GREENWORKS

PHILADELPHIA

Mayor Michael A. Nutter
CITY OF PHILADELPHIA

ENERGY **ENVIRONMENT** EQUITY **ECONOMY** ENGAGEMENT

PHOTO BY PETER TOBIA

CITY SKYLINE FROM BELMONT PLATEAU

"*Greenworks Philadelphia* is a vision for how Philadelphia can and should seize the moment, building upon the assets left to us by earlier Philadelphians and creating a better future for ourselves, our children and generations still to come."

MAYOR MICHAEL A. NUTTER

MY FELLOW PHILADELPHIANS:

I am proud to introduce *Greenworks Philadelphia*, our commitment to make this city the greenest in America. That's the goal I set during my mayoral campaign, knowing this is our opportunity to show Philadelphia as a city of the future.

Some people might question the wisdom of launching a strategy as ambitious as *Greenworks Philadelphia* given the current economy and the city's financial problems. Why start working now toward a greener, growing Philadelphia?

My answer is simple. To ensure that Philadelphia's best days are ahead of it, we must dream big—and we must dream smart. And we must take steps today that will make our city's future more secure and more prosperous.

The stakes are high. Over the past five decades, Philadelphia lost jobs and residents. The pulls that caused people to leave our city and others like it were driven in part by government policies that valued highways over transit and new tract housing over older row homes. These pulls were aggravated by pushes that led many families to flee crime, blight and racial tensions.

But in recent years, Philadelphia has begun to witness a rebirth. In many of our neighborhoods, people and jobs are moving in, not out, and private investments are being made. People again view Philadelphia's walkable neighborhoods and public transportation system, not to mention the diversity of its people and sense of community, as assets to value and nurture. Citizens are making Philadelphia a better place to live by volunteering to clean vacant lots, plant trees, reduce and recycle trash and reclaim our watersheds. And many of them understand that cities like Philadelphia will thrive in a world where fuel prices are high and carbon has a price tag. They know that cities are no longer warehouses of great need, but reservoirs of great value.

Greenworks Philadelphia is not a panacea for the city and its current economic struggles. Rather, it is a vision for how Philadelphia can and should seize this moment, building upon the assets left to us by earlier Philadelphians and creating a better future for ourselves, our children and generations still to come. That vision includes buildings that use less energy so home owners and businesses save money, jobs for people to weatherize homes or manufacture new green products, tree-lined streets in every neighborhood and cleaner air.

Philadelphia enjoys a reputation as a city that values work—real work, honest work, hard work. So despite these economic times—or perhaps because of them—it is time once again for all Philadelphians to roll up their sleeves and get to it. Together we will build a new city.

MAYOR MICHAEL A. NUTTER

CONTENTS

EXECUTIVE SUMMARY

"The greenest city in America."

That's the ambitious goal that Mayor Michael A. Nutter has set for Philadelphia.

Reaching it will be an opportunity to reposition and repurpose Philadelphia as a city of the future. For the first time in decades, changes beyond our borders—primarily rising energy prices, but also climate change and an emerging green economy—are increasing the value of our urban assets. Philadelphia's dense and durable stock of housing, infrastructure and amenities position us to prosper in a carbon-constrained future.

Much of this future derives from our past. William Penn's "greene countrie towne" enjoyed access to water and farmland and to successive energy resources—from abundant forests that made charcoal to the world's largest anthracite coal deposits that fueled factories—all of which helped Philadelphia become the "workshop of the world." And the city enjoyed the highest rate of home ownership of any city in the world. Philadelphia epitomized the best of American industrial cities, where factory workers became middle-class home owners and stable and rewarding work led to strong, prosperous communities.

But in the later 20th century, with energy and water plentiful and inexpensive, Philadelphia lost ground to cities that used these abundant supplies to their advantage. When people could easily and inexpensively commute 30 or 40 miles from home to work and when goods could travel hundreds or thousands of miles from origin to market, Philadelphia was no longer competitive. Public policies, such as mortgage subsidies and federal highway spending, and new technologies like the city's air conditioning only accelerated obsolescence. Simply stated, Philadelphia lost its place in a world of cheap and falling energy prices, especially since those prices avoided their true environmental costs.


PHOTO BY PETER TOBIA

Now, for the first time in generations, sustained increases in energy costs are underscoring rather than evaporating the value of Philadelphia's inherited assets—our walkable and bikeable neighborhoods, far-reaching transit system, rich stock of existing buildings and abundant supply of fresh water. And our regional network of dense local neighborhoods is the perfect urban form for the future. So today, many cities are reinventing themselves to become more like Philadelphia, building regional rail systems from scratch and constructing high-density clusters of residences and workplaces.

For decades, Philadelphia has felt obsolete—a fine old relic of the past. It's been a while since anyone walked down the streets of Philadelphia and concluded, "Yes, this is the future." But many people are doing just that these days. *Greenworks Philadelphia*'s challenge is to turn their hopes and aspirations into reality. By 2015, people will walk (and bike and trolley) the green streets of Philadelphia on their way to work and school and play, and will feel that this is exactly the kind of city that the future demands.

Greenworks Philadelphia describes a city in which residents and businesses benefit from lower energy costs, cleaner air, greener neighborhoods, better transit and new jobs. But it acknowledges that visions—especially those that anticipate reaching established goals in 20 or 30 years—are meaningless unless backed up with specific and measurable targets that can actually be achieved within a few years. Therefore *Greenworks Philadelphia* also presents the specific steps that all Philadelphians, not just their government, must take over the next seven years to reinvent the city.

Philadelphians understand why this work is important. They know that the Mayor's call for Philadelphia to become the "greenest city in America" is not just about preventing ice caps from melting or crops from drying up thousands of miles away, but also about decreasing the cost of cooling a Southwark house in the summer or heating it in the winter; reducing the number of trips a mother in Oak Lane takes to the hospital with her asthmatic son; preventing sewage from backing up into a basement in Northern Liberties; and giving every child in every neighborhood a safe, clean, healthy place to play. *Greenworks Philadelphia* is about putting Philadelphians to work.

With *Greenworks Philadelphia* as its guide, 21st-century Philadelphia will face the challenges and opportunities created by recent global shifts and reposition itself as a city of the future.

METHODOLOGY

Greenworks Philadelphia builds upon the work of the 2007 Local Action Plan for Climate Change that was produced by the Sustainability Working Group, a task force of more than 50 municipal employees. The Local Action Plan outlined a series of steps that the City of Philadelphia government (City) should take to reduce greenhouse gas emissions by 10 percent by 2010. Many of those proposed efforts are already under way and described in *Greenworks Philadelphia.* This program also incorporates the goals of GreenPlan, the City's soon-to-be-adopted open-space plan.

Greenworks Philadelphia considers sustainability through five lenses—Energy, Environment, Equity, Economy and Engagement. For each, an overarching goal was conceived, with measurable targets then called out and specific initiatives designed and described to help Philadelphia reach its targets by 2015. For each target, a baseline number was determined using the most recent data available. *Greenworks Philadelphia* then calculated where Philadelphia would be in 2015 if nothing were done (for those targets implicated by the city's population, *Greenworks Philadelphia* projected a 75,000 person increase—Mayor Nutter's stated goal). Finally, a third number—the target—was determined. These calculations are in the chart that follows this executive summary.

These goals, targets and initiatives were refined over the past 10 months by the Sustainability Working Group with input and feedback from additional City employees, local and national nonprofit organizations, and civic and business leaders, including the Mayor's Sustainability Advisory Board. The Mayor's Office of Sustainability has met with and presented elements of *Greenworks Philadelphia* to hundreds of citizens over the past nine months.

Greenworks Philadelphia is a living document. Policies, technologies and external forces will lead us to adapt the framework over the coming months and years. Our initiatives will thus evolve as these changes occur, while our goals will remain firm. The Mayor's Office of Sustainability is working with two environmental consulting firms, ICF International and Stratus Consulting, to begin the task of determining which of the proposed initiatives will bring the City closer to reaching *Greenworks Philadelphia's* targets and which ones might produce too little return for the investment. *Greenworks Philadelphia* contains the beginnings of that effort.

ENERGY

GOAL: PHILADELPHIA REDUCES ITS VULNERABILITY TO RISING ENERGY PRICES

TARGET 1

Lower City Government Energy Consumption by 30 Percent

In fiscal year 2008, the City government consumed 3.64 trillion Btus of energy at a total cost of $82.5 million. *Greenworks Philadelphia*'s target is to reduce consumption by 30 percent from this level by 2015. With energy use projected to increase during this period to 4.16 trillion Btus, the gap between 2015's projected demand and the target of 2.54 trillion Btus is 1.62 trillion Btus. This gap is equivalent to the total annual energy usage of 16,200 households, and meeting this target will save the City an estimated $36.3 million in 2015. Retrofitting municipal buildings, creating target energy budgets for City departments and developing energy-conservation education for City employees will help the City reach this target. Additional programs will get it the rest of the way.

TARGET 2

Reduce Citywide Building Energy Consumption by 10 Percent

In 2006, residential and commercial buildings in Philadelphia consumed nearly 100 trillion Btus of energy. The target 10 percent reduction in the face of rising consumption will save city residents and businesses 12.9 trillion Btus. This savings will be achieved by weatherizing existing homes and commercial buildings in every city neighborhood, developing new buildings that are more energy efficient and encouraging people to replace their lightbulbs and energy-wasting appliances.

TARGET 3

Retrofit 15 Percent of Housing Stock with Insulation, Air Sealing and Cool Roofs

Weatherization represents a crucial component of *Greenworks Philadelphia*'s building energy-reduction target. While the city has a history of successful weatherization programs, the American Recovery and Reinvestment Act of 2009 (Recovery) provides Philadelphia with a once-in-a-generation opportunity to retrofit Philadelphia's aging housing stock. These funds will support the weatherization of households earning less than 200 percent of the poverty line ($44,000 for a family of four). Using census data from 2000, more than 60 percent of households in Philadelphia could qualify. Recovery dollars will help the City weatherize thousands of low-income households each year. Additional financial and other incentive programs will assist home owners who don't meet the Recovery's income requirements. All told, these efforts will enable Philadelphia to meet *Greenworks Philadelphia*'s target of 100,000 houses retrofitted by 2015.

TARGET 4

Purchase and Generate 20 Percent of Electricity Used in Philadelphia from Alternative Energy Sources

In 2008, alternative-energy sources comprised approximately 2.4 percent of the city's electricity mix, or 340,000 megawatt hours (MWh). *Greenworks Philadelphia* calls for an increase to 20 percent by 2015, or 2.93 million MWh. A significant portion of this target will be met through PECO's adherence to Pennsylvania's Alternative Energy Portfolio Standard—which mandates that energy providers obtain 9.2 percent of their electrical supply from alternative-energy sources by 2011, with further increases in out years—and institutional purchases of renewable energy certificates (RECs). But *Greenworks Philadelphia* commits the city to also produce renewable energy from solar arrays, biogas, wind and hydroelectric sources. By 2011, Philadelphia will have a solar-generation capacity of 2.3 megawatts (2,869 MWh hours of energy annually), enough to provide electricity to more than 350 households; by 2021, that amount will increase to 57.7 megawatts.

ENVIRONMENT

GOAL: PHILADELPHIA REDUCES ITS ENVIRONMENTAL FOOTPRINT

TARGET 5

Reduce Greenhouse Gas Emissions by 20 Percent

Philadelphia has already decreased its greenhouse emissions by nearly 10 percent from its 1990 levels, but the city must do more to help avert the worst-case scenarios related to global climate change. Nearly every initiative described in *Greenworks Philadelphia* will help the city lower its emissions by 2015 to a targeted reduction of 20 percent below 1990 levels. Proposed federal legislation to create a national cap and trade carbon market could benefit cities like Philadelphia, provided they can implement wide-scale carbon-reduction projects, such as *Greenworks Philadelphia*'s proposed building retrofit efforts.

TARGET 6

Improve Air Quality toward Attainment of Federal Standards

Although Philadelphia's air quality is better than many of our peer cities, *Greenworks Philadelphia* seeks to protect the health of Philadelphia residents by reducing the number of days that the Air Quality Index is "unhealthy," while also decreasing the city's ozone and fine-particulate-matter levels so that they meet new, stricter federal standards. To do this, the City will continue its work to reduce street congestion, improve the exhaust of its diesel fleet and switch to cleaner fuel sources, such as biodiesel and compressed natural gas. The Port of Philadelphia and the Philadelphia International Airport will also take steps to reduce emissions from their operations.

TARGET 7

Divert 70 Percent of Solid Waste from Landfill

Each household in Philadelphia throws away an average of 1.25 tons of trash each year, but recycles only 160 pounds. The City of Philadelphia picks up 731,000 tons of trash annually at a total cost of more than $100 million. (Approximately 291,000 tons of this trash currently goes to energy-from-waste plants, not to landfill.) An additional 48,000 tons were recycled by Philadelphia households last year. Commercial buildings and construction sites generate an additional 1.17 million tons of trash each year that goes to landfill. They report recycling 1.05 tons of waste. *Greenworks Philadelphia* calls for diverting 70 percent of all solid waste from landfills by 2015 by increasing the amount of materials recycled by city residents, commercial building owners and contractors, and by pursuing additional energy from waste-disposal options. It will also seek to minimize the amount of trash generated by city residents.

PHOTO BY PETER TOMA

EQUITY

GOAL: PHILADELPHIA DELIVERS MORE EQUITABLE ACCESS TO HEALTHY NEIGHBORHOODS

TARGET 8

Manage Stormwater to Meet Federal Standards

Managing stormwater is a basic government function. If not controlled, runoff in urban centers causes flooding, erosion, areas of stagnant water and sewer backups that spill into basements. The 19th-and 20th-century solution was a network of drainage pipes that moved the rainwater—and industrial, household and human waste—away from homes, streets and businesses and into rivers and streams. *Greenworks Philadelphia* recommends that the natural links between land and water be reconnected and that green infrastructure—trees, vegetation and soil—become the City's preferred stormwater management system. If the U.S. Environmental Protection Agency revises its applicable regulations, 3,200 acres of green space and pervious surfaces will be created in Philadelphia by 2015 to meet the city's stormwater needs. Philadelphia can manage its stormwater while creating healthier neighborhoods by planting thousands of new street trees; increasing the amount of green and open space; using pervious pavement on parking lots and playgrounds; building green roofs; and distributing rainwater-collection barrels to home owners.

TARGET 9

Provide Park and Recreation Resources within 10 Minutes of 75 Percent of Residents

Currently less than 60 percent of Philadelphia's residents are adequately served by a park or recreation center within a half-mile of their residence. *Greenworks Philadelphia* endorses the recommendation made in GreenPlan, the Parks and Recreation Department's draft open-space plan, that 100 percent of residents live within a 10-minute walk of a green, open space by 2025. To meet this long-range goal, *Greenworks Philadelphia* seeks to adequately serve 75 percent of its residents with parks and recreation resources by 2015. This aspiration would require the creation of an additional 500 acres of greened public space. Philadelphia will reach this goal by redeveloping and providing public access to its major waterways, creating open space during neighborhood redevelopment efforts and maintaining efforts to clean and green vacant lots.

TARGET 10

Bring Local Food within 10 Minutes of 75 Percent of Residents

Philadelphia's local food networks have the potential to bring fresh, healthy and affordable food to all city residents. But today, unfortunately, that local food is not accessible to many, especially low-income, households. Mayor Nutter created a Philadelphia Food Charter and Food Policy Council in 2008 to increase access through such initiatives as expanding the number of farmers' markets and creating more working gardens; encouraging commercial agriculture; and integrating local food into anti-hunger programs. To help bring local food within a 10 minute walk of 75 percent of residents, *Greenworks Philadelphia* calls for the creation of 86 additional local food outlets by 2015.

TARGET 11

Increase Tree Coverage toward 30 Percent in All Neighborhoods by 2025

Trees bring a multitude of benefits ranging from decreased air pollution, stormwater runoff and extreme temperature days to increased property values, carbon sequestration and quality of life. Many of Philadelphia's neighborhoods lack adequate tree cover. GreenPlan calls for Philadelphia's tree canopy to increase to 30 percent in every neighborhood by 2025. *Greenworks Philadelphia*'s supporting target is thus 300,000 trees planted by 2015. To achieve this ambitious goal the City will have to increase its own activities and work with partners like the Pennsylvania Horticultural Society, seeking new spaces in which to plant trees, such as vacant lots and school yards. In addition, all of Philadelphia's citizens will be called upon to embrace this goal and plant and care for trees in their streets and yards.

ECONOMY

GOAL: PHILADELPHIA CREATES A COMPETITIVE ADVANTAGE FROM SUSTAINABILITY

TARGET 12

Reduce Vehicle Miles Traveled by 10 Percent

Although Philadelphia already has one of the country's lowest rates of vehicle miles traveled per capita, *Greenworks Philadelphia* calls for reducing miles driven by 10 percent by 2015. Philadelphia has the type of transit system that many progressive cities are now trying to build and that gives the city a competitive advantage over other cities. *Greenworks Philadelphia* applauds SEPTA's efforts to increase transit ridership through further services and capital improvements and the adoption of new fare technologies. Transit Oriented Development investments supported by the City will also help induce more people to take transit. Finally, the appointment of Philadelphia's first Bicycle and Pedestrian Coordinator in 2008 will help grow the city's thriving bicycle culture as it seeks to create a city wide trail network.

TARGET 13

Increase the State of Good Repair in Resilient Infrastructure

Even as new buildings and parks are created in Philadelphia, the City must also ensure that its existing infrastructure is in a state of good repair so that "no backlog of needs exists and no component is beyond its useful life." Currently less than 74 percent of City-owned buildings, streets, bridges and utility infrastructure meet this definition—though there are wide variances among categories. A few City departments already have existing asset management systems that are well-used by their employees; others do not. By 2015, *Greenworks Philadelphia* calls for 80 percent of the City's infrastructure to be in a state of good repair. Steps must also be taken now to begin to adapt our infrastructure to certain climate changes caused by global warming.

TARGET 14

Double the Number of Low- and High-Skill Green Jobs

All the goals and initiatives in this report will produce demand for workers who have the skills to make the city more sustainable. As our society shifts toward a greener economy, Philadelphia has the potential to be a hub of green jobs. The city already has nearly 14,400 green jobs, according to the U.S. Conference of Mayors. By 2015, *Greenworks Philadelphia* projects a doubling of this number as workers are employed in such areas as weatherization, green infrastructure and other industries that have the potential for growth and career-track, family-supporting jobs. To achieve this target, the City will undertake different approaches, such as creating an economic-development strategy built on demand for affordable energy and linking workforce development programs to green job opportunities.

ENGAGEMENT

GOAL: PHILADELPHIANS UNITE TO BUILD A SUSTAINABLE FUTURE

TARGET 15

Philadelphia is the Greenest City in America

Greenworks Philadelphia will use the power of new technologies and old-fashioned word of mouth to engage every Philadelphian in this important work. From our green infrastructure to our green economy, Philadelphia will earn the mantle of America's Greenest City. The Mayor's Office of Sustainability will track the city's progress over the next seven years. The office will report annually on Philadelphia's efforts and accomplishments, using data to measure how close we are to meeting all of our targets. It will also post data on-line so that independent analyses can be conducted.

