



## **PLANNING AND ZONING FOR GREEN BUILDINGS**

**17**

### **MUNICIPAL IMPLEMENTATION TOOL #17**

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## What is Green Building?

Green building is the design, construction, management, and operation of buildings and communities in a way that minimizes negative impacts on the environment. Many green building practices also lead to long-term cost savings and benefits to human health.

Green building practices are important because the built environment has a profound impact on the environment, economy, and human health. In the United States, buildings alone account for:

- 72% of electricity consumption
- 39% of energy use
- 38% of all carbon dioxide (CO<sub>2</sub>) emissions
- 40% of raw materials use
- 30% of waste output
- 14% of potable water consumption

(Source: USGBC)

Increasing numbers of local, county, and regional governments are devising ways to promote green buildings through comprehensive plans, building and municipal codes, and zoning ordinances. This brochure provides an overview of the benefits of green building and identifies the various green building certification programs currently in use. It also describes planning strategies to promote green buildings and profiles green buildings and planning programs in Greater Philadelphia.



*The Comcast Center is the tallest building in the City of Philadelphia and the tallest sustainable building in the United States. Developed by Liberty Property Trust, the 58-story, 975-foot office tower was designed with a goal of achieving Silver LEED certification.*

SOURCE: Peter Aaron/Esto courtesy of Liberty Property Trust

## Green Building and Municipal Sustainability

Green building can be an important part of an overall municipal approach to sustainability. Sustainability is often described using the analogy of a three-legged stool. Kent Portney describes the three legs in his book *Taking Sustainable Cities Seriously*:

- **Environmental sustainability** – Earth’s resources have a finite ability to sustain life (a concept referred to as ecological carrying capacity). Human activity that depletes the earth’s resources also exhausts the capacity of the planet to carry life.
- **Economic sustainability** – The pursuit of economic growth should be linked to consideration of ecological impacts. Economic growth that depletes the earth’s resources will also be unsustainable economically, as illustrated by peak oil.
- **Social sustainability** – Interest in human welfare underscores concerns about both environmental and economic sustainability. The concept of social sustainability also includes the idea that the earth’s resources should be shared equitably.

Together, these three often-overlapping components of sustainability are required to sustain ecological systems, economic security, and human well-being for present and future generations. Because local governments construct, operate, and maintain environmental, economic, and social infrastructure, conduct planning, and implement environmental regulations, many of the actions necessary for a sustainable future must take place at the local level.

### Some Local Sustainability Issues

- Environmental justice
- Diverse representation on local government boards and commissions
- Energy efficiency and conservation
- Municipal greenhouse gas emissions
- Green buildings
- Sustainable land use and transportation
- Local food production
- Water conservation and quality
- Tree and woodland management
- Green municipal facilities, operations, and purchasing
- Waste reduction and recycling

## Benefits of Green Buildings

Green buildings yield a range of benefits for their users, developers, the surrounding community, and the environment.

### Environmental benefits

- Reduce greenhouse gas emissions
- Enhance and protect ecosystems and biodiversity
- Improve air and water quality
- Reduce solid waste
- Conserve natural resources

### Human and community benefits

- Improve performance of schoolchildren
- Cut hospital patient recovery times in half
- Improve public health
- Enhance physical comfort through higher-quality heating, ventilation, and air-conditioning (HVAC) systems
- Minimize strain on local infrastructure
- Contribute to overall quality of life

### Economic benefits

- Optimize life-cycle economic performance
- Boost employee job satisfaction and reduce absenteeism
- Improve bottom line with enhanced employee productivity
- Take advantage of expanding economic markets and tax breaks or other incentive programs
- Consume less energy and water—saving money every month
- Green buildings command premium rents
- Green homes sell faster than conventional homes



*A solar array on the Armory in Media, PA helps the Borough achieve its goal of using 20% clean energy by 2010. SOURCE:*

**Borough of Media**

## Green Buildings and Climate Change

Global concerns about climate change have led to an unprecedented number of initiatives aimed at reducing greenhouse gas emissions. The most significant of these is the Kyoto Protocol, an international environmental treaty negotiated by more than 160 nations that was adopted in 1997. The Kyoto Protocol calls for significant reductions in CO<sub>2</sub> emissions based on 1990 levels. As one of the original signatories of the agreement, the U.S. agreed to reduce its CO<sub>2</sub> emissions by 6% from 1990 levels. In 1997, the U.S. Senate voted 95-0 on a resolution that said the U.S. should not be a signatory to the Kyoto Protocol. U.S. CO<sub>2</sub> emissions have since increased 15% above 1990 levels and 21% above the Kyoto objective.

