating system is unique in that it provides considerations for projects where actual occupancy of a facility is not known, guidelines for modeling building systems that may extend beyond a developer’s scope, and a specialized checklist to show what is and is not within a developer’s control.

Schools—New Construction and Major Renovations

Addresses the design and construction activities of new school buildings and major renovations of existing school buildings. It is the only LEED rating system that is to be applied to the construction of academic buildings. While designed with K-12 schools in mind, it may be applied to higher education facilities.

Retail—New Construction & Major Renovations and Commercial Interiors

Two ratings systems are available for retail operations that recognize the distinct needs of retail environments. Occupancy characteristics, hours of operation, parking needs, energy consumption and prototype design use are all considered in the development of
this standard. In addition to stand-alone stores, this system also includes retail designs for use inside larger facilities. Retail includes grocery, restaurant, apparel, specialty stores and banks. The “New Construction” guide should be used for new buildings and the “Commercial Interiors” guide should be used for tenant spaces in larger buildings.

**Healthcare**

The newest LEED rating system introduced in April of 2011. Addresses new construction and major renovations and can be used at inpatient, outpatient and long-term care facilities as well as medical offices, research centers, and medical education complexes.

**Homes**

Although primarily known for rating commercial buildings, LEED also offers guidelines for residential buildings including dormitories and single-family dwellings.

**Neighborhood Development (Pilot Phase)**

This rating system integrates smart growth principles, green building and urbanism into one system. It is the product of a partnership between USGBC, Congress for the New Urbanism and the Natural Resources Defense Council. This rating system includes best practices for the location and design of new neighborhood developments. These guidelines counter sprawl with compact, pedestrian-friendly, mixed-use developments while considering the performance of the buildings within that neighborhood.
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18 “FW: LEED Professionals by Year/region.” Message to Anisa Baldwin Metzger. 11 Aug. 2010. E-mail.