SUMMARY OF TARGETS

2008 BASELINE	2015 PROJECTION
TARGET 1: MUNICIPAL GOVERNMENT ENERGY USE	
3.64 trillion Btus	4.16 trillion Btus
TARGET 2: CITYWIDE BUILDING ENERGY USE	
99.7 trillion Btus •	103 trillion Btus
TARGET 3: RESIDENTIAL WEATHERIZATION	
3,500 projects	28,000 projects
TARGET 4: ALTERNATIVE ENERGY	
0.34 million MWh	1.35 million MWh
TARGET 5: GREENHOUSE GAS EMISSIONS	
17.2 million tCO2eq ••	15.6 million tCO2eq
TARGET 6: AIR QUALITY ATTAINMENT	
20 "Unhealthy" AQI days	20 "Unhealthy" AQI days
TARGET 7: DIVERSION FROM LANDFILL	
1.56 million tons	1.56 million tons
TARGET 8: GREEN INFRASTRUCTURE	
51,000 pervious acres	51,000 pervious acres
TARGET 9: OUTDOOR AMENITIES	
10,300 green acres	10,300 green acres
TARGET 10: LOCAL FOOD	
230 gardens, markets	230 gardens, markets
TARGET 11: TREE CANOPY	
2.1 million trees	2.1 million trees
TARGET 12: VEHICLE MILES TRAVELED	
6.40 million VMT •••	6.91 million VMT
TARGET 13: STATE OF GOOD REPAIR	
73% of assets in SOGR	71% of assets in SOGR
TARGET 14: GREEN JOBS	
14,400 green jobs •••	18,300 green jobs

GREENWORKS TARGET	GREENWORKS INITIATIVES WILL YIELD
30% < 2008=2.54 trillion Btus	1.62 trillion Btus saved in 2015
10% < 2006=89.7 trillion Btus	12.9 trillion Btus saved in 2015
15% of total housing=100,000 projects	72,000 additional projects by 2015
20% of electricity=2.93 MWh	1.58 million MWh in 2015
20% < 1990=13.8 million tCO2eq	1.77 million tCO2eq in 2015
2015 < 2008=2006 numbers	10 fewer "Unhealthy" AQI Days in 2015
70% diversion rate=890,000 million tons going to landfill	0.67 million tons diverted in 2015
60% of total surface=54,200 pervious surfaces	3200 additional pervious acres by 2015
75% of residents with access=10,800 green acres	500 additional green acres by 2015
75% of residents w/ access=316 gardens/farms/markets	86 additional gardens/farms/markets by 2015
30% canopy by 2025=3.1 million trees	300,000 additional trees by 2015
10% < 2005=5.76 million VMT	1.15 million fewer VMT in 2015
80% in 2015	13% of assets raised to SOGR by 2015
Double 2005 by 2015=28,800 green jobs	10,500 additional green jobs by 2015

• = 2006; •• = 1990; ••• = 2005

THE COMCAST CENTER IN PHILADELPHIA

PHOTO BY PETER TOBIA

energy

PHILADELPHIA REDUCES ITS
VULNERABILITY TO RISING ENERGY PRICES


PHOTO BY PETER TOBIA


PHOTO BY PETER TOBIA

Cities have always been associated with power. And for the last 300 years, that power has included energy as well as political, economic and cultural might. Philadelphia's ability to first harness water and then access coal and oil enabled the city to grow and prosper. Today, however, in a world of rising energy prices and uncertainty around future supply, cities that can lower their energy consumption without losing their other powers will have an enormous advantage in the competition for residents and investment. Increasing energy-efficiency and cultivating renewable-energy sources have emerged as two of the most promising sustainable strategies a city can employ. Such efforts will lead to a decreased dependence on carbon-based energy sources, personal and commercial financial savings, and the creation of new businesses and new jobs.

A major new report by the American Council for an Energy-Efficient Economy (ACEEE) highlights and endorses these approaches, naming energy-efficiency in particular as a promising pathway to energy independence: "We have only begun to scratch the surface of the potential savings that additional investments in energy-efficiency technologies could provide. While current investments in energy-efficiency are having an important impact on our economy, efficiency remains under-funded, and the potential benefits of efficiency remain unrealized." A paper released by McKinsey & Company in 2009 made similar arguments regarding the returns on investment to be realized by making buildings more energy efficient.

Greenworks Philadelphia embraces this strategy, which offers cities significant opportunities to reduce their citizens' vulnerability to rising energy prices. Increasing energy-efficiency in Philadelphia is the centerpiece of its sustainability strategy. The initiatives proposed below will provide financial relief to Philadelphians and help increase the city's economic competitiveness.

Recent actions at the state and federal levels have created the starting point for *Greenworks Philadelphia*'s proposed strategy. Pennsylvania's Act 129, passed by the legislature in 2008, mandates that the Commonwealth's electric distribution companies reduce base-load electricity consumption by one percent by 2011 and three percent by 2013 and peak-load demand by 4.5 percent by 2015. To achieve these goals, PECO, which serves Philadelphia and the surrounding counties, can spend 2 percent of its annual rate base on energy conservation projects: This amounts to approximately $85 million in its service territory. These provisions will have significant impact on Philadelphia, and the Nutter Administration is working with PECO to help it reach its Commonwealth-mandated goals. The City is especially interested in swift action because Pennsylvania's rate caps, which have kept consumers' electric costs low, will be removed on January 1, 2011.

On the natural gas front, the City-owned Philadelphia Gas Works (PGW) is becoming a leader in helping its customers reduce their usage. In March 2009, PGW submitted an ambitious proposal to the Pennsylvania Public Utility Commission to invest $54 million over five years in conservation programs designed to lower demand for natural gas and to decrease home heating bills.

The American Recovery and Reinvestment Act of 2009 (Recovery), recently signed into law by President Obama, provides a once-in-a-generation opportunity to invest in efforts to develop cleaner energy sources and reduce building energy demand. It provides $43 billion in energy-related investments nationwide, with approximately a third of those funds dedicated to building efficiency measures that could help transform Philadelphia's future. These funding streams include the newly created Energy-Efficiency and Conservation Block Grant and the expanded Qualified Energy Conservation Bond programs. The City and its political representatives are

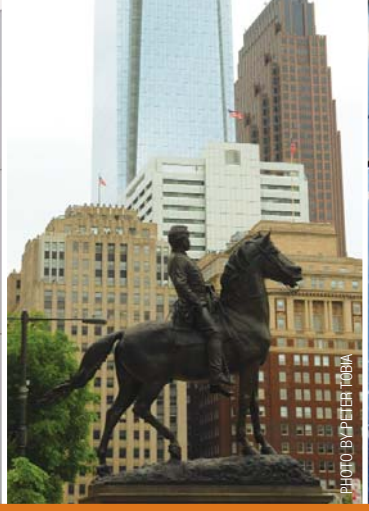


PHOTO BY PETER TOBIA

PHOTO BY PETER TOBIA

making sure that Philadelphia receives its fair share of those funds and that they are spent quickly and wisely.

Finally, the Pennsylvania Alternative Energy Portfolio Standard (AEPS) requires that state electric distribution and generation companies supply 9.2 percent of their electricity from alternative sources by 2011 (5 percent from renewable energy, such as solar and wind, and 4.2 percent from large-scale hydro, integrated gasification combined-cycle coal technology and energy from waste), with a goal of 18 percent by 2020 (8 percent from renewable energy sources).

Much of the electricity currently used in Philadelphia is derived from coal and nuclear-power sources that travel across PJM Interconnection's grid to the city. The fuel mix described in the table on this page is for PJM's entire network. The fuel mix that it supplies to Philadelphia changes on any given day. Although PECO can meet the AEPS requirement by purchasing energy credits sold by solar, wind and other alternative generation companies, the City of Philadelphia will also begin to produce solar and other renewable power within its borders.

TARGET 1

Lower City Government Energy Consumption by 30 Percent

Between the City's General Fund departments and the Philadelphia Water Department, the Philadelphia municipal government uses 3.64 trillion Btus of energy—electricity, natural gas, steam, oil and gasoline—each year, at a total cost of $68 million. If nothing is done to decrease consumption, the City's total energy use will increase to 4.16 trillion Btus by 2015, at a cost of $104 million, assuming projected rate increases and inflation. By implementing the initiatives proposed below, the City will decrease its demand 30 percent from current levels and will save $36 million in 2015 alone—truly doing well by doing good (see table of page 15).

GENERAL FUND BACKGROUND

Reducing the City's total energy consumption through increased efficiency and reduced waste makes environmental and fiscal sense. Using less electricity, natural gas and steam to power its buildings and decreasing the amount of gasoline used by the City fleet will help Philadelphia reach its greenhouse gas emissions goals. And, perhaps even more important given the current economic climate, reducing energy demand in its buildings and by its fleet represents a significant cost-saving measure. The City has made good progress in some areas, especially vehicle fuel consumption. But electrical demand is starting to increase again and needs to be addressed.

Buildings

In fiscal year 2008, the City General Fund spent more than $33 million to heat, cool and power its buildings and street lights. The two biggest users within the General Fund are the Prison System and the Department of Public Property, both of

AN ELECTRIC-GRID PRIMER

Much of our nation's current electrical distribution system consists of high-voltage transmission lines that were constructed to take electricity from large central power stations to cities and industrial plants. There power is transformed to a lower voltage for distribution to individual homes and businesses. Currently, 300,000 miles of transmission lines run across the United States.

Over the past 25 years, investment in the grid has fallen behind the increase in demand for electricity. On peak usage days—typically during summer months—the supply cannot keep up with demand, and distribution companies in large cities or states can find it difficult to obtain power from other areas of the country. Blackouts or brownouts can and do occur. There is a widely recognized need to reinvest in the nation's transmission network to help power travel more freely from places of high supply to those with high demand.

At the same time, some of the new supply being added to the grid is from smaller, more widely distributed technologies, such as wind turbines and solar photovoltaics. And a vast array of new technology is also now available to manage the flow of electricity more efficiently throughout the distribution system. A "Smart Grid" movement has emerged to improve the efficiency of the grid while creating the ability to accommodate more widely distributed electrical generation.

PHOTO BY PETER TOBIA

which manage many large and complex buildings. In addition, $3.4 million was spent on the Philadelphia Museum of Art's two buildings (see table of page 16). The museum is actively seeking to lower its energy demand, starting with a project to upgrade its air-conditioning system, which will yield lower electrical costs.

Although many departments have reduced their energy demand in recent years, the effort has not been a sustained priority across the board. One continuing drag on improvement is that departments do not pay for energy from their budgets. Instead, costs are paid directly from the General Fund. Thus City employees have little incentive to turn out lights, turn down heating or air conditioning and turn off computers at day's end. Compounding this problem are the lack of energy usage guidelines for the City's contracted maintenance workers, who control a great deal of the night and weekend usage. Energy is, in effect, treated as free by the users of municipal buildings.

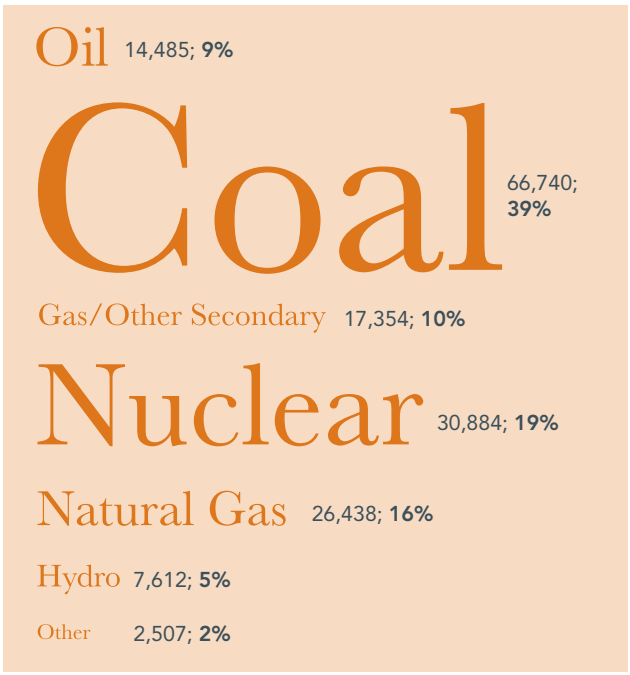
But the City's energy demand reflects more than habit. Many buildings are decades old and lack modern windows, insulation and heating. Correcting these deficiencies will be a significant challenge.

Fleet

The City, through the Office of Fleet Management (OFM), owns and maintains 5,771 vehicles, including ambulances, trash-and snow-removal trucks, police cruisers, highway paving equipment, riding mowers, motorcycles, passenger and cargo vans, buses and sedans. The OFM also operates 64 fueling sites. As with electricity and gas, departments do not pay for vehicle purchases and gas. The General Fund pays, once again reducing the incentive within departments to drive less frequently or request more fuel-efficient cars.

In 2003, the City became one of the first municipal governments in the country to use a private car-sharing service to handle some of its employees' automobile needs. As a result, the number of City-owned cars decreased by 300 that year.

PJM Interconnection's Fuel Sources for Electrical Generation
(in Megawatt installed capacity)



PJM Interconnection is the regional transmission organization that serves Philadelphia. It manages the movement of power within and across 13 states and delivers it to PECO's local distribution lines. The electricity that it handles is produced by these sources. SOURCE: PJM INTERCONNECTION

The program won an Innovation Award from the Kennedy School of Government. Further reductions in the number of cars used by City employees have since occurred, with an additional 500 to be taken off-line before June 30 (174 have already been eliminated.)

In recent years, the OFM has also altered the makeup of its fleet, replacing many SUVs with sedans and hybrid cars and using biodiesel fuel in its sanitation trucks. The result has been a 90,764-gallon reduction in fuel purchases between 2007 and 2008, a savings of more than $292,000 for the City (see chart above).

GENERAL FUND INITIATIVES

Energy-Efficient Capital Investments

A Pennsylvania law called Act 77, the Guaranteed Energy Savings Act (GESA), allows municipalities to contract for energy conservation measures in existing buildings without the requirement of an up-front budget allocation. Through GESA, energy service companies (ESCOs) can evaluate building energy use, and propose and then implement turnkey savings projects, with repayment coming from the reduced energy demand and attendant savings. Scarce City capital dollars are not necessarily required for implementation.

In January 2009, using a public contracting process, the Mayor's Office of Sustainability, working closely with the

Energy Demand – General Fund Departments

GENERAL FUND	2003	2004	2005	2006	2007	2008
Electricity (kwh)	305,115,334	305,298,479	288,973,206	288,538,284	292,318,553	298,204,623
Gas (Mcf)	810,314	770,537	769,905	712,055	750,370	716,493
Steam (Mlbs)	110,999	105,928	93,177	85,857	103,173	112,408
Heating Oil (gal)	895,257	725,048	317,676	303,267	284,112	262,683
Vehicle Fuel (gal)	7,378,843	7,458,622	7,272,156	6,854,041	6,843,324	6,825,229
TOTAL (Million MMbtu)	**2,876,288**	**2,822,478**	**2,687,052**	**2,574,510**	**2,622,362**	**2,602,913**

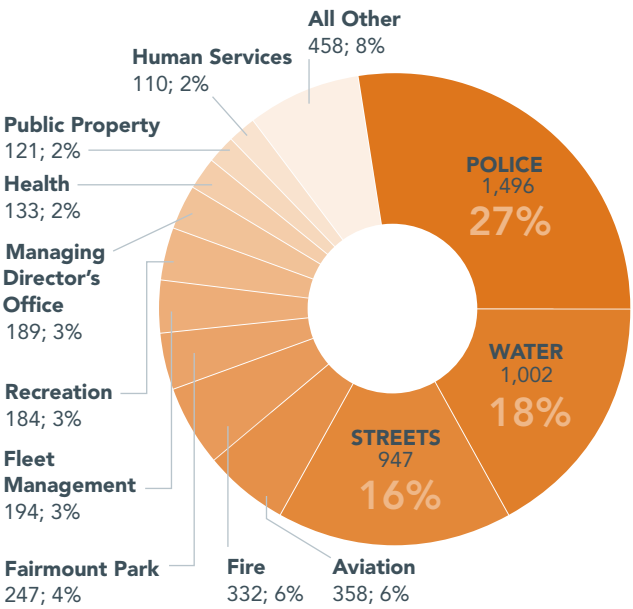
SOURCE: MAYOR'S OFFICE OF SUSTAINABILITY, CITY OF PHILADELPHIA

Department of Public Property (Public Property), selected three ESCOs to study the Center City buildings commonly known as the Triplex: the Municipal Service Building, the Criminal Justice Center and One Parkway. City Hall was also included in the mix. The ESCOs have been asked to submit detailed conservation proposals, with savings guaranteed to be enough to pay for the improvements over several years. Selection will occur over the summer. The work might be able to shave the buildings' energy demand by as much as 20 percent.

Having learned from this effort, the Mayor's Office of Sustainability and Public Property will begin to target smaller City-owned buildings. Fire and police stations, recreation centers and health clinics will all be prioritized for similar ESCO interventions based upon characteristics, including the amount of energy used per square foot and the age of the heating, ventilation and air conditioning (HVAC) equipment. Over the next 7 years, 50 smaller buildings will be retrofitted. The Philadelphia International Airport and Philadelphia Prisons have also begun their own ESCO selection processes.

ICF International estimates that this work will decrease the City's total electric demand by 23,626 MWh hours and gas and steam consumption by 89.5 billion Btus.

Fleet Size, April 2009, by Department



SOURCE: OFFICE OF FLEET MANAGEMENT, CITY OF PHILADELPHIA

Implement Target Energy Budgets

The City pays the bills on more than 1,000 different electric, gas and steam accounts. While the 40 biggest facilities account for 60 percent of energy use, conservation must take place at all facilities in order to achieve *Greenworks Philadelphia*'s ambitious goals. To provide an incentive, beginning in July 2009, each City department will become accountable for its energy costs. Using the federal ENERGY STAR program, the Mayor's Office of Sustainability will set energy targets that reduce consumption by 5 percent in fiscal year 2010 for every department and work with employees and building managers to meet their respective goals. If a department reduces demand by more than the target, the additional monetary savings will be granted back to the program budget in the next fiscal year. In fiscal years 2011 and 2012, the targeted energy budgets will be 10 percent below their currently projected energy budgets. ICF estimates that this program will decrease demand by 44 billion Btus its first year and more than 80 billion Btus in successive years.

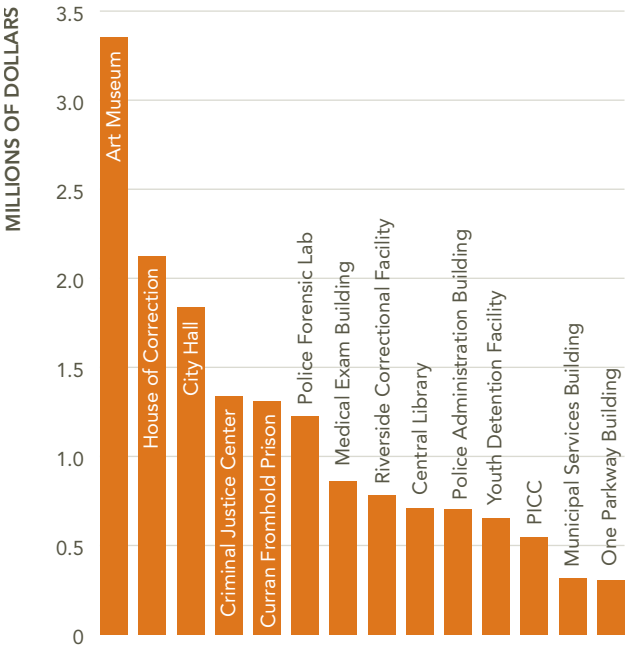
Encourage Conservation among Employees

Through an internal education campaign, the Mayor's Office of Sustainability and the Department of Public Property will make the City's workforce more aware of the advantages of turning off electronic devices and lights and turning up building thermostats in the summer and down in the winter. This effort will be tied to the previously mentioned Target Energy Budget initiative.

Install New Lighting

A quick way to reduce electrical demand significantly is to install motion sensors and timers on light switches, a recommendation the ESCOs are likely to make for the three downtown City-owned office buildings, as well as City Hall.

Top 14 Facilities by Total Energy Cost, Fiscal Year 2008



Note: The Art Museum's energy costs include its main building and the new Perelman Building. SOURCE: MAYOR'S OFFICE OF SUSTAINABILITY

Using federal money, the Streets Department will replace the incandescent yellow and green bulbs in traffic lights with LED lighting. (The red bulbs are already LEDs, but are nearing the end of their 10-year life, so will also be replaced.) This project will reduce energy demand by 9.2 million kilowatts annually, a $1.3 million savings. Because LED lights last more than 10 years—approximately three times longer than the old lights—the City will also save money in replacement costs.

Currently many recreation centers flood their fields with light throughout the night, often citing safety concerns as the reason for doing so. While certainly understandable, the flood lights deployed nonetheless consume significant amounts of electricity and should be better managed when the fields are not in use. New outdoor-lighting fixtures can be motion-controlled, while other new devices offer the option of leaving just a few lights on at a time. The Mayor's Office of Sustainability will work with the Parks and Recreation Department to replace the current outdoor lighting with energy-saving devices.

Include Energy Conservation in Future Building Maintenance Contracts

The Department of Public Property, which contracts out its building maintenance work, has recently changed the bid specifications in its request for proposals for facility-management companies to include energy-conservation language. It will ask any selected company to ensure that maintenance workers turn off lights at night, set thermostats at energy-saving temperatures and follow high-performance building guidelines when windows or HVAC systems need to be repaired or replaced. The City will also begin to explore the possibility of having building cleaning crews work during daylight hours, saving it nighttime electricity and energy costs.

Identify Less-Expensive and Alternative Electrical Sources

With caps on electrical rates ending in January 2011, large energy users, such as the City, will have an incentive to purchase electricity from any number of competing electricity suppliers. (PECO will remain the corporation responsible for distributing electricity from the selected supplier to the customer.) By entering the wholesale market, the City can use its procurement process to obtain competitively priced electricity. Price will be a major basis for comparing electricity options, but potential suppliers will also be evaluated on their offers for renewable and "low carbon" electricity.

Develop Energy Load/Demand Management Practices

Electricity rates vary with the time of day and the season, and are known in the industry as "peak" and "non-peak" rates. Wholesale prices for electricity are lowest, for example, in the early morning hours of winter and highest mid-afternoon in summer. Understanding those price variations and adjusting usage accordingly can save entities like the City money. Both wireless metering and computer-controlled energy management—known as "Smart Meter" technology—can make it easier for building operators to monitor demand across many buildings and minimize electrical use when prices peak. The Mayor's Office of Sustainability will work with Public Property to install the systems necessary to better monitor and regulate demand.