According to 2004 data from the Union of Concerned Scientists, the U.S. is the highest CO<sub>2</sub> emitter of any nation. Preliminary estimates indicate that China either may soon surpass the U.S. in total emissions, although U.S. per capita emissions are higher. Buildings account for much of the greenhouse gas emissions that affect climate change. In the U.S., buildings account for 72% of electricity consumption, 39% of energy use, and 38% of all CO<sub>2</sub> emissions.

Local governments across the U.S. have made a commitment to combat climate change by signing agreements or participating in programs to reduce greenhouse gasses such as:

- **U.S. Conference of Mayors Climate Protection Agreement** – Participating cities commit to meet or beat Kyoto Protocol targets and urge state governments and Congress to enact policies to reduce greenhouse gas emissions.
- **Sierra Club Cool Cities** - Cities that have made a commitment to stopping global warming by signing the U.S. Mayors Climate Protection Agreement may participate in this program, which encourages cities to implement smart energy solutions.
- **ICLEI Cities for Climate Protection Campaign** – This campaign assists cities in adopting policies and implementing quantifiable measures to reduce local greenhouse gas emissions.
- **ICLEI Climate Resilient Communities Program** – This program assists local governments in enhancing community resiliency to the impacts and costs associated with projected climate change.
- **National Association of Counties County Climate Protection Program** – Counties adopt a pledge to reduce greenhouse gas emissions by a numerical target.
- **American Institute of Architects (AIA) Sustainability 2030 Challenge** – The 2030 Challenge calls for public buildings to be carbon neutral by 2030.

## Climate Change in the Delaware Valley

Several initiatives address climate change and green buildings in the Delaware Valley. The City of Philadelphia has provided leadership on climate change through various commitments and planning efforts. Philadelphia participates in the Cities for Climate Protection Campaign, the U.S. Conference of Mayors Climate Protection Agreement, and the Large Cities Climate Leadership Group. Its 2007 Local Action Plan strengthened the City's commitment to these initiatives and outlined steps the City should take to reduce greenhouse gas emissions by 10% by 2010. On April 29, 2009, Philadelphia released the *Greenworks Philadelphia* sustainability framework to build upon the 2007 Local Action Plan. *Greenworks Philadelphia* sets goals and measurable targets in five areas: energy, environment, equity, economy, and engagement. The framework identifies more than 150 initiatives to help achieve the targets by 2015.

Montgomery County, Pennsylvania established a Greenhouse Gas Reduction Task Force in 2007 to create a plan for reducing greenhouse gas emissions in the County. The Task Force identified three reduction targets: 1) by 2012, reduce greenhouse gas emissions by 4% below 2004 levels; 2) by 2017, reduce greenhouse gas emissions by an additional 15% below 2004 levels; and 3) by 2025, reduce greenhouse gas emissions by an additional 32% below 2004 levels. The Task Force recommended more than 100 actions, including reducing energy use in county buildings and adopting a green building zoning ordinance. A number of counties in the region are working on climate change initiatives, including Chester County, Pennsylvania, which established a Greenhouse Gas Emissions Reduction Taskforce.

In 2009, DVRPC published the *Regional Greenhouse Gas Emissions Inventory*, which provides an accounting of greenhouse gas emissions for the nine-county DVRPC region for 2005. To conduct the inventory, DVRPC consulted with the U.S. Environmental Protection Agency, the Commonwealth of Pennsylvania, the State of New Jersey, and ICLEI Local Governments for Sustainability. The inventory allocates emissions to each of the nine counties and 352 municipalities in the region. The results clearly demonstrate that municipalities with higher densities tend to produce lower per capita emissions. DVRPC will use this inventory to develop policies and programs for the region to reduce greenhouse gas emissions. DVRPC will also use the regional inventory to support local inventory efforts, as well as to support analysis of where investments in energy conservation and efficiency might be most productively made.

## Some Techniques and Strategies for Building Green

### Site and Neighborhood Planning

- Infill and brownfield sites
- Sites adjacent to existing development
- Mixed-use development
- Building placement and orientation
- Stormwater design and management
- Alternative transportation facilities (e.g., bike racks)
- Public transportation access
- Light pollution reduction
- Preserve or provide recreation areas
- Adaptable building design

### Energy

- Insulation and sealing
- Efficient lighting (e.g., compact fluorescent bulbs)
- Efficient HVAC systems
- Energy-efficient windows
- Building commissioning (assesses building system performance)
- Energy-efficient appliances
- Passive solar heating and solar hot water
- Cool roofs
- Onsite renewable energy

### Water Conservation and Efficiency

- Water-efficient landscaping
- Water-conserving building systems
- Green roofs

### Construction, Demolition, and Materials

- Use of recycled materials or materials from the region
- Building reuse
- Use of wood products certified sustainably produced
- Construction waste management
- Low-and-zero volatile organic compound (VOC) emitting finishes and furnishings
- Storage and collection of recyclables

### Indoor Environmental Quality

- Thermal comfort and controllability
- Ventilation
- Air filtration
- Daylighting and views

### Third-Party Guidelines and Certifications

A number of organizations provide guidelines and certification programs to measure the “greenness” of buildings. Many local government green building regulations incorporate these certification programs into their local building codes, plans, or zoning.

Each of the programs is unique. For example, two of the most widely used programs—ENERGY STAR and LEED—present a number of differences. ENERGY STAR is a no-cost government program administered by the U.S. Environmental Protection Agency that promotes energy efficiency. Buildings that earn ENERGY STAR designation use less energy than similar facilities. LEED was developed by the U.S. Green Building Council (USGBC), a non-profit organization, as a way to define high-performance green buildings. LEED addresses a wide range of sustainable green building features, and the USGBC charges a fee for LEED certification.

It is relatively non-controversial for local governments to promote third-party certification for their own buildings or as part of a voluntary program. However, requiring certification by private, third-party entities may be legally invalid as an improper delegation of local governments’ authority to regulate buildings and land use. More flexible, voluntary programs that offer incentives in exchange for green building certification are more likely to hold up to legal scrutiny.

*Third-party guideline and certification programs include:*

#### **Green Building Challenge/SBTool**

[www.greenbuilding.ca](http://www.greenbuilding.ca)

Green Building Challenge (GBC) is a green building assessment tool. SBTool is the software implementation of the method.

#### **Green Communities**

[www.greencommunitiesonline.org](http://www.greencommunitiesonline.org)

The Green Communities Criteria is the first national framework for healthy, efficient, and environmentally-smart affordable homes.

#### **Green Globes**

[www.greenglobes.com](http://www.greenglobes.com)

Green Globes is a voluntary online assessment and rating tool operated by the Green Building Initiative.



## LEED (Leadership in Energy and Environmental Design)

[www.usgbc.org/leed](http://www.usgbc.org/leed)

Developed by the U.S. Green Building Council (USGBC), LEED is the most widely-used green building certification system in the U.S. Close to 2,000 buildings have been certified under LEED. Buildings that follow LEED guidelines can qualify for four levels of certification: Certified, Silver, Gold, and Platinum. Projects incorporating a greater number of green building strategies earn higher levels of certification.

LEED rating systems include:

- **The LEED for New Construction Rating System** is designed to guide and distinguish high-performance commercial and institutional projects, including office buildings, high-rise residential buildings, government buildings, recreational facilities, manufacturing plants, and laboratories.
- **The LEED for Existing Buildings Rating System** helps building owners and operators measure operations, improvements, and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts. LEED for Existing Buildings addresses whole-building cleaning and maintenance issues, recycling programs, exterior maintenance programs, and systems upgrades. It can be applied both to existing buildings seeking LEED certification for the first time and to projects previously certified under LEED.
- **The LEED for Neighborhood Development Rating System** integrates the principles of smart growth, urbanism, and green building into the first national system for neighborhood design. LEED for Neighborhood Development is a collaboration among the USGBC, the Congress for the New Urbanism, and the Natural Resources Defense Council.
- **LEED for Homes** is a rating system that promotes the design and construction of high-performance green homes. A green home uses less energy, water, and natural resources; creates less waste; and is healthier and more comfortable for the occupants. Benefits of a LEED home include lower energy and water bills, reduced greenhouse gas emissions, and less exposure to mold, mildew, and other indoor toxins.



## ENERGY STAR

[www.energystar.gov](http://www.energystar.gov)

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy designed to help save money and protect the environment through energy-efficient products and practices. ENERGY STAR programs provide energy-efficient solutions in four main areas: products, home improvement, new homes, and buildings and plants. Some of the ways municipalities can incorporate ENERGY STAR into their sustainability planning efforts include promoting purchase and use of ENERGY STAR products, encouraging homes and buildings to achieve ENERGY STAR performance standards, or becoming an ENERGY STAR partner.

Buildings can earn the **ENERGY STAR Label** if they score 75 or greater using the EPA's Portfolio Manager tool, which allows users to track and assess energy and water consumption in buildings and compare results to similar buildings nationwide. Close to 7,000 buildings have earned the ENERGY STAR Label. Design projects can achieve the **Designed to Earn the ENERGY STAR** recognition by demonstrating energy efficiency in design intent and construction documents.

Through the **ENERGY STAR for Government** program, local and state governments as well as federal agencies commit to:

- Developing an **Energy Strategy for the Future** to prepare for the risks and opportunities of our energy future
- Joining the **ENERGY STAR Challenge**, a national call-to-action to improve the energy efficiency of America's commercial and industrial buildings by 10 percent or more
- Becoming an **ENERGY STAR Partner** committed to measuring, tracking, and benchmarking energy performance; developing strategies to improve energy performance; and educating staff and the public about ENERGY STAR achievements

## National Association of Home Builders (NAHB) Green Scoring Tool

[www.nahbgreen.org](http://www.nahbgreen.org)

NAHB offers two scoring options:

- The **National Green Building Standard** provides scoring for single-family homes, multi-unit homes, lot and site development, and residential remodeling projects. NAHB developed this tool in partnership with the International Code Council (ICC) in compliance with the requirements of the American National Standards Institute (ANSI).
- The **Model Green Home Building Guidelines** are for single-family homes only.