Total Energy by Fund (in Btus)

Fiscal Year: 2008

GENERAL FUND	WATER FUND	TOTAL
2,602,909,804,076	1,033,899,687,200	3,636,809,491,276

PROJECTED

Fiscal Year: 2015

GENERAL FUND	WATER FUND	TOTAL
2,489,149,689,807	1,675,199,000,000	4,164,383,689,807

SOURCE: MAYOR'S OFFICE OF SUSTAINABILITY AND PHILADELPHIA WATER DEPARTMENT

Create Capital Budget Energy Guidelines

The Capital Budget Office, working with the Mayor's Office of Sustainability, will begin to apply energy savings criteria to City-owned building construction projects to achieve at least a 20 percent reduction in future energy use. The U.S. Green Building Council's LEED criteria or the Environmental Protection Agency's (EPA) ENERGY STAR standards will provide guidance. White reflective or green roofs will also be required on all new public buildings constructed in the city and when existing roofs are replaced. *Greenworks Philadelphia* supports current efforts in City Council to adopt such guidelines.

Use Future Energy Costs to Help Inform Building Acquisition/Expansion Decisions

The size and condition of the City's inventory of buildings is the primary determinant of its energy expenses. For existing buildings that have not been equipped with more up-to-date heating, air-conditioning and lighting systems, energy use may be easily double the EPA's ENERGY STAR norm for well-performing buildings. Future operating costs related to energy demand are not currently part of a City department's building acquisition or facility expansion decision-making process (and it's no wonder since they do not bear the costs of operating that facility). With target energy budgets being put into place, operating departments and Public Property must begin to consider the future heating, cooling and lighting costs of new or expanded building proposals before investments are made.

City Employee Car Management Plan

While the City fleet has already been reduced over the past five years, it will decrease by an additional 500 passenger vehicles before the end of this fiscal year (June 30, 2009), saving $3 million. To achieve the reduction, the Office of Fleet Management will minimize "take-home privileges" in cases where city managers are using a vehicle primarily to commute and only incidentally for field inspections and meetings. In addition, the City will set higher fuel-efficiency standards for its fleet and encourage the purchase of hybrid vehicles. In the coming years, the Office of Fleet Management will create fuel budgets for each department to increase awareness of fuel use, with the goal of cutting demand by 10 percent annually.

Investigate Conversion of City Buildings from Steam Loop to Natural Gas

Center City Philadelphia is served in part by a steam utility owned and operated by Trigen Veolia. This utility serves more than 400 institutional and commercial customers with approximately 3.6 million Mlbs (thousand pounds) of steam. Nine City-owned buildings are served by the steam system, including the Philadelphia Museum of Art, which accounts for two-thirds of the City's total steam usage. Steam service has the advantage to a building owner that no capital and operating funds are required for heating boilers: The steam is already produced and distributed right to the end user. But the cost per unit of the steam provided by Trigen Veolia has historically been twice that of the steam created by natural gas–fired boilers in other City buildings. The City is therefore evaluating whether a number of the buildings served by the steam utility should be converted to natural gas–fired boilers in order to gain the long-term advantage of lower fuel costs.

WATER FUND

The Philadelphia Water Department (PWD) is one of the largest consumers of electricity in the city, using nearly 300 million kilowatt hours a year at a cost of $18.1 million. It also consumes about a million cubic feet (mcf) of natural gas, 400,000 gallons of diesel fuel and 350,000 gallons of gasoline.

The PWD estimates that its total energy costs will increase by approximately 33 percent when caps on electric rates expire in January 2011. If department consumption stays the same or increases because of new regulations, it will spend an additional $7 million per year.

The PWD has already taken steps to reduce its demand. Each of its facilities, except the Southwest and Northeast wastewater treatment plants, has undergone extensive lighting retrofits to meet U.S. Department of Energy's Greenlight Standards. The PWD has also been pumping water at night to fill reservoirs, thus transferring much of its electrical usage to off-peak periods.

Five-Year Strategic Energy Plan

The PWD has begun to plan how it will cope with future electric rate hikes, identifying additional ways to reduce demand and switch to renewable-energy sources (see below for more information about those latter efforts). Anticipated steps include improved equipment efficiency, "right-sizing" motors and pumps and controlling electrical usage during peak demand times.

TARGET 2

Reduce Citywide Building Energy Consumption by 10 Percent

Although many large and small cities view green buildings solely through an environmental lens, *Greenworks Philadelphia* understands that high-performing buildings provide a way to reduce citizens' vulnerability to a future of rising energy prices.

Residential and commercial buildings use more energy than either industry or transportation, and improving their energy-efficiency can yield high returns at low risk. Building retrofits may be self-financing—the U.S. Department of Energy found that a $2,500 investment in home retrofitting can reduce annual energy consumption by 30 percent—but they are not self-implementing. So how can governments encourage commercial building and home owners to do the right thing, without mandating the desired behavior or increasing the cost of doing business? *Greenworks Philadelphia* proposes new financial tools, including tax incentives and low-interest loans, to help

DOYLESTOWN'S GREEN BUILDING INCENTIVE PROGRAM

Doylestown's voluntary program awards "Green Points" to builders who create sustainable structures. The borough's Department of Zoning and Planning developed a list of green building methods that cover such items as recycled materials, insulation, energy-efficient appliances and heating systems, solar hot-water heating and windows. Each item is assigned a point value. For example, three points are assigned if the builder uses ceiling insulation with an R-value of 38 and five points for R-43 or greater. Each point lowers the building's applicable permit fee by one percent. A maximum of 50 points can be awarded to any one project. Builders with an LEED rating of at least "Silver" automatically qualify for 60 points and are not required to submit the Green Points worksheet forms.

residents and commercial owners make the investments needed to decrease total building energy demand in the city by 10 percent during the next seven years. Current commercial and residential building energy demand in Philadelphia is 99.7 trillion Btus, meaning that by 2015 that demand should decrease to 89.7 trillion Btus. This effort will not only reduce carbon emissions in the city, but will also save residents and businesses hundreds of dollars each year.

The average household in the Northeast spends roughly $4,000 to $5,000 annually on energy. With a median household income in Philadelphia of $34,431, this means that about 14 percent of the pre-tax family budget goes to energy. This burden is even more pronounced for low-income families. The standard electric bill for PECO customers that do not heat their homes with electricity is $78.44 per month or nearly $1,000 per year. When the Commonwealth's cap on electric rates expires in January 2011, monthly bills could rise significantly.

Customers of Philadelphia Gas Works (PGW), the City-owned and-operated natural-gas supplier, use an average of 91 mcf per month, with demand rising in winter and falling during warmer months. Low-income customers, however, often use more gas than those in PGW's Customer Responsibility Program (CRP), consuming 120 mcf per month on average. The reason is two fold: first, many low-income households live in homes that are poorly insulated and have less efficient heating systems; and second, the CRP program charges participants based upon income and not upon actual natural-gas usage, providing little incentive to conserve.

Building weatherization typically reduces building operating costs by such an amount that the return on investment usually occurs within a few years. But the means to repay does not guarantee the up-front money needed to finance improvements. Building owners need access to capital, which can be collateralized by the lower building energy operating costs that energy-efficiency improvements yield.

There are enormous potential returns to constructing new energy efficient buildings and retrofitting existing buildings. But the challenge is in designing programs and incentives that will help building owners make those initial investments. *Greenworks Philadelphia* proposes a number of ways in which Philadelphia's current and future building stock might become more energy efficient.

INITIATIVES

MAKE BUILDING GREEN EASIER

Philadelphia can boast of having the largest LEED-certified building in the country—Liberty Property Trust's Comcast Center, which was certified "Gold" by the U.S. Green Building Council. It also has the nation's first "Platinum" LEED duplexes (Thin Flats) and the Friends Center is showing the world how to turn "Quaker Gray to Quaker Green."

Through these proposed initiatives, *Greenworks Philadelphia* will help all new buildings constructed in the city be green, sustainable and energy efficient.

Develop Energy-Efficiency Building Guidelines

The City's building code establishes a minimum level of energy-efficiency performance, but does not provide guidance on how to exceed those requirements or, to use current terminology, make a building "green." Working with public and private partners, the Department of Licenses and Inspections, the Mayor's Office of Sustainability and other City agencies will create energy-efficiency building-code guidelines or criteria as an appendix to the current building code. This "above code" appendix will give contractors, businesses and residents constructive information related to how to build or renovate structures that consume less energy, as well as guidance on green roofs and using recycled materials. The Department of Licenses and Inspections will also publish guidelines for City acceptance of third-party certified programs, such as LEED and ENERGY STAR, to the extent that they exceed the current code requirements. Additionally, City agencies will work with the Delaware Valley Green Building Council to develop customer-friendly guidelines for using building materials, equipment and construction practices that would boost a project's energy performance.

PHOTO BY PETER TOBIA

Greenworks Philadelphia also supports the development and adoption of statewide building codes that steadily and substantially increase the base energy-efficiency requirements for new structures and building retrofits. One immediate step would be for both the Commonwealth and the City to adopt the 2009 International Energy Conservation Code (IECC) that would make buildings at least 15 percent more energy efficient than projects built to comply with the current code. Going forward, the City will support further updates to the IECC that would make structures at least 30 percent more efficient.

PHOTO BY PETER TOBIA

Tie the Energy-Efficiency Code to Tax Abatement

Because most developers do not pay for the energy costs of the buildings they construct, they have little motivation to exceed base standards for energy-efficiency. *Greenworks Philadelphia* therefore proposes that the City develop financial incentives to encourage developers and existing commercial building and home owners to make energy-saving investments.

In March 2009, Mayor Nutter created a new Task Force on Tax Policy and Economic Competitiveness. One of the issues the taskforce will take up is the city's existing ten-year property-tax abatement program. One proposal for the group to consider is a change that rewards energy-efficient new construction and renovation. At the moment, property taxes on all new residential construction and the value of renovations to existing buildings are abated for 10 years. If the taskforce recommends that the abatement be maintained in this form, *Greenworks Philadelphia* proposes that buildings meeting the new energy-efficiency guidelines (or those that are LEED- or ENERGY STAR–certified) receive up to two more years in property-tax relief than projects that have not made these additional up-front investments. The proposed program would apply to residential and commercial renovation projects. This proposal offers a simple incentive mechanism and rewards developers who create high-performing buildings.

Grant Floor-Area Ratio Bonuses

Cities control the sizes of proposed buildings through zoning regulations that delineate the permitted floor-area ratio. (FAR is the ratio of the total building floor area to the area of the lot. For financial reasons, developers often seek to maximize the floor-area ratios of their projects.) Many cities have changed their zoning codes to create floor-area ratio bonuses for high-performing buildings. Height bonuses might also be awarded. *Greenworks Philadelphia* proposes that the City's Zoning Code Commission consider similar incentives.

Fast Track LEED-Certified and Energy-Efficient Buildings

At the moment, contractors pay $540 to have the required review of building plans expedited by the Licenses and Inspections department. *Greenworks Philadelphia* proposes that the fee be refunded if a project meets the new energy-effi-ciency guidelines, or has received a LEED or ENERGY STAR certificate.

Electronic Plan Development Review

Over the next two years, as part of the Development Process Made Easy (DPME) program being led by the Deputy Mayor for Planning and Economic Development, the City will de-velop an electronic system to enable multiple departments to review building permits simultaneously, instead of walking each request from one department to the next for approval. This system will save developers a significant amount of time, and therefore money, since approvals could be given concurrently. Given the City's interest in developing more "green" and energy-efficient buildings, the Licenses and Inspections department will test this initiative with permit requests involving green buildings.

Disclose Energy Use During Real-Estate Transactions

Many times, as a property owner is getting a commercial building or home ready for sale, he or she might invest in new paint or carpeting so that it shows better to a prospective

HISTORIC PRESERVATION AND GREEN BUILDINGS

The adage that the most sustainable building is the one already built is certainly true. And here in Philadelphia our historical building stock helps define who we are. Yet many of these structures are in dire need of repair and restoration. How should the City address the competing goals of preserving historic structures and increasing their energy-efficiency? For example, replacing windows that leak energy might be difficult because modern windows do not meet historic preservation guidelines. Further, there is no guidance on whether, where and how solar panels might be placed on historically certified buildings or within historic districts. *Greenworks Philadelphia* asks that the Philadelphia Historical Commission work with the Preservation Alliance, the National Trust for Historic Preservation and the building and solar-energy industries to develop guidelines that balance Philadelphia's past with the need to reduce energy demand. The newly renovated Friends Center offers Philadelphians an example of how historic structures and sustainability are compatible.

buyer. If the City were to require or encourage an owner to disclose two years of the building's energy demand (electrical and heating costs), investments might then also be made in installing new windows or attic insulation to bring those costs down before sale. *Greenworks Philadelphia* recommends that the City explore this possibility.

FINANCING MECHANISMS FOR HOME OWNERS AND SMALL BUSINESSES

In order to encourage home owners and commercial building owners to retrofit their buildings or install solar heating, low-water fixtures and efficient lighting systems, Philadelphia will seek out funds available from the Commonwealth and the federal government and create financial mechanisms to help pay for the up-front costs. There are a few models. The Cambridge Energy Alliance is a non profit organization that seeks to decrease energy demand by providing audits to building owners in Cambridge, MA. (An energy auditor examines air flow through windows and doors, checking for leaks, and inspects attic and wall insulation as well as lighting, heating and cooling systems, all with an eye toward energy savings improvements that could be made.) For owners who wish to carry out the recommended changes, the Energy Alliance has arranged for simplified loans with preselected banks. Loans are structured so that the amount that will be saved on electricity, heating or water bills covers the payments.

Other programs, like BerkeleyFIRST, defray the up-front cost of solar-panel installation, with repayment made through the home owner's property-tax bill. This program does not increase an individual's debt-to-equity ratio, but ties the capital improvements to the building. If the person sells his or her house, the debt remains with the property. Other cities are now considering similar financial tools.

Elsewhere, cities such as San Francisco and Boulder are considering the creation of revolving loan pools, capitalized with bond proceeds or with federal Recovery dollars, to finance energy-efficiency projects. And an organization called Architecture 2030 has proposed a "14 Stimulus Plan" that would use Recovery dollars to lower mortgage-interest rates by 1 percent for projects that meet a prescribed energy-efficiency standard.

Finally, in 2008, Delaware let bonds to create a sustainable energy utility whose mission is to decrease energy demand in that state by 30 percent. The bonds are repaid through the energy savings that home owners and businesses achieve. Philadelphia is now considering similar strategies.

Create a Sustainable Energy Authority

Greenworks Philadelphia proposes either creating a new or repurposing an existing public authority that can attract and pool a variety of capital sources to support large-scale energy investments, especially in weatherization. A public authority could go directly to capital markets; participate in federal programs, including Qualified Energy Conservation Bonds; attract state funding sources, such as Act 129's utility-generated conservation; potentially syndicate tax credits generated by renewable-energy production; and, with the creation of a federal carbon market, bundle and trade carbon credits derived from large-scale energy-efficiency projects. The proposed Sustainable Energy Authority (Authority) could use its funds to create a revolving loan pool, using energy savings as the repayment stream. The pool would then be replenished and new loans made until the city's, or even the region's, entire building stock was brought to optimal energy-efficiency.

In order to facilitate the future work of the proposed Authority, *Greenworks Philadelphia* supports Commonwealth-enabling legislation that would allow the city's property tax to be used as a repayment mechanism for energy-efficiency and development projects. With this tool in hand, the repayment of loans from the Authority could be tied to a building and not to an individual.

Reposition the Philadelphia Home Improvement Loan Program

Since 2003, the Redevelopment Authority has administered a home-repair and renovation program that, through local banks, provides low-interest financing to Philadelphia's home owners. Any owner-occupied building in the city is eligible for a 5 percent interest loan, with 3 percent financing available for lower-income households. This program could be retooled to make explicit that renovation work that reduces energy demand—particularly window replacement and insulation installation—and qualifies for these low-interest loans.

COMMERCIAL MARKET INCENTIVES

Many of Philadelphia's existing office and commercial buildings, as well as residences, are not owned by their actual tenants. This situation creates what is referred to as "renters' dilemma": Because the renters pay the utility bills, there is no incentive for a landlord to make an investment that would lower those costs. Given the sheer number of existing commercial, retail and apartment buildings in Philadelphia—particularly when compared to the amount of new buildings developed each year—the City should create initiatives that would encourage existing building owners to invest in weatherization and other sustainable activities. *Greenworks Philadelphia* therefore proposes these ideas as a starting point.

Create a Revolving Loan Fund for Tenant Improvement Work

Every year, Center City commercial building leases totaling two to three million square feet are signed or renewed in the city. At the time of signing a new or renewed lease, most landlords conduct tenant improvement work as part of the transaction. *Greenworks Philadelphia* proposes that the City Commerce Department, which, along with the Center City District, tracks downtown commercial leases, and the Philadelphia Industrial Development Corporation create a low-interest revolving loan fund using federal Energy Efficient Block Grant monies. Landlords could then finance energy-efficient improvements to a tenant's space—such work as lighting retrofits, lighting occupancy sensors, installation of low-flow toilets and sinks and window replacement—

with repayment coming from a portion of the savings. These funds would also be available to retail and industrial building owners.

Develop Power Purchase Pools for Small Businesses

In November 2008, Boston's Mayor Menino announced the creation of a new program called Boston Buying Power, which allows small businesses to enter the wholesale electric market through a combined purchasing group. Using an outside broker, the group can negotiate lower rates on behalf of its member businesses. As Pennsylvania moves toward deregulation, *Greenworks Philadelphia* recommends that the Commerce Department and Mayor's Office of Sustainability develop a similar purchase pool for Philadelphia's small businesses.

USING NEW TECHNOLOGY

Install Smart Meters

Technology exists to make the electric meter a two-way communications device between a home and the local power distribution company, in Philadelphia's case, PECO. Smart meters monitor usage and can adjust demand during peak times when prices are highest, automatically powering back some appliances. These meters not only save electricity during peak demand periods; they also help utilities cut the cost of acquiring power during those times. Smart meters also tell customers the times of day when peak rates are in effect, and can run dishwashers or laundry machines accordingly. The savings can be significant. Philadelphia's home owners should be encouraged to replace their old meters with this new technology.

Include Feedback on Utility Bills

Utility companies in California and Massachusetts have begun to calculate electrical demand per square foot for residential customers. The results are then compared to similar residences in the neighborhood. Residents whose energy use is lower than the neighborhood average receive a "Smiley" face on their utility bill. Evidence suggests that this subtle incentive has done more to reduce demand than more traditional marketing methods. *Greenworks Philadelphia* recommends that similar feedback features be implemented by PECO and PGW.

Create Neighborhood Competitions

Another innovative method being used to reduce demand is good, old-fashioned competition in the form of a program called Energy Smackdown, created by the BrainShift Foundation. This year, 10 families from three Boston-area towns are competing to see how much energy they can save. Their efforts are tracked and publicized on-line, and the families are even filmed and appear on the local-access cable channel. Last year's participants discovered that even small steps can save 36 to 69 percent in energy demand. Similar competitions are taking place at such colleges as Oberlin to reduce dormitory consumption. The Mayor's Office of Sustainability proposes to work with PECO, PGW and nonprofit organizations to create a similar competition here involving neighborhood associations or community-development corporations. Energy demand would be calculated for participating families in a specified area to establish a baseline, and their use would be tracked monthly for a year. At the end, the winning team would be given some sort of award or other recognition.

PGW, PECO and the PWD are already taking steps in this direction. Working with the Ogontz Avenue Revitalization Corporation, they have selected a block in West Ogontz on which every home owner has agreed to participate in a one-year energy-savings demonstration project. After a kick-off event on April 25, the three utilities will weatherize every home, replace lightbulbs and install low-flow water devices. While the utilities track the resulting energy demand decreases over the next year, the home owners will discover just how much money they will save.

PUBLIC EDUCATION

Develop a Citywide Energy-Efficiency Marketing Campaign

Working with PECO, PGW, the EPA and others, the Mayor's Office of Sustainability will help develop a public-education campaign designed to reduce energy demand among residential and commercial users. Any campaign will use existing marketing materials, as well as fresh messages, to convey how much money can be saved through conservation. Part of this effort will include informing home owners of the new federal tax credits for energy-efficiency investments, that were included in the federal Recovery package. The City will also use existing programs, such as BenePhilly and the Campaign for Working Families, to help spread the word.

Another emphasis of the campaign should be the money-saving benefits associated with energy-saving appliances and other household equipment (air conditioners, furnaces

SCHOOLS AND INSTITUTIONS

Given the sheer size and age of its physical plant, spread out in hundreds of locations throughout the city, the Philadelphia School District's efforts to reduce its energy costs will help determine whether *Greenworks Philadelphia*'s energy reduction target is met. The School District is already committed to constructing sustainable new schools, having received LEED Gold certification at the Barry school and Microsoft's School of the Future. Two other LEED schools are currently under construction in Kensington. The School District was also one of 12 school districts selected by the U.S. Green Building Council for its LEED Existing Building pilot project. This effort will help determine the steps needed to make already-built schools more energy efficient. The School District is expected to receive significant Recovery funds, some of which will help it implement much-needed building retrofit work.