## Promoting Green Building at the Local Level

Local governments are increasingly incorporating green building regulations, incentives, and strategies into local planning and zoning efforts. According to an American Institute of Architects study, the number of counties with green building programs rose from eight in 2003 to 39 in 2008.

There are a number of ways local governments can promote or require green building strategies, including the approaches discussed on the following pages. For more information on the current state of green building incentives at the state and local level, see the American Institute of Architects publication *Local Leaders in Sustainability—Green Incentives*, available via the web at:

[www.aia.org/advocacy/local/incentives/AIAB028722](http://www.aia.org/advocacy/local/incentives/AIAB028722)

### Legal Issues

As with all land development regulations, there are legal issues to consider when planning and zoning for green buildings. Be sure to consult with your township solicitor or a qualified attorney for legal guidance before enacting green building regulations.

***Avoid improper delegation of authority.*** Delegation of a power normally exercised by government authorities to a private agency is considered an improper delegation of authority. Requiring green certification by a third-party entity in order to get a Certificate of Occupancy would be subject to this challenge. This challenge probably would not apply for incentive-based programs or for municipalities' own buildings.

***Develop a sound, rational relationship between the regulatory means and the ends.*** Green regulations should include a clear intent and implement rational regulatory mechanisms that tie to the original intent of the regulation.

***Be careful of imposing arbitrary and excessive fees.*** If the cost of compliance with the regulation is too high, it may amount to a virtual taking of the property of the persons being regulated. This standard is high—the value of the property must be reduced to almost nothing for a taking to occur. However, regulatory license fees must be reasonably related to the costs associated with the services being provided.

## Green Building Requirements for Municipal Buildings

One of the easiest ways that local governments can foster green building in their communities is by incorporating green building techniques in municipal buildings. Sustainable building practices can be required for city facilities such as municipal halls, libraries, museums, transportation stations, convention and conference centers, community and recreation centers, schools, and multi-family housing.

A common approach is to apply green building requirements to all buildings of a certain size or cost. For example, Atlanta requires all city-financed new construction and renovation projects over 5,000 square feet or costing more than \$2 million to incorporate LEED standards. Alternately, requirements might apply to all buildings financed using local public dollars.

Typically, municipalities select one guideline and certification program as the standard of sustainability to be used for all municipal green building projects. For example, Philadelphia issued an Executive Order that requires all City new construction or major renovation projects of over 10,000 square feet to qualify for a LEED Silver rating.



*The Bellevue Court Homes in Trenton, NJ use 60% less energy than typical code-compliant homes. This green, urban rehabilitation project was spearheaded by the City of Trenton and developed by Isles Inc. and Tara Construction Management Corp. SOURCE: Isles Inc.*

## Local Green Building Programs and Guidelines

Some local governments go beyond green building requirements that apply only to publicly-owned or financed buildings. These cities and counties promote sustainable building practices throughout the community through adoption of comprehensive green building programs, often with their own set of green building guidelines.

These programs vary widely from place to place depending on local goals. Programs can apply to different types of buildings depending on use (residential or commercial), size, or type of development (new construction or renovation). Some programs are mandatory, while others are voluntary but promoted through use of incentives. Some communities create programs that require or encourage certain types of development to qualify for “green” ratings under third-party guideline and certification programs such as LEED or ENERGY STAR.

Programs from the City of Boulder, Colorado and Arlington County, Virginia illustrate different approaches to comprehensive, community-wide green building programs. Boulder’s Green Points Building Program is a mandatory residential green building program that requires a builder or homeowner to include a variety of sustainable building components based on the size of the proposed structure. Boulder developed its own guideline system, called Green Points, to gauge a project’s sustainability. Projects must earn a mandatory number of Green Points and comply with a list of green building requirements. Green Points are required for all new dwelling units as well as remodels and additions.

Arlington County’s Green Building Incentive Program encourages projects to achieve LEED certification through a building density incentive program. Arlington’s program applies to commercial and high-rise residential buildings. Projects that receive any of the four LEED award levels earn additional density. The density bonus ranges from a minimum of .15 floor area ratio (FAR) for a LEED Certified project to a maximum of .35 FAR for a Platinum project.

Most green building guideline programs, whether created by a local government or third party, allow for flexibility in the development process. Most guideline programs offer a menu of green strategies from which a developer may choose. Such programs are less likely to meet legal challenges than programs requiring developers to adhere to specific green building techniques.

## Green Building Incentives

Communities can provide incentives to promote green building practices. Broadly categorized, incentives may be financial or non-financial. Financial incentives can take a variety of forms including tax rebates, fee waivers, or cash payments. Portland, Oregon recently instituted a “feebate” structure whereby buildings built in a conventional manner pay a fee for permits, buildings built to LEED Silver standards receive a waiver from permit fees, and buildings constructed to LEED Gold or Platinum standards get a rebate.

In the Delaware Valley region, the Borough of Doylestown, in Bucks County, Pennsylvania, created a Green Points building incentive program that provides permit fee reductions or waivers if proposed buildings incorporate green building methods. Approximately 25 properties have utilized the program. The \$100 million Bucks County Courthouse project is anticipated to participate in the program for a savings of approximately \$750,000—or half of the project’s permit fees. Following Doylestown’s success, the Borough of Swarthmore, in Delaware County, Pennsylvania, adopted a Green Points program modeled on Doylestown’s initiative.

Non-financial incentives can also take a variety of forms. Some communities offer development bonuses such as increases in floor area ratio, building height, or density in exchange for meeting designated green building standards. Other local governments offer expedited permitting processes or fast-track review. Expedited reviews can translate into substantial financial benefit for developers because project costs and real estate dynamics are more predictable over the shorter term, construction loan interest costs are reduced, and properties can be constructed—then sold or leased—sooner.

Tredyffrin Township in Chester County, Pennsylvania provides for zoning bonuses in the form of modifications to building lot areas, building footprint, and building height in the Town Center Zoning District if a building meets or exceeds a LEED Silver rating. The City of Chicago’s Green Permit Program offers both expedited permitting and financial incentives. Under the program, permits for large or complex projects can be issued in as little as six weeks from the time of construction document submission, which is about half the typical time. Up to \$25,000 in city plan review consultant fees can be waived for projects that qualify for the Green Permit Program.

## Green Buildings in Ordinances

Municipalities can adopt green building policies as part of their zoning ordinance and other development regulations such as stormwater and subdivision ordinances. Municipal zoning codes can require that buildings in certain locations or of certain sizes or types achieve green building standards.

In the Site Plan and Construction Requirements of its zoning code, Austin, Texas includes the requirement that buildings achieve at least a one-star rating under the Austin Green Building program. The zoning code for Normal, Illinois mandates that new construction buildings with more than 7,500 square feet at the ground level in its B-2 Business District achieve LEED Certified status. In 2007, Boston made several amendments to the Boston Zoning Code to require all projects over 50,000 square feet to be designed and planned to meet the Certified level using the LEED system modified with Boston-specific credits.

A handful of municipalities in the Delaware Valley region have incorporated green building provisions in their zoning codes. The Borough of West Chester in Chester County, Pennsylvania, adopted zoning regulations that require new buildings over 45-feet tall in an overlay district to be designed and built to earn ENERGY STAR or LEED certification. West Chester is the first municipality in the country where, by law, private commercial buildings must be designed to earn the ENERGY STAR label. The zoning code also requires buildings to be annually benchmarked for the ENERGY STAR label.

The City of Trenton, in Mercer County, New Jersey, is revamping its zoning ordinance as part of a comprehensive strategy to green the City. Under the new zoning, projects that score high on Trenton's Sustainable Design Score Sheet can earn a 15% density bonus. The Sustainable Design Rating System assesses architectural and site design elements. Trenton also developed a new Downtown Master Plan that promotes waterfront access and formed the Trenton Green Task Force to develop sustainability strategies for the City.

In 2008, Honey Brook Township in Chester County, Pennsylvania adopted a Traditional Neighborhood Development Overlay District that promotes LEED certification in exchange for density bonus considerations.

The City of Philadelphia has begun work on a new zoning code. The new code is expected to incorporate green building principles.

## Green Buildings and Building Codes

In some cases, green building provisions are identified in local building codes. For example, in 2008, California adopted a green building code applying to all new construction statewide, with targets for energy efficiency, water consumption, plumbing systems, diversion of construction waste, and use of environmentally-sensitive materials in construction and design.

In the Delaware Valley region, local building regulations can be enacted pursuant to state-adopted building codes. In most cases, municipal regulations related to buildings must be equal to or more stringent than the New Jersey and Pennsylvania Uniform Construction Codes, and must demonstrate qualifying reasons if local regulations present a change from state standards. Local ordinances or regulations related to the building code that exceed the minimum requirements set forth in the state Uniform Construction Code typically must be justified by clear and convincing local circumstances and conditions. It is unclear whether local building code changes promoting green building practices would be considered legal exceptions to the statewide applicability of the Uniform Construction Codes.