Philadelphia is also rich with cultural institutions, many of which occupy buildings that were constructed decades ago and need to be retrofitted. Thankfully, Philadelphia is a member city of a project of the C40 Large Cities Climate Leadership Group that is working with the Clinton Climate Initiative (CCI). As such, it can take advantage of CCI's consulting and technical expertise. CCI resources are now being deployed at many of Philadelphia's largest cultural organizations, helping them determine the most economical way to invest in their physical plant and receive significant returns in the form of lower energy costs.

and computers). The recent ACEEE report asserted that a steady transition to ENERGY STAR–rated products could reduce citywide building energy consumption by 2 percent. Finally, the Mayor's Office of Sustainability will work with the City's Office of Education Advisor and the School Reform Commission to weave sustainability education into K-12 curriculum.

TARGET 3

Retrofit 15 Percent of Housing Stock with Insulation, Air Sealing and Cool Roofs

No issue better illustrates the multiple benefits of sustainability than residential weatherization. *Greenworks Philadelphia* discusses this target under the goal of reducing our vulnerability to rising energy prices because weatherization lowers monthly utility bills. But weatherization is also a workforce development strategy that creates demand for green jobs and an economic-development strategy that increases the competitive position of Philadelphia as a place to live and work. And, finally, weatherization reduces our environmental footprint by lowering the total amount of energy needed to heat, cool and light our homes, 260,000 of which were built before 1940. (Of Philadelphia's 560,000 occupied housing units, approximately 325,000 are owner-occupied.)

This target is a subset of the preceding target on reducing citywide building energy consumption. It is called out separately because of the multiple benefits described above and because of the opportunities that have emerged from the American Recovery and Reinvestment Act of 2009. President Obama and the Congress have committed an unprecedented level of federal funding for energy-efficiency in general and weatherization in particular. For example, the Weatherization Assistance Program of the U.S. Department of Energy is funded at $5 billion, which will drive almost $260 million to Pennsylvania's Department of Community and Economic Development. This amount represents a significant increase in current weatherization funding. Equally important are the changes Congress made to eligibility, expanding qualifying income to 200 percent of poverty ($44,000 for a family of four) from a 150 percent limit and increasing the amount of dollars that can be spent on any given home to $6,500 from $2,500.

Beyond the core Weatherization Assistance Program, the Recovery also created (for the first time) a number of new programs aimed at energy-efficiency activities. These include an Energy-Efficiency and Conservation Block Grant, which is likely to provide over $14 million directly to the City of Philadelphia to support a wide variety of energy-efficiency activities, including weatherization, training, program development and technical assistance. The scope of Qualified Energy Conservation Bonds was also expanded by Congress to allow for the funding of residential weatherization. The Department of Labor has a new competitive funding opportunity of $500 million to support green-jobs training. And finally, the Recovery contains $2 billion in funding for the Energy and Green Retrofit program for assisted housing (Section 8). Taken together these represent a once-in-a-generation chance to ramp up existing weatherization programming and imagine the possibility of large-scale retrofitting of Philadelphia's housing stock.

One of the principal attractions of a weatherization strategy is its capacity for creating new jobs, especially for those with various barriers to work. Employee training and retraining programs must be quickly developed so that Philadelphia's workers can do the type of work required. In Philadelphia, investments are under way to prepare hundreds of workers for weatherization and energy auditing jobs. Those efforts are discussed further in Section Four.

INITIATIVES

The forthcoming federal Recovery dollars will require a significant increase in Philadelphia's current weatherization capacity. And scaling up involves many distinct elements: policies, institutions, stakeholders and partnerships. A city that can successfully fit together these distinct elements into a comprehensive strategy will give itself a competitive edge in a carbon-constrained economy and build a new pathway to the middle class for its residents. Philadelphia aims to be one of those cities.

Expand Current Low-Income Housing Weatherization Efforts

The City of Philadelphia currently spends $19 million annually on housing preservation and weatherization, $11 million of which is supported by federal funds. Administered by the Philadelphia Housing Development Corporation, these Weather Assistance Program funds are used to provide traditional weatherization improvements, such as attic and wall insulation, window sealing and replacement, and upgraded heating equipment. Approximately 3,600 projects are completed each year. (In addition to basic systems repair, these funds also support emergency repairs and utility payments.) Through the Recovery, Philadelphia expects to receive more than twice the amount of money that it has historically spent on weatherization in a given year. This influx of new money will require a sea shift in how the work is carried out.

The Deputy Mayor for Planning and Economic Development's office has received grant funds from the Living Cities Foundation to hire a consultant to help it design a ramp-up in the City's weatherization efforts and make the needed connections between local workforce-training programs and the private contractors and nonprofit groups that will perform this work. A broad stakeholder team representing weatherization contractors, utility companies, job-training programs and community organizations will help guide the work of the consultant. The resulting plan will position Philadelphia to spend its weatherization dollars wisely and quickly.

One likely strategy will be to target entire blocks for weatherization and not work on a house-by-house basis in scattered locations throughout Philadelphia. Blocks could be selected using a process that looks at the houses' energy usage per square foot. Using this "zone" method, the City would create economies of scale, spreading certain costs over a larger number of sites.

Use the Sustainable Energy Authority to Create a Scalable Weatherization Program

The creation of the Sustainable Energy Authority described above could be capitalized with Qualified Energy Conservation Bonds and Energy-Efficiency and Conservation Block Grant funds. Those monies could seed a revolving loan fund for energy-efficiency projects in households that do not meet the Recovery's income thresholds.

The kind of work proposed—including insulation, air sealing and white roofs, which reduce building temperatures in the summer and decrease building energy demand by as much as 22 percent—typically has a payback of two to three years. In other words, the savings in reduced energy bills will exceed the up-front cost of the improvements in as little as 24 months, especially when combined with other incentives, such as rebates from utilities and tax benefits. Home owners would have no out-of-pocket costs for the improvements and could use their energy savings to pay back the Authority. As loans are repaid, the Authority could finance additional projects.

Expand Scope of PGW's Weatherization Program and Increase Size

In March 2009, PGW submitted a proposal to the Public Utility Commission (PUC) to invest $54 million over the next five years on an expanded housing retrofit program and other efforts to decrease gas usage among its customers. The programs would target PGW's highest energy users, including low-income households enrolled in its Customer Responsibility Program, weatherizing nearly 31,000 homes through both comprehensive and enhanced retrofit programs. It would also subsidize 80 percent of the cost of purchasing and installing high-efficiency gas appliances and heaters for 45,000 customers. PGW would also partner with PECO to install hundreds of thousands of efficient compact fluorescent light bulbs at the homes receiving the repairs. PGW estimates that the effort—to be funded for through a surcharge of approximately $5.64 per customer per year—would save its customers a combined total of 1.4 billion Btus of natural gas, or $104 million. *Greenworks Philadelphia* applauds PGW's leadership.

It also supports any steps PGW may take to change its CRP so that participants are billed based upon their actual demand and not on household income levels. Given that some of the higher demand among CRP participants is caused by existing building conditions, a switch to a demand-based formula should not be made for a participant until his or her home has been weatherized.

Build Energy-Efficiency into Public and Low-Income Housing

Using Recovery dollars, the Philadelphia Housing Authority will build 23 LEED-certified homes in West Philadelphia. It will also retrofit 100 scattered site houses that it owns throughout the city and replace lighting fixtures in some of its larger developments. These new federal monies for energy-efficiency work underscore the fact that up-front investments will lower the building operating costs. These savings are especially important for Philadelphia's most vulnerable residents. The City's housing agencies must therefore begin to include energy-efficiency standards in any publicly funded housing-development project, lining those standards up with federal and state criteria. The Redevelopment Authority has started down this path with the 175 housing units that it will rehabilitate using the EPA's ENERGY STAR standards. The $16 million funding for this effort comes from the federal Neighborhood Stabilization Program.

TARGET 4

Purchase and Generate 20 Percent of Electricity Used in Philadelphia from Alternative-Energy Sources

Reaching this target depends upon PECO's compliance with the Commonwealth's Alternative Energy Portfolio Standard that calls for it to receive 9.2 percent of its power from

alternative sources by 2011. The remaining amount will come from PECO's residential, commercial, industrial and institutional customers that purchase renewable energy credits (RECs) through, for example, PECO Wind. The University of Pennsylvania currently purchases 50 percent of its power through the purchase of RECs, which the Phillies and Eagles sports teams also use. In addition, a coalition of local hospitals, including Albert Einstein, Thomas Jefferson, Frankford and Magee Rehabilitation, recently joined together with Main Line Health Systems to purchase one-third of their combined energy needs directly from the Locust Ridge II wind farm in Hazelton. Philadelphia's City Hall is powered by PECO Wind.

In March 2009, PECO announced that it was seeking approval from the PUC to purchase six megawatts of s olar renewable energy credits (SRECs), enough to power 1,000 homes for 10 years. PECO will request bids from any entity that is or will be generating SRECs. (In effect, PECO is creating a market for solar energy.) If the PUC approves PECO's request, it would become the first utility in the state to buy and bank SRECs.

But *Greenworks Philadelphia* also commits the city to create the capacity for renewable-energy production within its own borders. This work will supplement PECO's and institutional REC purchases and combined will yield a 20 percent alternative-energy portfolio in Philadelphia by 2015.

INITIATIVES

SOLAR

In 2008, Philadelphia was named a Solar America City by the U.S. Department of Energy, joining 25 other cities working to accelerate the use of solar energy. In applying for that honor, the City proposed to increase the amount of solar-energy capacity in the city to 2.3 megawatts by 2011 and 57.8 megawatts by 2021. Housed within the Mayor's Office of Sustainability, the implementing effort—called the Philadelphia Solar City Partnership (Partnership)—is working with multiple stakeholders and industry experts to identify and remove barriers to the use of solar-energy and help Philadelphia become a leader in clean-energy development. Among other efforts, the Partnership will inventory City-owned rooftops and open space to determine what might be suitable for solar technology. It will examine orientation to the sun, electric load of the surrounding area, roof structure, shading and cost.

The City has already begun to use solar power at its properties. In 2008, Riverside Correctional Facility added a solar-powered heat-exchange system to produce all its hot water, using gas or oil only as a backup. With 1,300 gallons of hot water used daily at the prison, the 45 solar-collector panels will save $1 million over their 25-year life and reduce carbon emissions by a million pounds.

THE PHILADELPHIA WATER DEPARTMENT BOTTLES THE SUN

As the Philadelphia Water Department (PWD) seeks to reduce its energy demand, it is exploring the possibility of using solar energy at some of its facilities. It has hired a contractor, Metro Energy, to study three water-treatment plants and produce a feasibility study. The PWD is also working with the Mayor's Office of Sustainability to use a recently awarded $200,000 Solar America Showcases grant to investigate the appropriateness of any additional PWD sites for solar energy. The department believes that during sunny summer days, a plant with a solar array has the potential to produce enough energy to power most of the treatment and pumping operations. Overall, though, a one-megawatt solar facility, which normally covers six acres, would produce fewer than 1 percent of the electricity consumed by the facility over the course of a year.

Promote Renewable Power Purchase Agreements for Public Buildings

Using what is known as a Power Purchase Agreement, the City can pay a private developer to generate solar power on public land over a long period, typically 25 years. The advantage for the City is that the price is fixed for the life of the contract, bringing stability to energy costs. The developer gains a guaranteed long-term source of income, allowing it to recoup up-front installation and ongoing maintenance costs.

Reduce Regulatory Barriers to Solar Installation

The Partnership will also foster a friendly environment for the private sector to use solar. Staff will review procedures for large- and small-scale solar projects to identify barriers to installation and decrease the steps involved. In particular, the Partnership would like to help the Zoning Code Commission develop solar-friendly guidelines that would protect existing solar-power installations from being shaded by new development and allow solar installations by right within certain designated zones. The zoning code should also address solar installation on residential properties, balancing the interests of home owners and their neighbors.

Write a Guide for Solar Development

The Partnership will produce an on-line, user-friendly guidebook and resource materials to help solar-system investors and home owners develop projects. The guidebook will include information on financing, best locations and electrical and permitting requirements, and will be updated regularly.

Report Solar Financing Options

The Mayor's Office of Sustainability Web site will direct home owners and small businesses to sources of state and federal funding and explain how to get tax credits. For example, Pennsylvania's Commonwealth Funding Authority recently approved funding for the Pennsylvania Sunshine Program, which will give rebates to customers for as much as 35 percent of the cost of installing a solar-power system. Residential sys-

tems must generate 2 to 10 kilowatts to qualify, while small business systems must generate 3 to 200 kilowatts.

WIND

Through a purchase program, the City could buy power from a wind farm, an attractive arrangement since it would shift a portion of its energy use to a renewable source and the cost would be stable over a long period. However, unlike solar energy, which could be produced locally, wind farms are likely to be far away, supplying power to the overall grid rather than to Philadelphia exclusively. For this reason, *Greenworks Philadelphia* recommends that the City also focus its efforts on developing local sources.

Vertical Axis Wind Turbines for Public Roofs

New types of wind turbines offer urban areas the opportunity to harness wind energy. A vertical-axis wind turbine (VAWT) looks like a rotating helix, and its narrower turning radius makes it better suited for cities (horizontal-axis wind turbines require rotational diameters of 250 feet). VAWTs can generate electricity at wind speeds as low as four miles per hour and can be mounted on rooftops. As the technology evolves, VAWTs might be a solution in urban areas such as Philadelphia. In fact, the University of Pennsylvania is installing anemometers to test wind speed and direction around campus and researching small-scale wind options. The Mayor's Office of Sustainability will monitor the emerging VAWT technology as a possible alternative-energy source for the the city.

BIOGAS

Wastewater treatment involves breaking down organic matter in biological or anaerobic digesters, a process that results in biogas. The Water Department has historically used biogas from its Northeast and Southwest treatment facilities as fuel to heat buildings and to keep the digesters at a constant temperature. It burns any excess fuel. Given the increasing price of energy, biogas represents a renewable resource that the Water Department is working to enhance and optimize. PWD is therefore implementing plans that will use biogas to generate electricity and recycle materials from other departments to increase biogas production.

Create Biogas Cogeneration Facility at Northeast Wastewater Treatment Plant

The PWD is currently designing a 5.6-megawatt biogas cogeneration facility to be built at the Northeast wastewater-treatment plant to generate both heat and electricity. When operational in early 2011, the biogas process there could produce 50 percent of the plant's electricity and reduce the Water Department's overall electrical purchases by more than 10 percent. The biogas project could save approximately $2.5 million of the department's $18.1 million energy budget. The savings would cover the $15 million capital cost of the biogas project in approximately five to seven years. The project would also reduce carbon emissions by nearly 22,000 tons per year and 171,664 million metric tons of carbon dioxide equivalents, according to ICF International. The present value of savings totals $54 million.

Recycle Deicing Fluid

The Philadelphia International Airport uses more than a million gallons of deicing fluid on airplanes annually. The fluid is toxic to aquatic life and must be disposed of safely. Until recently, the airport took used fluid to wastewater plants in Delaware, Pottstown and Lehigh County, where it was aerated, an extremely energy-intensive process. Airports in Milwaukee and Albany, however, discovered recently that the fluid can be used to produce biogas. The Water Department and the airport collaborated to ship 50,000 gallons of fluid to the Southwest wastewater facility daily during winter months. Over the past winter, more than 1.5 million gallons of deicer fluid were transported to the plant, which is adjacent to the airport. Enough biogas is being created there to provide fuel needed to dry seven tons of biosolids a day, saving the PWD up to $200,000 per year. The project also saves the airport more than $100,000 annually in disposal costs.

GEOTHERMAL POWER DEVELOPMENT

In West Philadelphia, the Water Department intends to use several 350- to 400-feet-deep wells to tap geothermal supplies for its new $10 million Sewer Maintenance Facility. The facility, being built on seven acres, will be a base for sewer-maintenance team activities, truck storage, materials storage, training and fueling. The closed loop, vertical geothermal well system will meet all the building's HVAC and domestic hot-water needs, reducing energy costs by 15 percent a year. A green roof is also being installed that will help the building conserve energy and manage stormwater.

HYDROELECTRIC POWER

Hydroelectric power is one of the most efficient and renewable energy sources, with over 80 percent utilitization compared to solar, which has a 2 to 5 percent utilization rate. A study done more than two decades ago found that the Schuylkill River's Fairmount Dam, at the Waterworks, could generate approximately one to two megawatts of electricity. In addition, Flat Rock Dam (near the Manayunk Canal) could produce two to three megawatts. Obviously, there are political, historical, cultural, legal and contractual challenges to restoring hydroelectric power at the dams, particularly the iconic Fairmount Dam. But the energy generated could be used at the Fairmount Waterworks, Lloyd Hall, and Boathouse Row, whose iconic lights could then serve as a very public reminder that Philadelphia is going green. *Greenworks Philadelphia* asks that the PWD conduct a study of this proposal and partner with appropriate city agencies, knowing well, however, that there are many obstacles facing actual implementation.

PAINTED RECYCLING TRUCKS UNLOADING AT
29TH AND ELLSWORTH IN SOUTH PHILADELPHIA

PHOTO BY PETER TOBIA

SECTION TWO

Greenworks Philadelphia

environment

PHILADELPHIA REDUCES ITS ENVIRONMENTAL FOOTPRINT

PHOTO BY PETER TOBIA

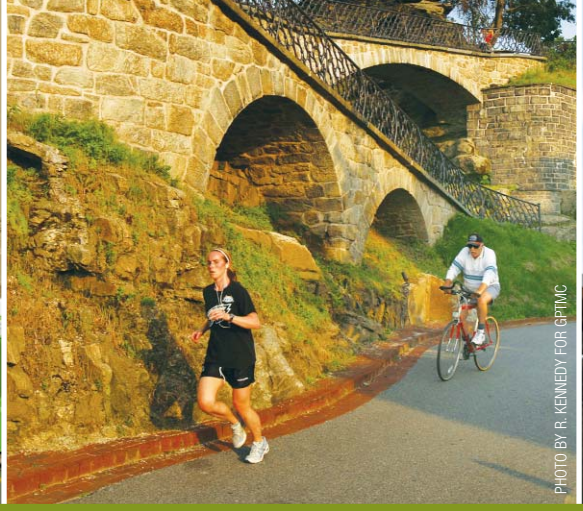


PHOTO BY R. KENNEDY FOR GPTMC

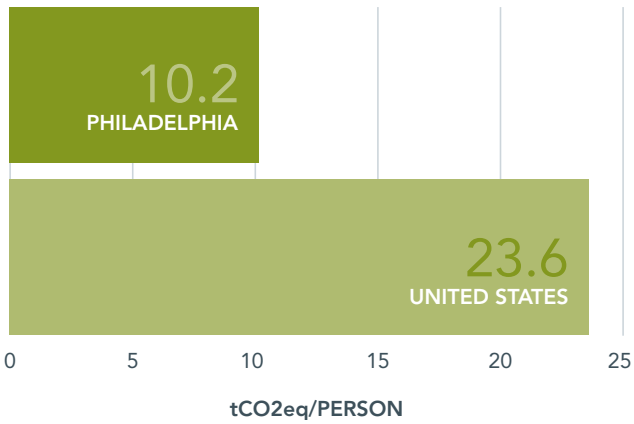
PHOTO BY PETER TOBIA

For the past two decades, warning bells have sounded that global climate change is real and, if ignored, will have a devastating impact on our planet. Those bells—rung by scientists, political leaders and environmentalists—have grown louder over the last few years as weather-prediction models depict ever faster and steeper global warming trends. In January, the MIT Joint Program on the Science and Policy of Global Climate Change released an update to its 2003 study on climate change. Its conclusions were startling: "The new projections are considerably warmer than the 2003 projections, e.g., the median surface warming in 2091 to 2100 is 5.1°C [9.2°F] compared to 2.4°C in the earlier study."

Climate change predictions and other messages regarding the link between global warming and carbon emissions have now broken through into mainstream America's consciousness, combining with last year's rapidly rising oil prices to create a new sense of urgency among many Americans. The recent determination by the U.S. Environmental Protection Agency that greenhouse gases threaten public health will heighten awareness further. Most conversations about climate change, decreasing the nation's dependency on foreign oil and investing in a sustainable economy now highlight their interconnectedness.

Out of the current policy debate has emerged an understanding that global population centers—which produce 75 percent of the world's energy consumption and related greenhouse-gas emissions—have a substantial role to play in reducing the emissions that lead to global warming, especially since densely populated cities like Philadelphia produce fewer greenhouse gas emissions per capita. Philadelphians on average emit 10.2 tons of carbon equivalents each year versus a national per-capita rate of 23.6 tons (see below).

Greenhouse Gas Emissions per Capita



SOURCE: LOCAL ACTION PLAN FOR CLIMATE CHANGE 2007, CITY OF PHILADELPHIA

To be certain, one of the central arguments of *Greenworks Philadelphia* is that sustainability will lead to a healthier, wealthier and more competitive city. But it should not be ignored that nearly all of its proposed initiatives will also positively impact the larger planet by reducing the city's carbon footprint.

TARGET 5

Reduce Greenhouse Gas Emissions by 20 Percent

Carbon emissions have steadily grown since the Industrial Revolution, but the rate of increase has been exponential in more recent decades. The Intergovernmental Panel on Climate Change (IPCC) reports that from 1970 to 2004, global greenhouse gas emissions increased 70 percent, causing a correlated rise in global temperatures. As emissions and temperatures continue to go up, sea levels will rise, as will the frequency of both intensive storms and drought in different parts of the globe.

The Union of Concerned Scientists projects that here in Pennsylvania the number of extremely hot days (temperatures over 90 degrees) could double over the next several decades.

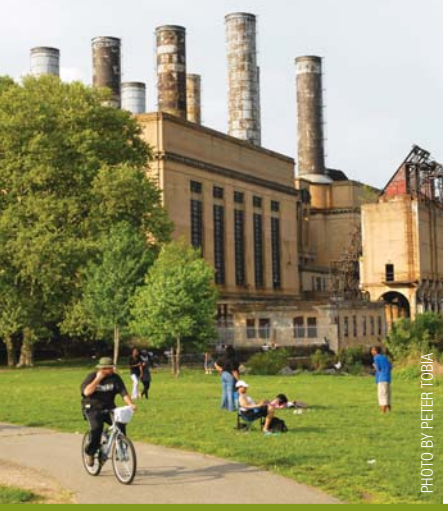


PHOTO BY PETER TOBIA


PHOTO BY PETER TOBIA


PHOTO BY PETER TOBIA

Its 2008 report, *Climate Change in Pennsylvania*, also noted that the average rainfall in the state had increased by six inches over the past century and will continue to grow in the coming years.

Although science paints a harrowing picture of our future, the good news is that there is agreement that steps can be taken to reduce emissions through a combination of behavior changes and new technologies.

As noted in Section One of this document, making buildings more energy efficient offers a cost-effective and relatively easy way to reduce carbon emissions. A recent study by McKinsey & Company looks at the emissions reductions from an economic point of view and predicted that cataclysmic climate change can be averted for less than one percent of forecasted global gross domestic product in the year 2030. But action must be taken now: Waiting even 10 years to reduce emissions, which by then will have increased even further, will make the chances of success virtually impossible. In addition to *Greenworks Philadelphia*'s proposals to increase building energy-efficiency, it also calls for increased tree canopy and green open spaces, local food production, and investments in public transportation, commercial corridors and bike trails. All these efforts will help decrease locally produced greenhouse gas emissions.

Philadelphia's Leadership to Date

The Kyoto Protocol of 1997 represented the first step in the formation of an international agreement to curb emissions. Although emissions by Asian countries are growing quickly, the United States still produces more per capita than other nations. Philadelphia has worked with other national and international cities to reduce its greenhouse gas emissions according to the goals set forth by Kyoto. Its commitments to date include:

- **The Clinton Climate Initiative.** In 2006 the City joined a distinguished group of major international cities (known as the C40) and recommitted itself to reduce its carbon emissions and adapt to climate change. The C40 is supported by the Clinton Climate Initiative (CCI) of the William J. Clinton Foundation.
- **Cities for Climate Protection® (CCP) Campaign of ICLEI—Local Governments for Sustainability.** In 1999 the City committed itself to reduce Philadelphia's greenhouse gases to 10 percent below 1990 levels by 2010. It is on a path to meet its pledge.
- **U.S. Mayors' Climate Protection Agreement of the U.S. Conference of Mayors.** In a similar vein as its ICLEI pledge, Philadelphia endorsed the U.S. Conference of Mayors' agreement to meet or beat the greenhouse gas reduction targets recommended for the United States under the Kyoto Protocol, and to urge the federal and state governments to enact policies and programs to reinforce local efforts.

Moving beyond these previous pledges, *Greenworks Philadelphia* now seeks to increase Philadelphia's greenhouse gas reduction target to 20 percent below 1990 levels by 2015.

Philadelphia's most recent greenhouse gas inventory showed that the city's current emissions were less than half of the nation's average emissions per capita. Yet, the city can still lower its emissions further and serve as a global leader in proving how cities can manage their energy use and related emissions. In so doing, the city will receive the co-benefits of economic competitiveness and increased quality of life through lower energy costs and pollution levels. What is good for the planet is good for Philadelphians—and vice versa.

Opportunities for Philadelphia in Proposed Federal Cap and Trade Legislation

It is looking increasingly likely that the U.S. Congress will take up debate this year on federal cap and trade legislation that would create a market for reducing the nation's carbon emissions. Cap and trade systems place a limit on how much greenhouse gas can be produced annually, requiring individual polluters to obtain permits to emit a set amount of greenhouse gases. If a business creates more than its permit allows, then it has to buy credits from entities that emitted less than their allowance. Simply put, carbon will have a cost, and polluters will have to pay for it. This approach encourages innovation in pollution reduction and helps phase out inefficient facilities. Cap and trade policies that have been effective at reducing acid rain are being used in Europe as a way to reduce greenhouse gas emissions.

GREENHOUSE GAS

The EPA reported in April 2009 that greenhouse gas (GHG) emissions had increased 17 percent nationally between 1990 and 2007. The three primary greenhouse gases are:

- **Carbon Dioxide (CO_2)** – emitted by burning fossil fuels like oil and coal and deforestation. CO_2 represents 85 percent of GHG emissions.
- **Methane (CH_4)** – emitted by landfills, natural-gas systems and livestock. Methane has as much as 21 times the impact per ton than CO_2.
- **Nitrous Oxide (N_2O)** – emitted by agricultural soils, livestock and burning fossil fuels. Its impact per ton is 310 times more than CO_2.

President Obama has requested cap and trade legislation that would distribute carbon-producing credits through an auction. Because polluters that currently emit the most greenhouse gases would need more credits, they would be penalized and have to pay the most. The revenue generated would be used for tax credits for working couples and provide $15 billion in clean energy funding per year. President Obama has included this "climate revenue" in his budget beginning in 2012. Between 2012 and 2019, his Administration expects $646 billion to be generated by the auction. The Obama Administration estimates that its proposal would reduce U.S. greenhouse gas emissions by 14 percent from 2005 levels by 2020 and 83 percent by 2050.

This cap and trade proposal would certainly have economic effects, with the impact varying by state. If the funding were to be apportioned based on population, the Center for American Progress estimated that Pennsylvania could receive between $2 billion and $13 billion per year for energy-related work. And Philadelphia could become a repository of great value. With its vast portfolios of existing buildings and infrastructure, the city would become one of the best places to find and harvest carbon-reduction measures. *Greenworks Philadelphia*'s proposed Sustainable Energy Authority (see Section One) could become the local marketplace for buying and selling carbon, using the city's own reductions in energy demand and attendant carbon emissions as the commodity. Proposed federal cap and trade policies only amplify the importance of *Greenworks Philadelphia*'s initiatives in securing a future of prosperity for Philadelphia.

TARGET 6

Improve Air Quality Toward Attainment of Federal Standards

Compared to many other U.S. cities, air quality in Philadelphia is fairly high. But in terms of public health, three measurements matter more than others: the number of "unhealthy" days, the level of ozone and the level of "fine particulates," or PM2.5, which refers to small particles that emanate from smoke or haze and affect breathing.

In 2008, the federal ozone eight-hour standard was reduced to 0.075 ppm (parts per million) from 0.08 ppm. In 2006, the PM2.5 24-hour standard became 35 $\mu g/m^3$ (micrograms per cubic meter) from 65 $\mu g/m^3$.

As a result, the number of days the city was out of compliance with federal clean-air regulations increased significantly (see graph above). And with federal standards expected to tighten further, more days of noncompliance lie ahead.

To bring its air quality into federal compliance in these three areas, the City will work to reduce emissions from cars, trucks, ships and airplanes. By 2015, Philadelphia will have fewer Air Quality Index (AQI) "unhealthy" days, decrease its ozone levels and meet the new federal requirements for fine particulate matter.

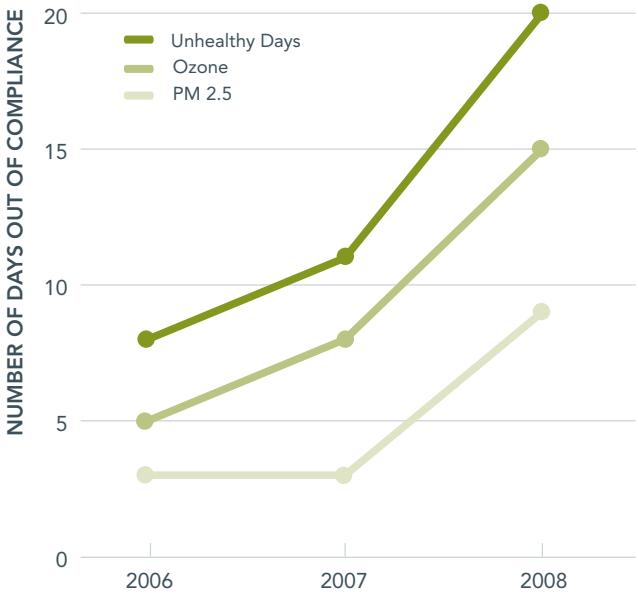
INITIATIVES

Retrofit Diesel Vehicles

Diesel engines are a major contributor to air pollution in Philadelphia. Unfortunately 70 percent of the City's fleet has diesel engines, including sanitation trucks and fire equipment. Using funds it received from a lawsuit between Sunoco and the EPA, the City's Air Management Services has been working with the Office of Fleet Management to place filters and diesel oxidation-catalyst equipment on its diesel fleet. Two hundred vehicles have already been serviced. The goal is to complete this process by 2011.

A grant was also received from the EPA to install diesel oxidation catalysts on 77 fire trucks. Because of maintenance

Air Quality Index from 2006-2008



SOURCE: CITY OF PHILADELPHIA, AIR MANAGEMENT SERVICES

requirements, fire trucks often idle inside firehouses, where firefighters eat, sleep and wait. The ambient air quality in fire stations is a concern because firefighters are already exposed to poor air while fighting fires. The diesel engines of their trucks expose them further.

In addition, Air Management Services is working with the Procurement Department on a proposal that would require construction equipment used by private contractors on public projects to meet air-quality standards. In many cases, this would require contractors to install similar air-improvement fittings to their equipment before beginning work for the City. A phase-in period would give small companies time to comply with the requirement.

Emission Reductions in SEPTA's Hybrid Diesel Buses

POLLUTANT	EMISSION REDUCTION (TONS PER YEAR)	OVER VEHICLE LIFE CYCLE (TOTAL TONS)
Particulate Matter	0.03	0.35
Hydrocarbons	0.16	2.15
Carbon Monoxide	0.43	5.77

SOURCE: SEPTA

Increase the Use of Biodiesel Fuel in the City Fleet

The City is already pursuing alternatives to diesel fuel and gasoline for its highway maintenance vehicles and sanitation trucks. It has begun to use biodiesel fuel, which is derived from Pennsylvania-grown soybeans and recycled waste grease and produces 20 percent less carbon monoxide, particulate matter and hydrocarbons (see table below). This project was supported by a $351,000 Alternative Fuel Incentive Grant from the state, which was renewed in 2009 with an additional $131,000. A portion of the funds was used to install an above-ground biodiesel tank. In 2009, the City will use 500,000 gallons of biodiesel in more than 200 trash trucks and street sweepers. Another tank is being constructed now and will be open later this spring.

Increase the Fleet's Gas Mileage

As promised in the City's 2007 Local Action Plan, overall fuel consumption of the City fleet will be reduced by 15 percent by 2015, and 15 percent of the fleet will be hybrid or will use alternative fuel, such as biodiesel. The City already owns 100 hybrid vehicles.

Develop a Compressed Natural Gas Facility

Engines that use compressed natural gas (CNG) produce far fewer pollutants. Although these engines have been manufactured for more than a decade, their use in Philadelphia's diesel fleet has been limited because of concerns about performance, a lack of fuel sites and the engines' higher cost. Recently, however, with more manufacturers entering the market, the City has become interested in this technology, particularly for use in its sanitation trucks. In 2008, the City was awarded a $750,000 EPA grant to cover the incremental cost of 15 CNG trash trucks. This amount was supplemented by an additional $150,000 from the Commonwealth of Pennsylvania. These funds will cover the entire cost differential between a CNG and a conventional truck. CNG trucks will cost the City about a dollar per gallon less to fuel and will produce 95 percent less pollution than regular diesel trucks, making a significant difference in the city's air quality.

Purchase Hybrid Diesel Buses

Using funds from the American Recovery and Reinvestment Act of 2009 and other federal sources, SEPTA will buy 440 hybrid diesel buses over the next three years, replacing 60 percent of its fleet. Although hybrids cost $160,000 more per bus, their maintenance and fueling costs are lower, and they create up to 50 percent less pollution. SEPTA will also install ceramic filters on the diesel buses that won't be initially replaced.

Facilitate Use of Electric Cars

As technology improves, electric cars provide an especially promising alternative to carbon-emitting vehicles. New federal funding and tax credits make them even more attractive. But at the moment, electric cars are not allowed on state highways, which many Philadelphia streets actually are. The City will seek state legislation that would change the current law, following the lead of other states.

In 2008, locations to plug in electric vehicles were created on Laurel Street in Northern Liberties—the first on-street outlets in the city. With electric cars becoming more popular, the City will develop outlets at Parking Authority lots. It will also seek to expand the number of on-street outlets.

Increase the Number of Hybrid or CNG Taxis

Air Management Services, working with the Philadelphia International Airport, is researching the possibility of initiating a preferred queuing option for hybrid or alternative-fuel taxis that service airport passengers. The program, similar to those in San Francisco and other cities, would allow qualifying taxis more airport round trips per day, since wait time in the airport queue would be decreased. This type of incentive could induce more of the taxi fleet to go green.

GREEN PORTS

The Port of Philadelphia is one of the busiest ports on the Atlantic Coast, handling more than one-quarter of the North Atlantic District's annual tonnage. The port is directly accessible to more major cities by rail and truck than any other port in the United States. Ports play an important role in the local economy, providing jobs and lowering the cost of moving goods for local businesses.

Unfortunately our ports are one of the largest sources of diesel emissions in the city, accounting for 10 percent of Philadelphia's diesel particulate pollution. As the ports become busier and other users of diesel, such as highway vehicles, reduce their emissions, the ports' share of particulate pollution will increase unless they take action.

To address this, the Philadelphia Regional Port Authority has partnered with other area port operators to develop a "Green Ports Initiative" that will look at how they can all reduce their carbon footprint without sacrificing their competitive advantage. This initiative will take a regional approach because many ports exist along the Delaware River and emissions from passing ships that do not dock in the city still impact Philadelphians.

The Green Ports Initiative plan will be released in 2010.

THE AIRPORT'S ENVIRONMENTAL PLAN

The Philadelphia International Airport (PHL) is also working diligently to reduce its emissions, while simultaneously making plans to expand by approximately 25 percent to meet forecasted air-travel demand. To achieve the dual goals of environmental stewardship and economic performance, PHL has undertaken the following efforts:

Reduce NO_X Emissions from Fleet. Currently trucks, vans, shuttle buses and other vehicles operating at PHL release 251.6 tons per year of nitrous oxide (NO_X) which is one of the main ingredients in the formation of ground-level ozone. Sixty percent of these NO_X emissions are generated by rental-car buses. PHL hopes to reduce these emissions in the short term by reducing idling and encouraging a clean fuel vehicle program. In the long term, it plans to construct an intermodal ground transportation center that will reduce the need for rental-car buses to continuously loop through the terminal arrival areas.

Reduce NO_X Emissions from Aircraft. Although PHL does not directly control aircraft emissions, management has successfully reduced emissions by prohibiting the use of power-back at gates. Aircraft no longer use their jets to back up from gates, but are towed back by tug vehicles. As a result, less NO_X is emitted. Aircraft emissions are also created when airplane engines remain on at the gate to provide electricity and conditioned air to the plane. PHL is thus installing power and pre-conditioned air hook-ups at its gates to decrease airplane idling.

Reduce Greenhouse Gases. PHL is committed to reducing its energy demand and increasing its use of renewable energy. To reduce the impact of the airport expansion plans on its efficiency goals, PHL has begun an ESCO process to identify energy savings in its existing plant. It will also increase its purchase of wind energy to 10 percent from its current level of 8 percent.

Congestion Reduction

Idling trucks and gridlock contribute to pollution. The Mayor's Office of Transportation and Utilities (MOTU) has developed a plan to reduce congestion in Center City. Beginning in 2009, the Streets Department will increase the number of on-street loading zones on streets in Center City. At the same time, the MOTU and Air Management Services will work with the Philadelphia Parking Authority to increase enforcement of double-parking and idling laws, especially involving delivery trucks.

In 2009, the Streets Department will finish updating its traffic-control server and software to help traffic flow better. The upgrades will enable it to monitor and control more than 400 intersections and as many as 100 monitoring cameras on major streets. These efforts will help reduce gridlock, and thus car and truck emissions, on Philadelphia's streets. As a follow-up project, the Streets Department will build a traffic-management center to improve its ability to monitor major roadways, control traffic signals and respond to emergencies. Philadelphia is the only major U.S. city without a traffic operations center, and the Streets Department will seek federal assistance for the project.

Parking Policies

In 2008, the City increased on-street parking-meter prices in Center City to $2.00 per hour. It did so to encourage long-term visitors to use parking lots or garages or to take public transportation into downtown neighborhoods. It also sought to minimize the number of drivers who circle already-congested streets looking for parking spots.

As new smart meters—those that can accept credit and debit cards—are installed throughout the city, MOTU will begin to consider the creation of demand pricing schemes. In San Francisco, for example, parking prices fluctuate based on the time of day and the day itself: Parking at 11 a.m. on a Tuesday in the city's Financial District now costs more than parking at 10 p.m. on a Sunday. Philadelphia's computerized parking meters will allow similar pricing variations to be introduced.

Parking for Bicycles and Motor Scooters

Over the next year, the Streets Department will set aside at least 200 linear feet of on-street bicycle parking and 430 linear feet for motor scooters. The department has installed 1,400 new bike racks on sidewalks. It will also explore the possibility of using existing parking-meter poles for on-street bike parking: As the old coin meters currently lining the streets are replaced by smart meters, which cover multiple spaces, the poles could be capped to provide secure lock-up locations.

TARGET 7

Divert 70 Percent of Solid Waste from Landfills

One of the biggest and most noticeable impacts that Philadelphians have on the environment is in the trash they produce. In 2008, the estimated 584,000 households in

All City Collected Waste (Not Including Recycled Materials)

Philadelphia generated 731,181 tons of trash, or more than 1.25 tons per household (see graph above). But Philadelphians recycled only 48,000 tons of trash last year (not including leaves picked up by the City and composted). City workers collect trash five days a week in every neighborhood and commercial corridor. In many popular public areas, collection occurs multiple times a day. Over the past two years, the amount of household trash collected and sent to local landfills has decreased 3 percent, the result of slightly higher recycling rates and the current recession.

City trucks take their loads to transfer stations in five neighborhoods. Trash is then transferred to trucks operated by private corporations, which charge the city $65 per ton in "tipping fees" to haul the trash to landfills or "energy-from-waste" facilities in Bucks and Chester counties, and beyond. These charges currently total approximately $47 million. Coupled with the City's operational costs, the price tag for trash collection is more than $100 million annually.

Because the City pays haulers by the ton, Mayor Nutter has made it a priority to lower the amount of waste that residences and businesses produce for City pickup and increase how much they recycle. The City pays significantly less money per ton to the companies that process its recycled waste (and until January, when the market for glass, plastic and paper collapsed, was paid for its recyclables). That commitment is reflected in the Streets Department's shift to weekly, single stream recycling in every neighborhood in January 2009—single-stream pickups allow households to put all of their recyclable materials in one container. In January and February, recycled waste tonnage increased to 6,800 tons and 5,728 tons, respectively, a more than 50 percent increase over the previous year's results. If this level of activity continues, Philadelphia could recycle more than 75,000 tons of trash this year, which would save the City nearly $1 million based on current hauling fees.

But the percentage of diversion varies significantly by neighborhood, and more must be done to convince some residents to recycle, especially poorer and older residents. And Philadelphia still has a long way to go before its rates are on par with other American and European cities. The Streets Department's goal is to have households recycle 20 percent of their trash by 2011 and 25 percent by 2015. It will use a number of incentives and initiatives to do so. Improving recycling rates reduces the City's costs for picking up and disposing of trash and, when the market for recycled materials rebounds, could provide it with revenue.

PHOTO BY PETER TOBIA

The City must also better monitor private trash haulers who service large commercial buildings. Although the City is not responsible for pickup at those buildings, it does charge private haulers a license fee, and the Streets Department is responsible for ensuring that these haulers recycle. Oversight, however, has been lax. Currently more than 1 million tons of commercial trash are sent to local landfills each year. Private haulers report that an additional 1.05 tons of commercial waste is recycled annually. That being said, there are any number of anecdotal reports of local office buildings not providing their tenants with recycling options.