*This home in the Borough of Doylestown, PA was constructed using the Borough's Green Points program. The project saved more than one thousand dollars in permit fees. SOURCE: Doylestown Borough Planning Commission*



## Renewable Energy

Many communities are working to create greener buildings by incorporating renewable energy technologies—such as wind, solar, and geothermal—in new construction and existing buildings.

In Delaware County, Pennsylvania, Media Borough's Solar Energy for Media program resulted in the installation of solar panels on a number of public buildings in the Borough. With funding from a Pennsylvania Department of Environmental Protection Energy Harvest Grant and the Southeastern Pennsylvania Sustainable Development Fund, the Borough installed solar panels on seven municipal buildings, including the Media Armory, Media Elementary School, Media Upper Providence Library, Media Theatre, and Media Fire House.

The Borough of Hightstown in Mercer County, New Jersey signed an agreement with WorldWater and Solar Technologies Corp. that will allow for installation of solar equipment on Borough property at two wastewater treatment plants. The equipment, worth approximately \$5 million, is to be installed at no cost to the Borough, and the Borough will realize significant energy savings. One installation will serve a water treatment plant and public works garage, while the other will power a wastewater treatment facility. These efforts are part of Hightstown's commitment to increase use of clean energy under the U.S. Conference of Mayors Climate Protection Agreement.

Through the City of Philadelphia's partnership participation in the U.S. Department of Energy's Solar City Partnership, Philadelphia is working to remove barriers to solar development in the city, transform the local market for solar energy, and increase the share of solar electricity generated within the city. Several solar projects on city-owned land are underway, including a major installation at the Navy Yard. In 2008, the Philadelphia Prison System's Riverside Correctional Facility became the first urban jail in the U.S. to install a rooftop solar water heating system. The Philadelphia Water Department is also working to install solar technology at several of its facilities.

A number of municipalities in Chester County, Pennsylvania have incorporated geothermal energy technologies in municipal buildings. Easttown Township constructed its administration and library building with geothermal HVAC systems along with a variety of energy-efficient features. West Bradford Township retrofitted its municipal facilities to incorporate geothermal heating and cooling.

## Green Management, Operations, and Procurement

Perhaps the easiest and least costly way for municipalities to green their buildings is through management and operations improvements. Examples of management and operations improvements include efforts to enhance energy data management, installation of energy-saving technology, and education or policies designed to change behaviors for energy conservation. Simple changes such as installing motion-sensitive lighting or turning computers off after working hours can create significant energy savings. Upper Providence Township in Montgomery County, Pennsylvania upgraded municipal facilities for energy efficiency by installing programmable thermostats, upgrading gas systems, and improving insulation.

The ENERGY STAR Portfolio Manager is a good place to start when considering management and operations improvements. The interactive energy management tool allows users to track and assess building energy and water consumption.

Municipalities can conduct simple energy audits or contract with a professional energy auditor. Energy audits assess how much energy a building consumes, identify measures that can make a building more energy efficient, and provide information about potential energy cost savings. An energy audit of facilities operated by a municipality can help in creating a municipal carbon footprint, which identifies sources of greenhouse gas emissions related to municipal operations and facilities. Funding for municipal energy audits is available through a number of sources. In New Jersey, funding for conducting an energy audit is available through the New Jersey Board of Public Utilities, Office of Clean Energy (BPU) Municipal/Local Government Energy Audit Program. In Pennsylvania, the Local Governments Initiating Conservation for Sustainability (LOGICS) group secured \$15,000 in grant funds for Penn State's Pennsylvania Technical Assistance Program (PennTAP) to provide municipal energy auditing.

Green procurement, also known as environmentally-preferable purchasing, is the purchasing of goods and services to minimize impacts on human health and the environment. Examples include products with high recycled content. Green procurement programs can incorporate purchase of locally-made products, which have reduced transport distances, resulting in lower greenhouse gas emissions. Many municipalities in the Delaware Valley region have adopted Green Fleet programs that call for purchase of fuel-efficient hybrid vehicles.

## Select Green Building Programs in the Delaware Valley

### **Delaware Valley Green Building Council (DVGBC)**

[www.dvgbc.org](http://www.dvgbc.org)

The goal of the Delaware Valley Green Building Council is to become the regional point of contact for users, agencies, and companies interested in green building; and to foster cooperation and collaboration among organizations dedicated to environmental responsibility and sustainability. DVGBC is a resource for information about events, news, green builders, and other green resources in the Delaware Valley.

### **The Rutgers Center for Green Building**

[www.greenbuildingrutgers.us](http://www.greenbuildingrutgers.us)

The Rutgers Center for Green Building, housed at the E.J. Bloustein School of Planning and Public Policy, conducts applied research utilizing planned and existing green building projects, works with industry and government to promote these concepts, and develops undergraduate, graduate, and professional education programs.