PHOTO BY PETER TOBIA


PHOTO BY PETER TOBIA

In addition to increasing recycling rates, *Greenworks Philadelphia* calls for the minimization of household waste. Possible steps include having citizens pay for the amount of trash they produce, exploring energy-from-waste options, and limiting the use of plastic bags and Styrofoam containers.

As the City implements these recycling and waste-minimization programs, it must also redouble efforts to curb littering and short-dumping.

INITIATIVES

RECYCLING

Incentives for Recycling

In March 2009, the Streets Department issued a request for proposals from private companies to develop a household recycling-incentive program. The Streets Department envisions an effort through which recycled materials would be weighed after a truck completes its route, with rewards—such as coupons from local stores—given to every household on that route. In 2007, when a company called Recycle Bank implemented a pilot program in two Philadelphia neighborhoods, Chestnut Hill and West Oak Lane, recycling participation increased significantly.

Neighborhood competitions—similar to Recyclomania on college campuses or Cincinnati's Recycling Challenge—also offer a fun way to convince households to recycle. The Streets Department could track how much recycling increases in participating neighborhoods during a period of time, perhaps six months. Those whose recycling rates go up the most could receive a small donation from the City to help community associations or assist beautification projects. The monthly totals could be tracked on-line, so neighborhoods could see how they're doing in real time.

The Streets Department has made it easier for households to get recycling bins by distributing them through local recreation centers, but it could also consider partnering with local civic organizations or community development corporations to increase the number of locations. These organizations could also help engage and educate their neighbors about the benefits of recycling.

Expand Plastics Recycling

As the commercial market for recycled materials improves, the Streets Department will expand its collection of plastics to include #3 to #7 materials.

Increase Recycling at City Facilities

Recycling shouldn't stop when people are at work, especially if they work for the City of Philadelphia. The Streets Department has stepped up its efforts to mandate recycling at all City-owned buildings and has recently begun to educate City workers about the benefits of recycling at work—including its cost savings to the City.

Increase Oversight of Recycling in Commercial Buildings

Since 1994, the City has required all commercial buildings and companies that employ a private waste hauler to develop and file a recycling plan with the Streets Department. Failure to do so could result in a $25 fine. Only a few plans are currently on file, however. In 2009, the Streets Department will send every commercial building owner in the city a notification letter asking for their updated plans. It will also step up enforcement of this law and investigate the possibility of increasing the fine for companies in violation.

Introduce Public Space Recycling

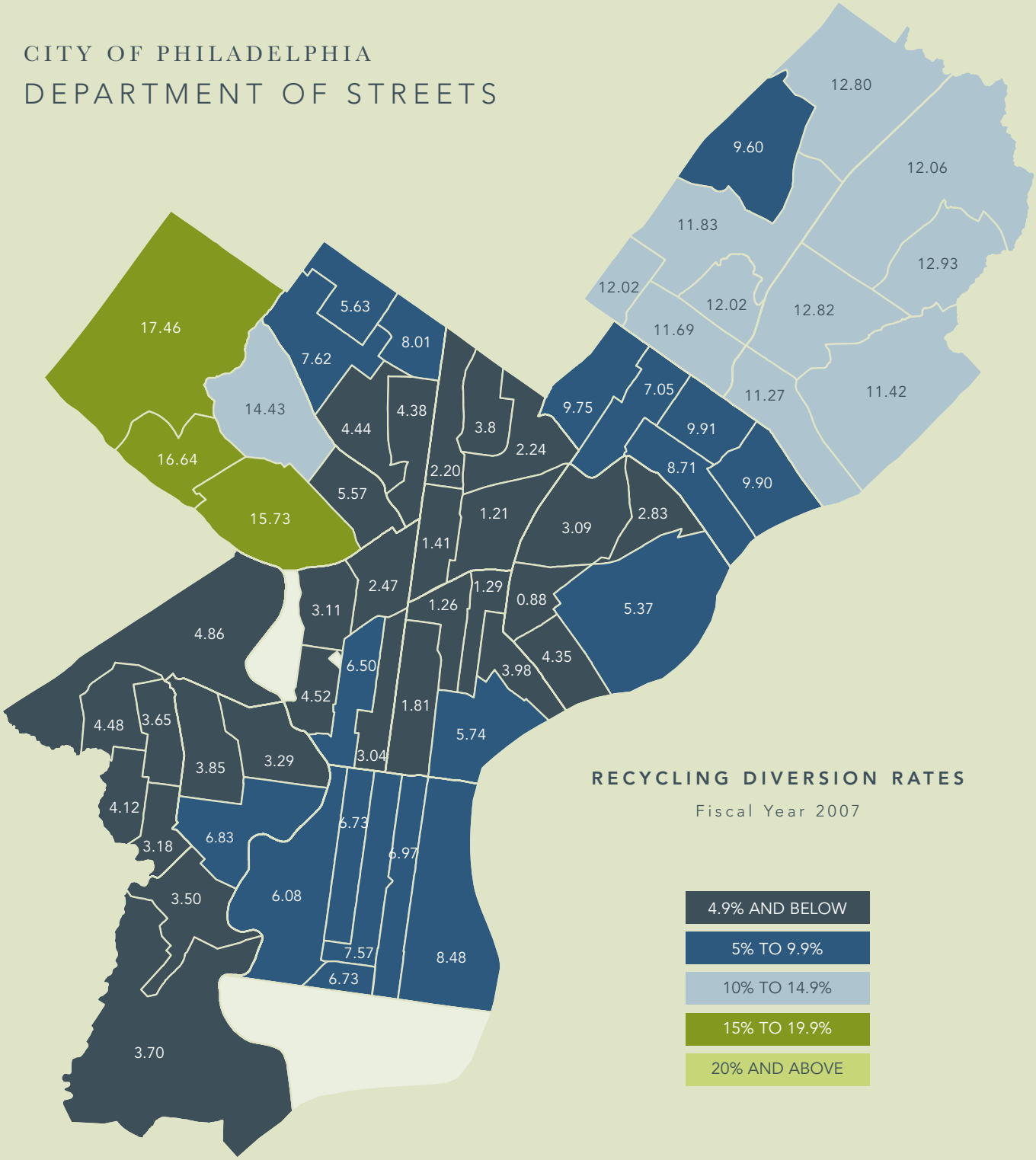
The Nutter Administration believes that it should be as easy to recycle bottles, cans and newspapers in public as at home. Beginning in 2009, the City will place recycling containers downtown, alongside trash receptacles that are designed so that waste does not get blown out of them. (Because the planned trash receptacles contain solar-powered compactors, the Streets Department will need to empty them only five times a week, instead of the current 17 times, saving $800,000 per year). *Greenworks Philadelphia* recommends that the Streets

Tons of Waste Recycled (Fiscal Year)

2002	38,550.71
2003	45,524.80
2004	44,330.36
2005	40,983.20
2006	39,319.70
2007	45,762.03
2008	**48,475.10**

CITY OF PHILADELPHIA

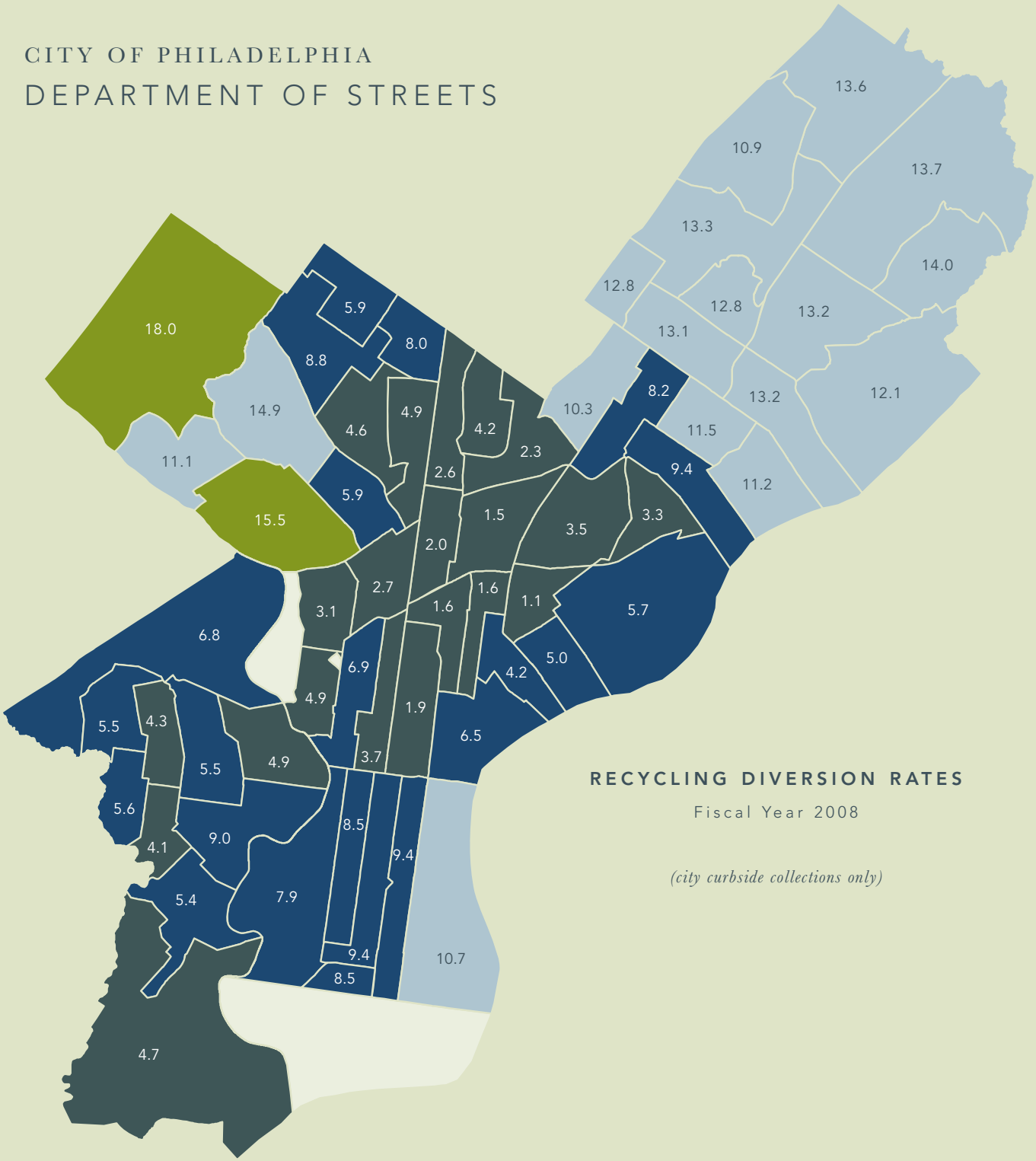
DEPARTMENT OF STREETS



DATA INCLUDES TONNAGE FOR REGULAR COLLECTION ONLY.
SPECIAL COLLECTION SUCH AS BULK, LEAVES, AND CHRISTMAS TREES ARE NOT INCLUDED.

CITY OF PHILADELPHIA

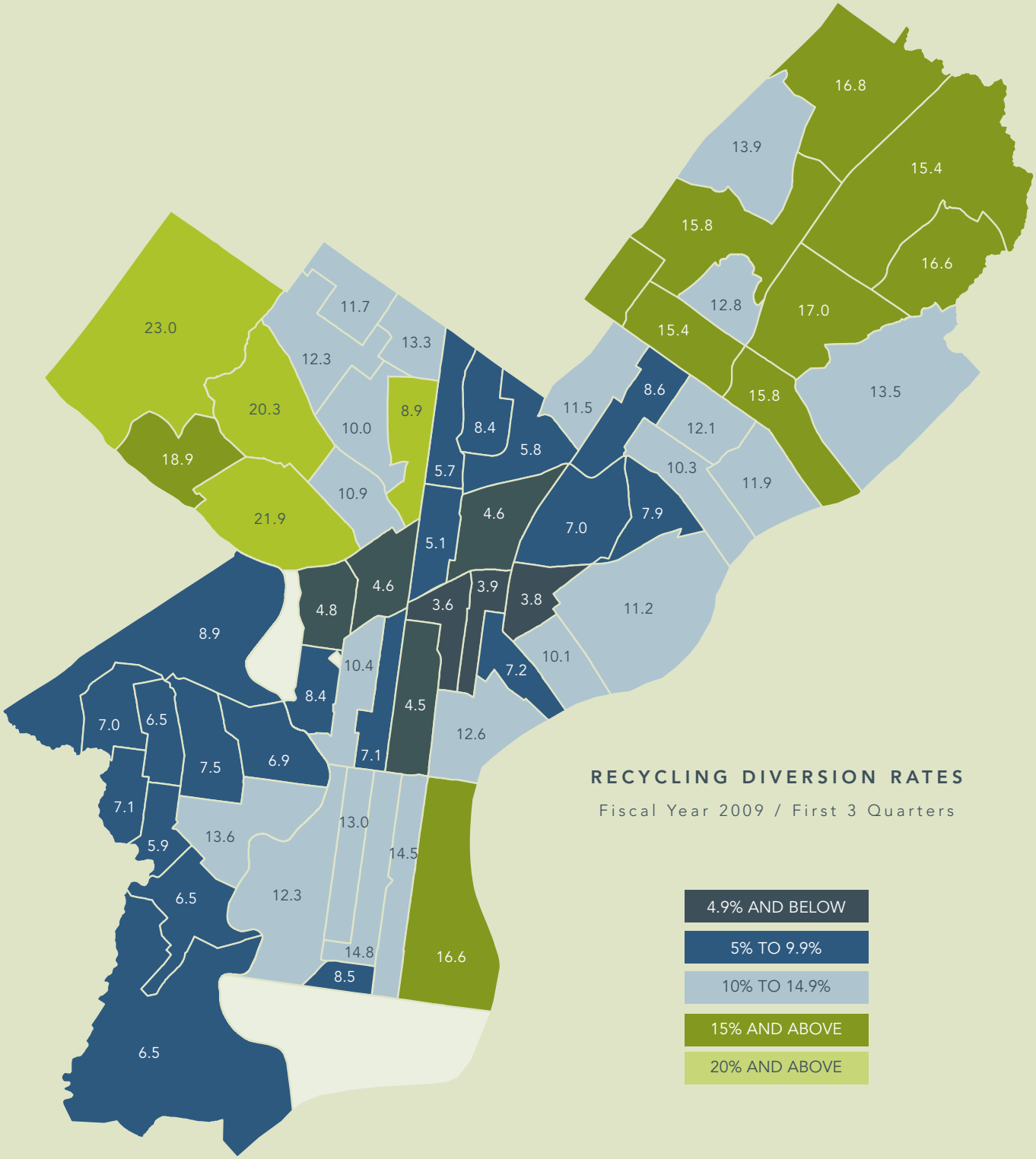
DEPARTMENT OF STREETS



RECYCLING DIVERSION RATES

Fiscal Year 2008

(city curbside collections only)



RECYCLING DIVERSION RATES

Fiscal Year 2009 / First 3 Quarters

- 4.9% AND BELOW
- 5% TO 9.9%
- 10% TO 14.9%
- 15% AND ABOVE
- 20% AND ABOVE

Department work with neighborhood business associations to install recycling units along other commercial corridors in the city.

Continue Event Recycling

Beginning in 2008, the Streets Department began to set out temporary recycling bins at all public events happening in Philadelphia. This effort has encouraged more people to recycle at events as large as Welcome America and the Mummers Parade, as well as at street and neighborhood festivals.

Expand Recycling at Transit Stations

SEPTA is committed to helping commuters recycle newspapers. Already, it has placed recycling receptacles on regional rail platforms at its three main Center City stations: 30th Street, Suburban and Market East. Beginning in 2009, it will expand recycling to other high-volume rail stations and stops.

Construction and Demolition (C&D) Waste Management Program

A number of cities and states have begun to require building contractors to recycle building materials from construction sites. Such items include wood and bricks, glass and metals—basically the debris created during demolition as well as scrap materials left over as a building goes up. It is known as construction and demolition (C&D) waste. Chicago mandates that 50 percent of construction debris be diverted from landfills, requiring contractors to file recycling plans with the City government. With diversion efforts required for LEED certification, many more contractors are recycling C&D waste. This has created a demand for businesses that can sort and process the debris. *Greenworks Philadelphia* recommends that Philadelphia ask contractors working for the City to recycle a specified percentage of their C&D waste.

Electronic Recycling

The Streets Department requires that all electronics—televisions, computers, radios, etc.—be recycled through the City's trash transfer stations. They cannot be left out at curbside to be picked up by street sanitation services or recycling trucks. Yet most households seem unaware of this requirement, as do some sanitation workers. *Greenworks Philadelphia* recommends that the Streets Department begin to educate residents and its own workers, who often pick up the items and place them in trash trucks despite the regulations.

Composting

Food accounts for about 13 percent of the nation's trash, the third-largest component after paper and yard trimmings. Based on that average and the $65 per-ton rate to haul away trash in Philadelphia, it costs the City approximately $6.1 million a year to move uneaten food from plate to landfill. (The environmental cost is also great, because decomposing food buried in landfills releases methane, a potent greenhouse gas.) To reduce the amount of food sent to landfills, *Greenworks Philadelphia* and the Streets Department welcome the efforts of local urban farming and other horticultural groups to encourage more food-waste composting. Larger-scale neighborhood composting sites could also be created to help restaurants and institutions dispose of waste. The resulting soil could be sold or distributed to local gardeners.

The Streets Department will also continue to work with the Department of Parks and Recreation to coordinate leaf collection and composting in Fairmount Park. Parks and Recreation has identified funds for a new mechanized leaf-composting machine that will generate soil for use in city parks or for purchase by private customers.

REDUCING SOLID WASTE

Increasing recycling is not enough. The overall amount of trash generated by Philadelphians must be reduced as well. Already, the City has limited the amount of trash that each household can place at the curb to four cans or eight bags, down from six cans and a dozen bags. More, however, can and should be done to minimize our waste stream.

PHILLY COMPOST

An organization called PhillyCompost has created an educational Web site (http://phillycompost.com) aimed at increasing the amount of composting in the city. The site contains maps that show where private and public composting is occurring, and provides tips on how to start backyard composting.

Saving Money and Reducing Trash (SMART)

The Streets Department recently proposed charging households a fee for trash pickup, just as 7,100 other municipalities across the country do, including 200 towns in Pennsylvania. Although this idea has been set aside for now, so-called "pay as you throw" (PAYT) programs can decrease the amount of trash sent to landfills and could save Philadelphia tens of millions of dollars. A 2006 EPA study concluded that after cities have introduced PAYT systems, the amount of solid waste going to landfills decreased an average of 17 percent. Similar results in Philadelphia could yield significant costs savings for the City.

Other Waste-Minimization Efforts

Recently introduced legislation in City Council would impose a small fee on plastic bags used in the city. As has been done elsewhere, shoppers would be charged 25 cents for each plastic bag they receive at a store. Retail locations where revenues exceed $1 million annually would pay the fees to the City quarterly, while smaller stores could keep the fee. The bill would encourage Philadelphians to bring their own, nondisposable bags to stores, reducing the number of plastic bags that end up on streets and in landfills. Another proposal to ban restaurants and fast-food outlets from using Styrofoam containers is also being considered by City Council. *Greenworks Philadelphia* supports these efforts to reduce the amount of non-recyclable products used in the city.

Anti-Littering Campaign

The Philadelphia More Beautiful Committee (PMBC), part of the Streets Department's Sanitation Division, began in 1965 as part of a "Clean-Up, Paint-Up, Fix-Up" initiative. Today, this partnership between the City and approximately 6,500 block captains organizes annual block cleanups and beautification efforts. In 2008, 90,000 volunteers—the most in any city in the country—filled 110,000 bags of trash.

For the past two years, Mayor Nutter sponsored a spring cleanup day. This year, 10,000 volunteers joined him to clean 1,500 neighborhood blocks, 12 recreation centers and 24 parks. The volunteers collected 346 tons of garbage. Last year's cleanup was named the largest single-day effort by Keep America Beautiful.

Although this annual event helps keep the city cleaner, more can be done on an ongoing basis. The interactive Web site www.phillycleanup.com could be deployed throughout the year to announce weekly neighborhood, commercial corridor and park cleanups. Efforts coordinated by the Streets Department block captains or by other groups could be posted on the Web site. People or community volunteer organizations could then use the Web site to learn about upcoming events, see on a map where they will occur, and then sign up for whatever activity, location or date works best for them. This technology could help cleanups attract more volunteers and help the Streets Department target its own clean up efforts in neighborhoods where not much activity is occurring.

Paperless Office

It is impossible to imagine the City government going 100-percent paperless, but efforts to reduce the flow are in the works. Human Resources is moving its payroll processing to an electronic system. Employees will have the ability to file time cards on-line (currently, many City personnel still use paper forms that must then be manually entered into a computer) and track vacation and sick days. Although more than 80 percent of the workforce is paid through direct deposit, Human Resources is also moving all employees to this paperless system.