### **Borough of Doylestown Green Points Program**

[www.doylestownborough.net/greenpoints%20schedule.pdf](http://www.doylestownborough.net/greenpoints%20schedule.pdf)

[www.doylestownborough.net/Green%20Points%20Measures%20Application.pdf](http://www.doylestownborough.net/Green%20Points%20Measures%20Application.pdf)

The Borough of Doylestown provides incentives in the form of reduced permit fees for development projects that incorporate green features, measured through the Green Points worksheet.

### **Borough of Swarthmore Green Points Program**

[www.swarthmorepa.org/government/permits.asp](http://www.swarthmorepa.org/government/permits.asp)

The Borough of Swarthmore adopted the Green Points program, modeled on Doylestown's efforts.

### **West Chester Borough Leaders United in Emissions Reduction**

[www.wcbluer.org](http://www.wcbluer.org)

The West Chester BLUER committee is an all-volunteer ad hoc committee formed by West Chester Borough Council. BLUER's mission is to help the entire West Chester community—including municipal and county government operations, residents, businesses, and nonprofits—reduce greenhouse gas pollution by 10% over 2005 levels by the year 2015. BLUER was instrumental in the adoption of West Chester's ENERGY STAR ordinance.

## Pennsylvania Green Building Policies and Programs

*This section describes a selection of programs, policies, and resources that support or impact planning and zoning for green buildings in Pennsylvania. A variety of other programs are available, such as programs targeted to homeowners and businesses.*

### Municipalities Planning Code

The Municipalities Planning Code (MPC) empowers cities, in part, “to promote the conservation of energy through the use of planning practices and to promote the effective utilization of renewable energy sources.” The MPC should not be a barrier to regulating green buildings; it provides municipalities with the authority to incorporate conservation and energy efficiency into their planning efforts.

### Act 129

Act 129, signed into law in 2008, is a statewide energy initiative that requires utilities to adopt cost-effective plans to cut electricity use by 1% by 2011 and 3% by 2013. Utilities must implement plans to cut energy use by 4.5% during peak demand periods by 2013. Act 129 is designed in part to ease the effects of deregulation as electricity rate caps come off throughout the state over the next several years.

### Renewable Energy Program – Geothermal and Wind

[www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/funding-detail/index.aspx?progId=19](http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/funding-detail/index.aspx?progId=19)

The Renewable Energy Program provides financial assistance to promote the use of geothermal technologies and wind energy projects. The program is administered jointly by the Department of Community and Economic Development (DCED) and the Department of Environmental Protection (DEP) under the direction of the Commonwealth Financing Authority (CFA). The program offers a number of loans and grants, including grants for planning studies up to 50% of the total cost of the project or \$175,000, whichever is less.

### Sustainable Skylines

The U.S. Environmental Protection Agency is working with cities and regions throughout the U.S. on the Sustainable Skylines initiative to integrate transportation, energy, land use, and air quality planning. The five-county Pennsylvania portion of the DVRPC region (Bucks, Chester, Delaware, Montgomery, and Philadelphia counties) was selected for participation in the initiative. Through Sustainable Skylines, a one-time grant program funds air quality planning projects that produce quantifiable air quality benefits.

### **High-Performance Green Schools Planning Grant**

[www.gggc.state.pa.us](http://www.gggc.state.pa.us)

High performance green schools provide a demonstrably-better learning environment for students and can reduce annual operating costs. To encourage school districts to invest in these facilities, High-Performance Green Schools Planning Grants will help defray costs that are not typically included in the design fee but are critical to the design of a high-performance building. The grants are funded by the State Public School Building Authority and jointly administered by the Governor's Green Government Council and the Pennsylvania Department of Education.

### **Pennsylvania Uniform Construction Code**

In 2004, Pennsylvania adopted the Uniform Construction Code (UCC), a common building code for all municipalities in Pennsylvania. As discussed, municipal regulations that deviate from UCC provisions must meet specific criteria. These criteria, identified by the Pennsylvania Department of Labor and Industry (L&I), include clear and convincing local climatic, geologic, topographic, or public health and safety conditions that justify the exception. Certain court decisions have made it questionable whether green building goals would satisfy the "clear and convincing" standard to justify the exception [see *Schuylkill Twp. v. Pa. Builders Ass'n*, 935 A.2d 575 (Pa. Commw. Ct. 2007)]. In a 2007 Schuylkill Township case, which dealt with a municipal requirement for sprinklers that conflicted with the UCC, the Commonwealth Court held that townships must prove that "the conditions there were so different from the statewide norm that the uniform standards were not appropriate to use in the Township," in order to satisfy the "clear and convincing" standard for an exception to the UCC. In other words, townships would have to convince Pennsylvania L&I that the public health and safety considerations that are ameliorated by green buildings—like green house gas emissions, indoor air quality, etc.—are so different in a particular municipality that supplementing the standards in the building code is required. This is a very high, if not impossible, standard to meet with respect to green building. This case is currently up on appeal before the Pennsylvania Supreme Court. In addition, the Commonwealth of Pennsylvania is considering implementing a state-wide green code that might solve this thorny state-preemption problem.

## New Jersey Green Building Policies and Programs

*This section describes a selection of programs, policies, and resources that support or impact planning and zoning for green buildings in New Jersey. A variety of other programs are available, such as programs targeted to homeowners and businesses.*

### Municipal Land Use Law

In August 2008, Governor Corzine signed an amendment to Section 19 of the Municipal Land Use Law (P.L. 1975, c.291) authorizing local planning boards to include in the master plan a:

...green building and environmental sustainability plan element, which shall provide for, encourage, and promote the efficient use of natural resources; consider the impact of buildings on the local, regional, and global environment; allow ecosystems to function naturally; conserve and reuse water; treat storm water on-site; and optimize climatic conditions through site orientation and design.

A number of grant programs may support development of these plan elements, including those offered by the Association of New Jersey Environmental Commissions (ANJEC) and the Sustainable Jersey program. Public organizations (including DVRPC) and private consultants can assist municipalities in the preparation of these elements.

### Sustainable Jersey

[www.sustainablejersey.com](http://www.sustainablejersey.com)

Sustainable Jersey is a certification and incentive program for municipalities in New Jersey that want to go green, control costs and save money, and take steps to sustain their quality of life over the long term. Municipalities that register with the Sustainable Jersey program or earn certification qualify for technical assistance and funding. Two actions in this program relate to green buildings. First, municipalities are encouraged to promote green design of commercial and residential buildings by adopting a green building policy, creating a green building scorecard, implementing green design standards through site plan review, and distributing green building educational materials. Second, municipalities are encouraged to upgrade and retrofit municipal buildings by organizing a green building training program, improving water conservation, reducing light pollution, and increasing construction waste recycling.

**Energy Master Plan of New Jersey**

[www.nj.gov/emp](http://www.nj.gov/emp)

The final version of Governor Corzine's Energy Master Plan was released in October 2008. The Energy Master Plan lists a series of goals and action items that will put the State on track to successfully meet the energy challenges facing it, while developing the clean energy industry as a cornerstone of the State's economy. The series of action items proposed in this Energy Master Plan will effectively reduce the State's energy consumption 20% by 2020, contribute to the goal of reducing greenhouse gas emissions to 1990 levels by 2020, and ensure that the energy infrastructure provides reasonably-priced and reliable energy to New Jersey's homes and businesses.

**Local Government Energy Audit Program**

[www.njcleanenergy.com/commercial-industrial/programs/local-government-energy-audit/local-government-energy-audit](http://www.njcleanenergy.com/commercial-industrial/programs/local-government-energy-audit/local-government-energy-audit)

The New Jersey Board of Public Utilities Local Government Energy Audit Program provides incentives of up to 100% of the cost of conducting energy-efficiency audits. The program targets municipal and local government-owned facilities. Participating municipalities will select from a list of pre-qualified auditing firms who will follow the parameters of New Jersey's Clean Energy Program and deliver an investment grade audit. When the audit is complete, participating municipalities will have a list of recommended, cost-effective energy-efficiency measures and facility upgrades. These measures are eligible for additional incentives available through the NJ SmartStart Buildings Program.

**NJ SmartStart Buildings Program**

[www.njsmartstartbuildings.com](http://www.njsmartstartbuildings.com)

The NJ SmartStart Buildings Program is a statewide energy-efficiency program available through New Jersey's electric and gas utility companies that is designed to offer incentives for upgrading to high-efficiency equipment.

**New Jersey Uniform Construction Code**

Local regulation of building design, construction, and maintenance is regulated pursuant to the state's building code.

## ACKNOWLEDGMENTS

*Cover photo shows Thin Flats, the first LEED duplexes in the country and a winner of the 2009 Philadelphia Sustainability Awards. Located in the Northern Liberties and sold at a market-rate price, Thin Flats demonstrates that sustainable buildings can be affordable and accessible in a dense urban setting. SOURCE: Onion Flats*

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The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals and the public with a common vision of making a great region even greater. Shaping the way we live, work and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region - leading the way to a better future.

DVRPC fully complies with Title VI of the Civil Rights Act of 1964 and related statutes and regulations in all programs and activities. DVRPC public meetings are always held in ADA-accessible facilities and in transit-accessible locations when possible. Auxiliary services can be provided to individuals who submit a request at least seven days prior to a meeting. For more information, please call (215) 238-2871. Publications and other public documents can be made available in alternative languages or formats, if requested. For more information, please call (215) 238-2871.



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