In addition, the City must move quickly to place its public records, plans and documents on-line to provide easy access to residents and businesses. Doing so would increase transparency in city government, decrease transaction costs for those seeking to do business in the city and lengthen the life of the printed materials.

Sustainable Procurement Policy

Already the City's Procurement Department purchases recycled paper products, ENERGY STAR–rated equipment and appliances, and low VOC paints and carpets. Going forward, Procurement will work with the Mayor's Office of Sustainability to develop energy and environmental standards for procured products. It will then buy from the lowest responsive and responsible bidders that can meet those criteria. The effort will be guided in part by the checklist developed by the Pennsylvania Environmental Council's recently launched Greater Philadelphia Green Business Commitment.

ENERGY-FROM-WASTE

Much of Philadelphia's trash contains energy waiting to be tapped. It is estimated that 10 tons of trash contain enough energy to supply the annual needs of a typical Philadelphia household. But that energy has not until recently been easily or inexpensively recovered.

The technology needed to recover the energy in trash has evolved significantly in the past decade. One emerging option is called nonoxidative thermal processing or gasification, which releases little or no pollution because trash is burned at such a high temperature. This technology promises an economical footprint, net energy production and reusable ash. Although installations are capital intensive and require a trained workforce, successful operations have been introduced in a number of Asian and European cities. A new plant is under construction in Ottawa, Canada.

Another innovation involves anaerobic digestion of trash. Digestion is a common technology for processing biosolids collected in treating wastewater (see Section One). The methane released by the process fuels turbines or internal-combustion engines that power generators. The heat of the engines is then returned to the digestion process. While anaerobic digestion is used less commonly on streams of mixed municipal trash, several large cities, such as Toronto and Sydney, have employed this method.

Study Energy-from-Waste Alternatives

Greenworks Philadelphia recommends that the Mayor's Office for Transportation and Utilities and the Mayor's Office of Sustainability examine so-called energy-from-waste options to determine whether emerging technologies offer an alternative to sending solid waste to local landfills. If a study reveals gasification or anaerobic digestion is beneficial, the offices will work with federal and state regulators, other local officials, and environmental and community organizations to bring such an operation to Philadelphia.

Include Sustainability Criteria in Solid Waste Contracts

Philadelphia already has contracts with solid waste companies that use energy-from-waste processes to generate electricity from the City's trash. When the City's contracts with its trash haulers expire in 2010, *Greenworks Philadelphia* recommends that the Streets Department ask bidders to disclose the amount of energy generated from the city's trash and price their bids so that the City shares in that revenue stream.

CARING FOR NEWLY PLANTED TREES AT SAUNDERS PARK AT 39TH AND POWELTON AND BARING

PHOTO BY PETER TOBIA

equity

PHILADELPHIA DELIVERS MORE EQUITABLE ACCESS TO HEALTHY NEIGHBORHOODS

ALL ABOVE PHOTOS BY PETER TOBIA

Prior to settlement, the land that is now Philadelphia consisted of streams, forests and wetlands. As William Penn planned his utopian city, he hoped to preserve much of this natural setting, believing that open space was essential for pleasure and health. In 1683, he asked Thomas Holmes to create a plan for a "Greene Countrie Towne" that gave residents access to gardens and parks as well as 10,000 acres of "Liberty Lands," which were located north and west of the settled city and were to remain undeveloped. But as the city grew and industrialized, Penn's vision became obscured.

Toward the end of the 18th century, yellow fever outbreaks occurred regularly in Philadelphia during summer months, causing many deaths and great concern among citizens. While the wealthy could escape to healthier environments north and west of the central city, others were not as fortunate. City leaders began to believe that contaminated water caused the disease and formed a Watering Committee in 1799 to ensure clean supplies.

Through the committee's efforts, in the early 1800s, water wheels began to move water from the Schuylkill River to a reservoir at "Faire Mount" (now the site of the Philadelphia Museum of Art), and then through a gravitational-designed distribution system to the rest of the city. Within a few decades, the pumping system was replaced by hydraulic turbines, camouflaged by the now-iconic Water Works buildings.

The effort to maintain water quality culminated in 1855 with the creation of Fairmount Park, created through land purchases alongside the Schuylkill River to the northwest of the growing city. These land set-asides attempted to protect the city's water source from industrialization. Today, with 9,200 acres spread over 63 neighborhood and regional parks, Fairmount Park remains one of the country's largest municipally operated park systems and still plays an integral role in watershed management and protection, even as its emphasis has shifted to recreation.

Philadelphia now finds that emphasis shifting again. Green infrastructure solutions are emerging as a way for the city to manage its water, primarily stormwater. "Back to the future" technologies like green roofs, undeveloped land, rain gardens and tree plantings acknowledge the natural links between land and water and provide Philadelphia with social benefits that so-called grey infrastructure cannot.

Increasing the amount of public open space and greened neighborhoods and maintaining what already exists will therefore require not only the efforts of the Philadelphia's Department of Parks and Recreation, but will also implicate the Philadelphia Water Department, the Streets Department, the Redevelopment Authority and any number of local nonprofit organizations. (Fairmount Park and the Recreation Department are being merged as the result of a voter-approved City Charter change in 2008. *Greenworks Philadelphia* therefore uses the department's new name.)

Many of the proposals described below emerged from a two-year planning process that the City undertook to develop its first-ever open-space plan. Called GreenPlan, the strategy formation has been overseen by staff from the Department of Parks and Recreation as well as the Planning Commission, the Commerce Department and the PWD. After a substantial public-engagement process, a thorough review of available data and internal vetting, GreenPlan will describe a long-term open-space vision for the city. *Greenworks Philadelphia* incorporates much of its data and recommendations into this section.

TARGET 8

Manage Stormwater to Meet Federal Standards

Managing stormwater is a basic government function. If not controlled, runoff in urban centers causes flooding, erosion, areas of stagnant water and sewer backups that often end up flooding building basements. Many city residents, particularly in neighborhoods like Northern Liberties, Fishtown and South Philadelphia, know far too well what happens when heavy rains are unmanaged. Left unchecked, urban stormwater can destroy property and create disease.

The 19th-and 20th-century solution was a network of drainage pipes that moved the rainwater—and industrial, household and human waste—away from homes, streets and businesses and, until the 1970s, directly into rivers and

streams. The Clean Water Act of 1977 mandated that local governments capture and treat this wastewater before it entered rivers, and spurred billions of dollars in new infrastructure investment.

The effort has been extremely successful, except when the volume of rainwater exceeds the capacity of the pipes. Then overflows of rainwater, sewage and industrial waste occur in cities like Philadelphia that have combined sewer systems, and solid waste mixes with run off and enters the water supply. This problem, which is known as combined sewer overflow, has been exacerbated by the loss of undeveloped land in Philadelphia's suburban and rural areas. As more green space is paved—44 percent of surfaces in Philadelphia are considered impervious—the ability of the land to soak up rainwater decreases, causing more water to be carried by the sewer network. And as global waming causes Philadelphia's climate to change, the intensity and frequency of storms is only expected to increase in the Delaware Valley. This additional rainwater will contribute to even more frequent system overflows.

The EPA has tried to address these pollution concerns with a number of regulatory policies, including the Combined Sewer Overflow National Policy and the Stormwater Phase I & II Regulations. The rules require cities to expand their infrastructure to address pollution problems. New York, Chicago, Boston, Washington, Detroit, Milwaukee, Portland and Philadelphia are spending significant funds to maintain their existing systems, and will spend billions more to expand capacity. Often, the new systems use large underground tanks or tunnels to hold, treat and gradually release water overflows. But these projects are expensive, and their long-term operation and energy demands make the approach unsustainable.

Moreover, this traditional "big tunnel" or "grey infrastructure" approach breaks apart nature's water cycle. It reduces groundwater infiltration, which lowers water tables and stream flows. In turn, lower water levels in streams decrease habitat and vegetation, which diminishes transpiration and evaporation.

The Philadelphia Water Department is pioneering an approach that uses nontraditional (or, one could claim, very traditional) "green infrastructure" to limit, and eventually reverse, the negative impacts of past stormwater practices. These methods have capital costs similar to grey infrastructure, but, unlike sewer pipes, attempt to use the landscape itself to manage stormwater. These methods also produce benefits—cooler air and air quality improvement—that grey infrastructure cannot.

Greenworks Philadelphia supports the City's proposed green infrastructure efforts and calls for 3,200 acres of additional pervious surfaces to be created in the city by 2015.

PHOTO BY PETER TOBIA

INITIATIVES

STORMWATER MANAGEMENT

Maintain Recent Regulatory Changes

In 2006, the PWD changed its regulations to require that all new construction projects in the city infiltrate, detain or treat the first inch of rainwater on-site. The regulations are among the nation's strongest and essentially reduce the department's cost of managing stormwater.

As many developers discovered, however, the review process for stormwater management permits can be quite long. But by 2008, the PWD had decreased its average concept-review time to 2.9 days from 8.4 days in 2007 and to 5.2 days from

INDIRECT BENEFITS OF PHILADELPHIA'S GREEN APPROACH TO STORMWATER MANAGEMENT

In addition to the direct environmental benefits of improving water quality and aquatic habitats throughout the city, Philadelphia will also obtain a number of very tangible indirect benefits from adopting a green infrastructure approach to stormwater management. Over the 40-year period during which Philadelphia's stormwater systems are being transformed, the present value of these benefits in economic terms is estimated to be $333 million in just the Tacony-Frankford watershed (on page 38). Estimates are being developed for other watersheds. The grand total could be in the range of $1 billion citywide.

RECREATION. Streamside recreational opportunities will be increased as a result of stream restoration and riparian buffer improvements. Recreation will also improve owing to the general increase in vegetated and treed acreage in the city.

HEAT-STRESS REDUCTION. Green infrastructure (trees, green roofs, and bio-retention areas) creates shade, reduces the amount of heat-absorbing materials and emits water vapor—all of which cool hot air. This cooling effect will be sufficient to actually reduce heat stress–related fatalities in the city during extreme heat-wave events.

ENERGY SAVINGS AND CARBON FOOTPRINT REDUCTION. Green space helps lower ambient temperatures and, when incorporated on and around buildings, helps shade and insulate buildings from wide temperature swings, decreasing the energy needed for cooling. In addition, diverting stormwater from wastewater collection, conveyance and treatment systems reduces the amount of energy needed to pump and treat the water. Reduced energy demands in buildings and increased carbon sequestration by added vegetation result in a lower carbon footprint.

AIR QUALITY IMPROVEMENT. Trees and vegetation improve air quality by filtering some airborne pollutants (particulate matter and ozone). Likewise, reduced energy consumption results in decreased sulfur dioxide emissions from power plants. These air-quality improvements can reduce the incidence and severity of respiratory illness.

GREEN JOBS. Specialized labor is required for construction of conventional stormwater management solutions (e.g., boring, tunneling, etc.). Such skilled laborers might typically be already employed in the construction field. Green infrastructure creates the opportunity to hire unskilled—and otherwise unemployed—laborers for landscaping and restoration activities. Thus the benefits of providing these green jobs include the avoided costs of social services that the City would incur on behalf of the same people if they remained unemployed.

INCREASED PROPERTY VALUES. Trees and plants improve urban aesthetics and community livability, and studies show that property values are higher when trees and other vegetation are present.

SOURCE: STRATUS CONSULTING

11.9 for technical reviews. Any additional steps the City takes to streamline its construction-permit system should maintain this strong environmental regulation.

Implement New Stormwater Fees

In 2008, the PWD proposed to begin charging non-residential landowners for stormwater control based upon parcel characteristics. The new fee formula calls for 80 percent of a property's charges to be based on the amount of its impervious surface area and 20 percent on its gross area. As commercial, industrial and institutional owners create more pervious surfaces—by maintaining open space, using water-permeable pavement in sidewalks or parking lots, installing green roofs or planting trees—their stormwater bills will decrease. Hearings on the proposal are still under way, but the PWD is committed to having the new system adopted in 2009 and implemented in 2010. *Greenworks Philadelphia* supports this proposed system.

GREEN INFRASTRUCTURE

Increase the Number of Green Roofs

Philadelphia is second in the nation, after Chicago, in the amount of roof area that is "green." (Green roofs use plant materials to soak up stormwater and reduce internal building temperatures. They also help reduce urban island heat effect.) But more must be done. First, the tax credit for green roofs should be modified so that only those projects that capture the first inch of rainwater qualify. Second, the tax credit should be extended to residential developers and home owners. Third, the City's Plumbing Code should provide guidance on green roofs and allow roofs that meet the stormwater regulations to be disconnected from the sewer system.

Finally, the City itself must get in the game. Presently, the only City-owned building with a green roof is the main branch of the Free Library. The City must set an example for the private sector and install more green roofs on its buildings. A recent study found that a green roof costs as much as 40 percent less over time than a traditional roof when the savings in stormwater costs, energy costs and air pollution are counted.

Create Green Streets

About 40 percent of Philadelphia's impervious area consists of public streets or rights of way. *Greenworks Philadelphia* therefore supports "Green Streets" programs that manage stormwater within city blocks. Treatments range from increasing tree cover and installing sidewalk planters to using bioswales (low-gradient water basins that can capture rain and runoff and slowly release it), rain gardens, corner bump-outs, and underground infiltration areas on adjacent lands or pervious pavement or concrete. Such "green standards" for city streets would touch every neighborhood in a city and require hundreds of millions of dollars in investment. But they would also help the city meet its stormwater-management mandate.

In the near term, the PWD will implement pilot programs to evaluate how Green Streets ideas and technologies can be applied in different settings. Target areas include Market Street East, Lancaster Avenue and Passyunk Avenue. This is

a $6 million effort funded with federal dollars that will create 100 jobs.

The PWD has also proposed to create model "green" neighborhoods in South Philadelphia, Northern Liberties and Awbury/Cliveden, working with PennFuture, the Pennsylvania Horticultural Society (PHS) and the Next Great City Steering Committee. Improvements will include tree planting and stormwater runoff reduction in residential properties.

Transform Vacant Land

Philadelphia has tens of thousands of vacant lots, most of them abandoned by their owners and left to grow weeds and accumulate trash. For the past few years, the Office of Housing and Community Development has worked with PHS and neighborhood-based organizations to "Clean and Green" thousands of these lots, improving their appearance and value. In some cases, the owners of the lots are billed for the services. The City's Redevelopment Authority has also taken possession of many of these parcels.

Although the City's goal is to sell back to the private sector most of the vacant parcels it owns, maintaining some lots as open and green space would have tremendous stormwater-management benefit and would improve the health of many neighborhoods that currently lack public greened spaces. But how can the value of maintaining this "green infrastructure" be captured? Who would own and maintain these spaces? Given the policy overlap between stormwater management and the creation of new park land, see Target 9 below for further discussion of these questions.

Create Wetlands

Wetlands provide invaluable service to a community, protecting and improving water quality, promoting the infiltration of stormwater, storing floodwaters and providing habitat for fish and other wildlife. The PWD's wetlands registry for the Delaware River identifies 327 sites in which to restore, enhance or create more than 85 more acres of tidal wetlands. Other projects might be possible at the Navy Yard, the Northeast Airport and along the Schuylkill River.

Philadelphia has begun a first-in-the-nation urban wetland registry to help developers find sites to reclaim and nurture in exchange for disturbing water or wetland sites elsewhere during construction projects. The registry will help encourage the re-development of industrialized riverfront properties.

The department has already created new wetlands habitat to better manage stormwater. At Saylor Grove in northwest Philadelphia, the PWD revitalized a three-acre park while creating a stormwater-treatment wetland. Located at the end of an urban watershed, the park now filters a large portion of the 70 million gallons of annual stormwater that flows through the watershed.

Restore Waterways

More than 78 miles of streams and river in Philadelphia are impaired. Beginning with the most-damaged stretches, the PWD will restore up to one mile of stream per year. Specifically, it will use nearly $2 million in federal funds to restore fish passage to sections of Cobbs and Mill creeks in West Philadelphia and Tacony Creek in the lower Northeast. They will be transformed into "green destinations" with areas that link parks and recreation, transportation, biking, jogging, fishing and environmental education.

Green Surface Parking Lots

Philadelphia has many surface parking lots that negatively impact the city's urban heat island effect and exacerbate storm runoff. *Greenworks Philadelphia* recommends that the Philadelphia Zoning Code be changed to require that trees be planted around the perimeter of all surface lots, public and private. Shade trees should also be placed within lots. Such steps would lower the lots' surface temperatures significantly. In addition, the Zoning Code should allow and encourage pervious pavement to be used in parking lots. Currently, the code requires asphalt-covered concrete, which simply directs rain- water to nearby PWD drains and pipes.

Expand the Rain Barrel Program

The PWD operates a pilot program that gives more than 200 rain barrels to residents each year to connect to gutter downspouts and collect rainwater that would otherwise go into the sewer system. Residents can attach hoses to the bottoms of the barrels and use the water for gardens and lawns. The program should be expanded in partnership with environmental, horticultural and community development organizations.

Preliminary Estimates of Indirect Benefits of Green Approach to Stormwater Management in the Tacony-Frankford Watershed

BENEFIT CATEGORIES	BENEFIT MEASURES	PRESENT VALUE OF BENEFITS (40-YR PERIOD)
Recreation	46 million more user days	$ 34 million
Heat-Stress Reduction	18 fewer fatalities	$ 93 million
Energy Savings	120 million KWh of electricity	
	230 million kBtu of natural gas	$ 10 million
Carbon-Footprint Reduction	220,000 metric tons of CO_2	$ 4 million
Air-Quality Improvements	Decrease of 0.01 ug/m^3 in annual average particulates (PM2.5) and a decrease of 0.02 ppb in the 7-month seasonal average ozone	$ 51 million
	Reduced SO_2 emissions (500 metric tons)	$ 15 million
Green Jobs	3,400 work years	$ 28 million
Increased Property Values	96,000 residences affected	$ 98 million
		TOTAL $333 MILLION

SOURCE: STRATUS CONSULTING

Control Pollution and Trash on the Rivers

The PWD operates two skimming vessels to collect floating trash on the Schuylkill and Delaware rivers. An additional several hundred tons of trash and debris are removed each year from other local waterways by the department's Waterways Restoration Unit. The PWD will continue these efforts with an eye toward improving recreation opportunities on both waterways.

TARGET 9

Provide Park and Recreation Resources Within 10 Minutes of 75 Percent of Residents

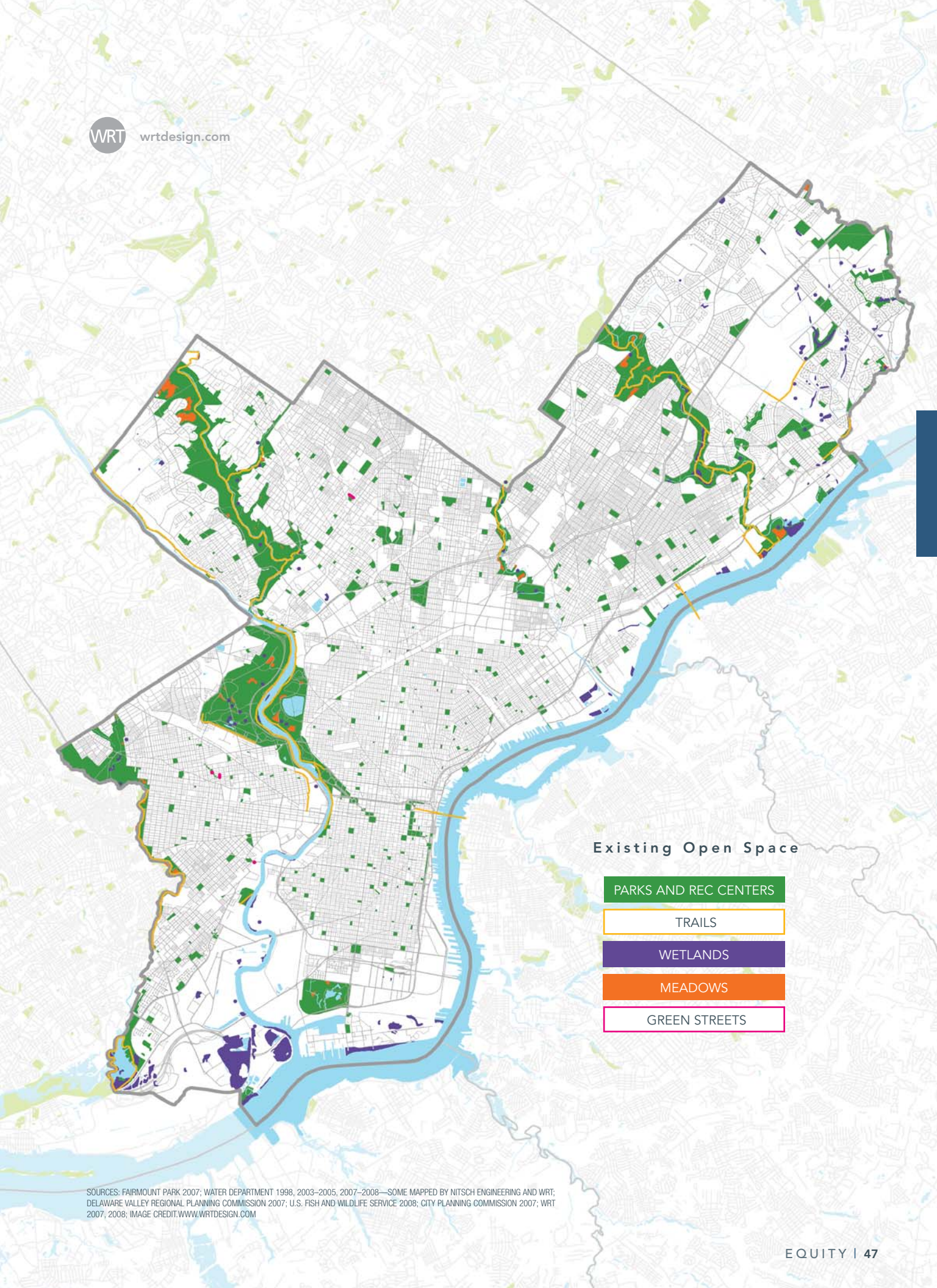
In addition to helping stormwater management, urban parks filter air pollutants and provide respite and gathering spots. Philadelphia has more than 10,926 acres of public park and recreation land, representing 12 percent of its total area. It also enjoys additional open space that is owned and managed by private entities, such as the Morris and Awbury arboretums (see map on pg. 47).

Overall, Philadelphia has 7.5 acres of green-and-open space for every 1,000 residents, placing it near the national average for cities of comparable density (see table on page 48). Yet within the city, the open space is not distributed equally. While some areas of Northwest, Northeast and West Philadelphia have more open land per capita than average, other areas are woefully underserved. As calculated in GreenPlan, a standard of one acre of park for every 500 people means that only 58 percent of residents enjoy adequate access to green open space (see map on pg. 49).

As the City moves toward the goal of having all residents live within a half-mile of public parks and recreation areas—approximately a 10-minute walk—by the year 2025, it will need to create 500 acres of new space within seven years. These new green areas will come in many shapes and forms. Along the city's rivers and streams, new trails and reclamation efforts will provide greater public access to and recreational use of these waterways. In some city neighborhoods, pocket parks formed by greening land once occupied by houses will provide quiet refuges to nearby residents. Elsewhere, entire city blocks that once held multiple houses or factories could be turned into neighborhood parks (see pg. 50 for a map of where opportunities may exist).

The challenge, however, will be to ensure that both these new public lands and the city's already existing parks and recre-

PHOTO BY PETER TOBIA



SOURCES: FAIRMOUNT PARK 2007; WATER DEPARTMENT 1998, 2003–2005, 2007–2008—SOME MAPPED BY NITSCH ENGINEERING AND WRT; DELAWARE VALLEY REGIONAL PLANNING COMMISSION 2007; U.S. FISH AND WILDLIFE SERVICE 2008; CITY PLANNING COMMISSION 2007; WRT 2007, 2008; IMAGE CREDIT.WWW.WRTDESIGN.COM

ation areas are well-maintained. Given these tight fiscal times, that task becomes more difficult.

CREATE OPEN SPACE AS PART OF NEIGHBORHOOD DEVELOPMENT

As part of the Zoning Code Commission's review of the Philadelphia zoning code, *Greenworks Philadelphia* recommends that it give careful consideration to rules around open space. Regulations should encourage the creation and preservation of publicly accessible open space in all new commercial and residential developments, particularly large-scale projects, such as those anticipated along the Delaware River. In addition, the Planning Commission must incorporate parks and open space into its neighborhood plans.

Many models for how new green space can be created in Philadelphia exist. In University City, both Drexel University and the University of Pennsylvania are creating public parks on former industrial lands. Drexel took a two-acre parcel at 32nd Street and Powelton Avenue and turned it into a vibrant green square for students and neighborhood residents. And as part of Penn's redevelopment of the former Post Office parking lots, it will create a 24-acre public park adjacent to new student playing fields.

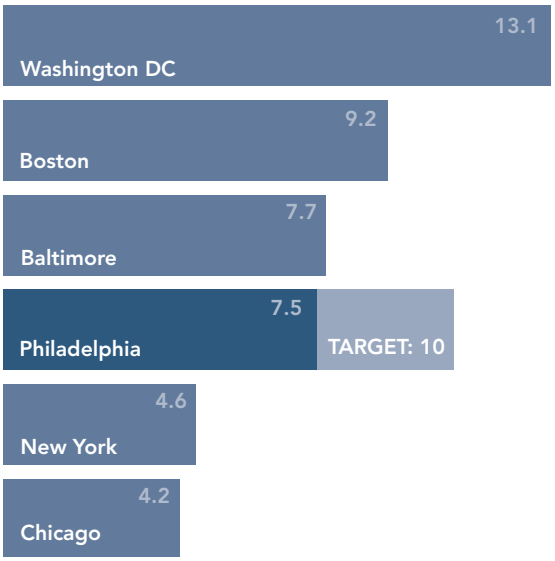
Hawthorne Park in South Philadelphia demonstrates how land that had been slated for new housing can be preserved as green, open space in a section of the city that lacks outdoor recreational resources. And Julian Abele Park in Southwest Center City is an example of how a former vacant lot can be transformed into a community asset. Finally, the Center City District's plan for Dilworth Plaza shows that public urban spaces can be enhanced and transformed through greening.

Explore the Use of Innovative Financing for Open Space Development

Green and open space enhances the value of surrounding properties—by 5 percent, according to a study done by the Trust for Public Land for the Philadelphia Parks Alliance. But as noted above, the challenge lies in monetizing the value of that green space so that its preservation (or creation) and maintenance are ensured. A few financial tools recommended in the Economy League of Pennsylvania's *Implementing Green Infrastructure* report commissioned by the Pennsylvania Environmental Council bear further investigation. The report suggests using developer fees, such as those employed by Philadelphia's successful "One Percent for Arts" program, or creating a special-service district devoted to green infrastructure and funded through dedicated taxes. It also raises the possibility of using tax increment financing to capture anticipated future increased property tax revenues to pay for upfront investments and ongoing maintenance of neighborhood open space.

PHOTO BY PETER TOBIA

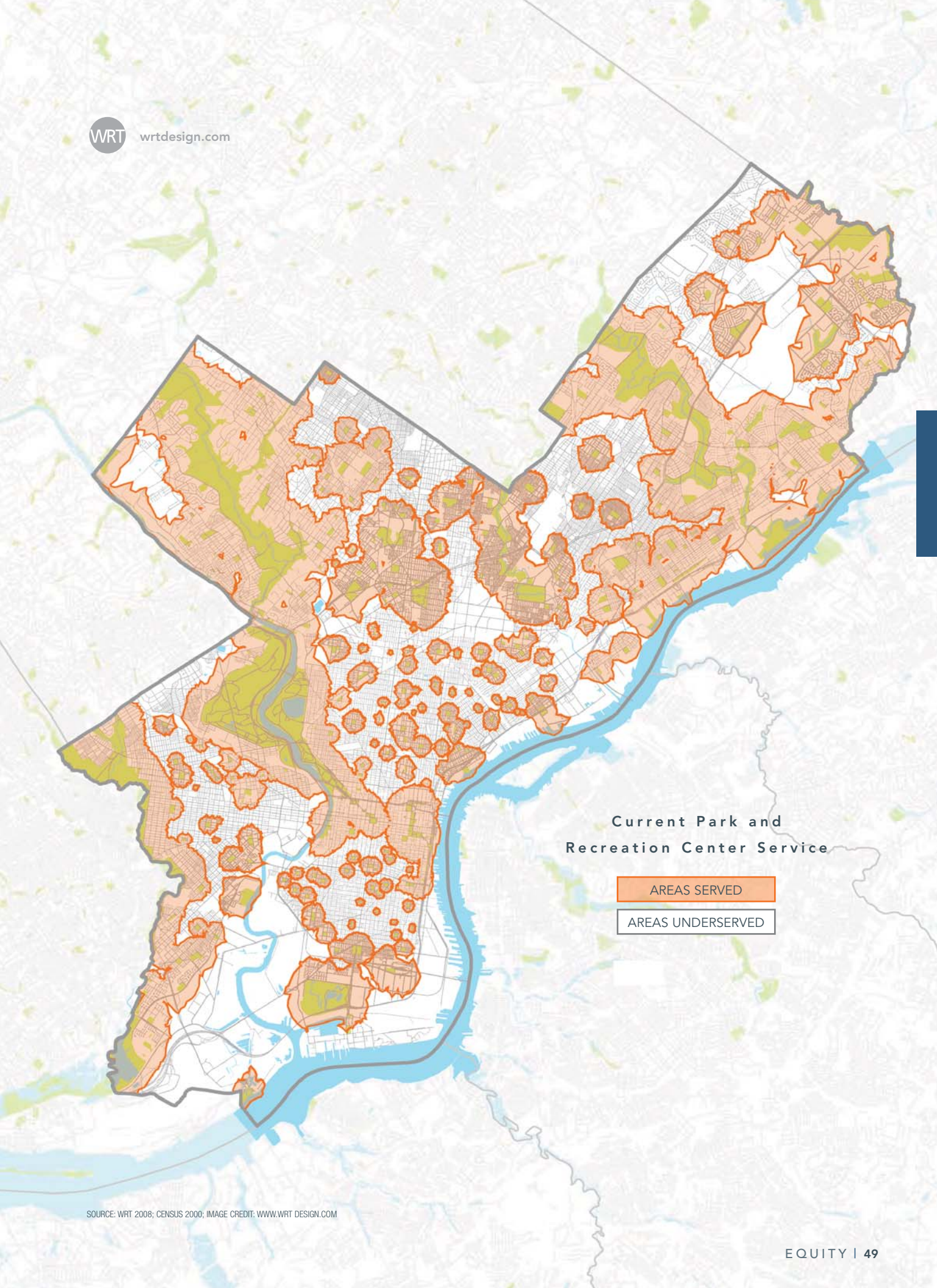
Total Parkland per Thousand Residents (acres)



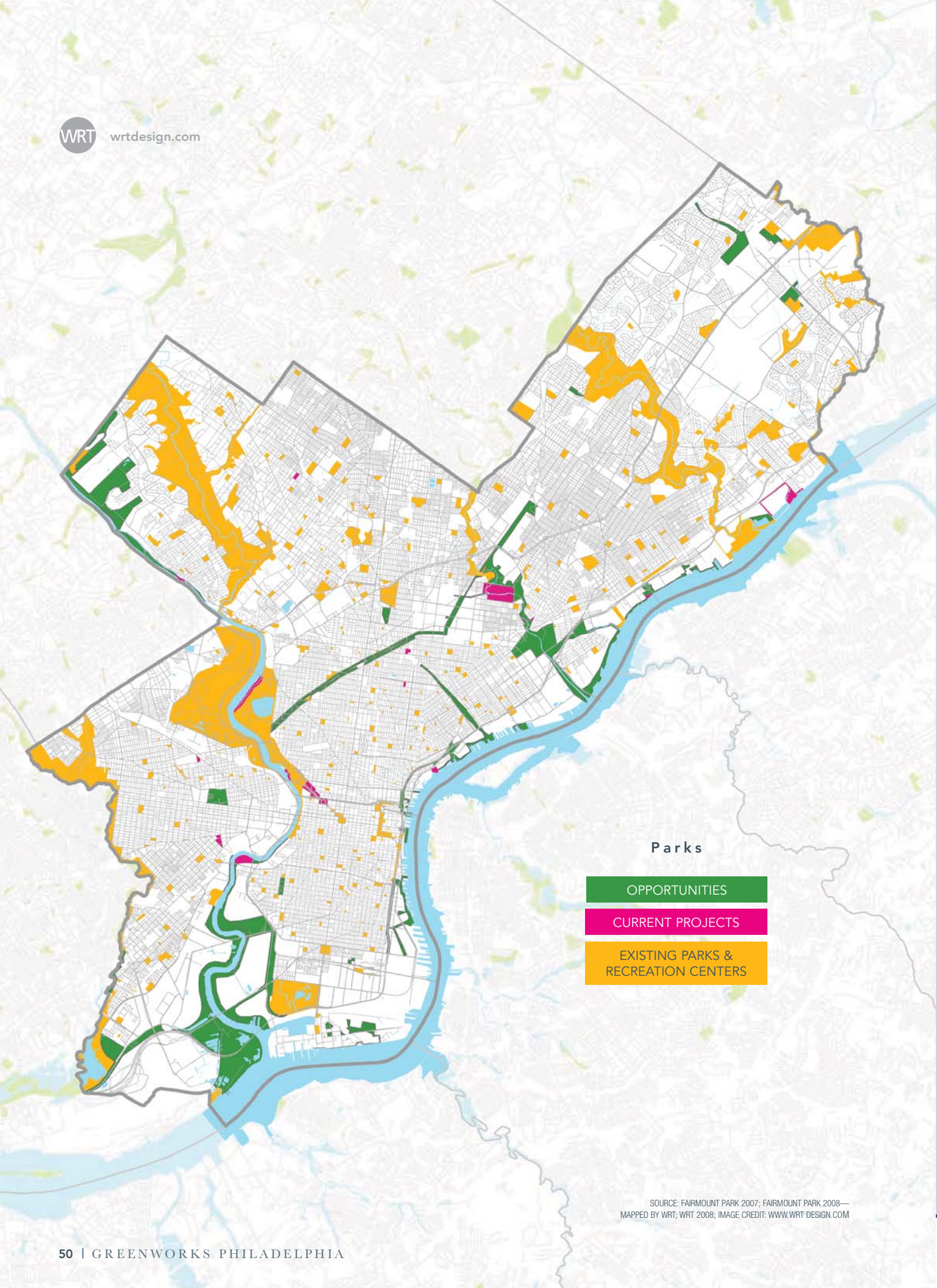
SOURCE: GREENPLAN, CITY OF PHILADELPHIA

Prioritize New Green Space Creation Within Low-Served Neighborhoods

More than 6,800 parcels of land have been cleaned and greened by the City during the past eight years. Much of that land is now owned by the Redevelopment Authority, which has begun to take steps to map and inventory it through a comprehensive data-management system. As noted above, the City's priority is to sell much of this land back to private-sector owners as quickly as possible and have it redeveloped. Yet, in some cases, the highest and best use may be a park that could be enjoyed by many and help with stormwater management. This solution has cost and implementation implications, however. Although it may be the case that there is no "one size fits all" solution, *Greenworks Philadelphia* proposes that the Redevelopment Authority work with the Department of Parks and Recreation, the Mayor's Office of Sustainability and the PWD to determine how best to approach and balance these competing interests. This group should also begin to pilot different green financing methods to assess their potential and develop a standardized set of procedures.



SOURCE: WRT 2008; CENSUS 2000; IMAGE CREDIT: WWW.WRT DESIGN.COM



SOURCE: FAIRMOUNT PARK 2007; FAIRMOUNT PARK 2008—
MAPPED BY WRT; WRT 2008; IMAGE CREDIT: WWW.WRT DESIGN.COM

DEVELOP PARKLAND AND OPEN SPACE CONNECTIONS ALONG THE CITY'S CREEKS AND RIVERS

THE SCHUYLKILL RIVER

The smaller of Philadelphia's two rivers, the Schuylkill River runs from Philadelphia through Valley Forge and Reading to its headwaters in the anthracite coalfields. In the city, the land that abuts the river includes parks, factories, oil refineries, institutions, highways and railroad tracks. Recently, Philadelphians have worked diligently to reclaim parts of the river as green space for public use.

The Schuylkill River Development Corporation has led the efforts to revitalize the Schuylkill waterfront between the Fairmount dam and the Delaware River, completing a 1.2-mile recreational trail and greenway where 16,000 people a week enjoy the outdoors. It is now working to extend the trail below South Street through a section of land called the DuPont Crescent.

On the sections of the Schuylkill that run through East Falls and Manayunk, neighborhood organizations and local civic leaders are developing plans to reconnect residents to the river. These efforts will kick off with the creation of a bike and pedestrian trail link between the Wissahickon Creek and the Schuylkill River in 2010.

THE DELAWARE RIVER

The Delaware River is Philadelphia's historic trade route and the center of its original settlements and commercial centers. Over the years the waterfront became disconnected from the main fabric of the city, particularly since the construction of Interstate 95, which effectively cut the river off from the rest of Philadelphia. For decades, efforts to rejoin the city to the waterfront have failed.

Since 2006, Penn Praxis, the clinical arm of the University of Pennsylvania's School of Design, has been leading a civic visioning and action plan for the Central Delaware, a seven-mile, 1,100-acre stretch from Oregon Avenue to Allegheny Avenue. In 2009, Mayor Nutter created the Delaware River Waterfront Corporation, which will use Penn Praxis' work as a starting point and develop a master plan to guide future public and private investments. Its first major effort will be to transform Pier 11 at the base of the Ben Franklin Bridge into a world-class recreational amenity. In addition, work is already under way on a recreational trail that will run from Penn's Landing to Pier 70 at Reed Street. The Center City District is overseeing this work.

A parallel process is under way for the North Delaware, an 11-mile, 700-acre section of riverfront that extends from the Betsy Ross Bridge in Bridesburg to Pleasant Hill Park in Holmesburg. The Delaware River City Corporation (DRCC) has been leading the effort to replace vacant industrial and other lands with a publicly accessible greenway. One signature project will soon transform the 4.5-acre Lardner's Point Park, which is located just south of the Tacony Palmyra Bridge. The DRCC recently received $500,000 in Athos Oil Spill mitigation funds that it will use to remediate the land and construct new walking trails and a fishing pier in what will be a new public park.

PHOTO BY PETER TOBIA

TARGET 10

Bring Local Food Within 10 Minutes of 75 Percent of Residents

No issue illustrates the challenges and opportunities of going green better than food. What we eat and how we get our food is the most basic of human needs. And now the issue has both local and global impact as communities like Philadelphia focus on the energy expended to get food from farm to plate.

This interest has created strong momentum for the creation of a comprehensive locally grown food policy plan that establishes goals and activities for the City of Philadelphia, as well as for local non- and for-profit organizations.

The Philadelphia Food Charter was created by Mayor Nutter in October 2008 to facilitate the development of a sustainable city food and urban agriculture system—one that contributes to community, economic, health and environmental goals; encourages local production, protecting our natural and human resources; recognizes access to safe, sufficient, culturally appropriate and nutritious food as a basic right for all Philadelphians; fosters community gardens and farming; creates economic opportunities for neighborhood residents; encourages collaboration and builds upon the efforts of existing stakeholders throughout the city and region; and celebrates Philadelphia's multicultural food traditions.

To further these goals and align the city's food and urban agricultural activities, Mayor Nutter also established the Food Policy Council. The Council will create a Sustainable Food Policy Plan that commits the City of Philadelphia and its partners to achieving a number of goals together. The Mayor's Office of Sustainability has been taking the lead on implementing this work.

INITIATIVES

INCREASE ACCESS TO FRESH FOOD

Urban marketplaces have always played an important role in the formation of cities and even in the present day contribute to neighborhood livability. Today Philadelphia enjoys 30 outdoor seasonal farmers' markets, which provide a place for people to gather and purchase agricultural products from the region. An additional 200 food-producing gardens combine to make access to fresh food convenient for even more city residents. And no discussion of access to fresh food would be com-

plete without a nod to Philadelphia's crown jewel—the Reading Terminal Market. In addition to its being a leading tourist destination, Reading Terminal Market is the leading redeemer of food stamps and Senior Farmers Market Nutrition Program vouchers in the state.

Yet, as the map on page 53 indicates, many city neighborhoods still lack access to locally grown fresh food. To increase this access citywide, *Greenworks Philadelphia* calls for the creation of 59 food-producing gardens, 12 farms and 15 farmers' markets in Philadelphia.

Expand the Number of Neighborhood Farmers' Markets

The Mayor's Office of Sustainability will work with non- and for-profit partners to target communities that have little or no access to fresh, healthy food, working, for example, with community development corporations to foster neighborhood interest in farmers' markets. This work may also involve the City providing on-site amenities needed by farmers, including nearby parking for their trucks and access to water.

Publicize Local Food-Source Efforts

An on-line inventory of community gardens, urban farms, farm stands and other sources of fresh food will be created, with a printed version available at neighborhood libraries and recreation centers so that Philadelphians can find the nearest fresh-food location. The Mayor's Office of Sustainability will combine this publicity work with an on-line Web tool that presents an inventory of land available for food-growing or gardening. The effort will be modeled after London's Capitol Growth strategy (www.capitalgrowth.org), which connects landowners willing to allow their parcels to be used for growing food (including city-owned parcels) with people and organizations that are looking for land for growing food or creating gardens.

Provide Technical Assistance

The Mayor's Office of Sustainability will work with academic, business and non-profit partners to connect communities and citizens with technical assistance and how-to guides for would-be farmers. It will also support the establishment of neighborhood-based gardening centers for residents interested in gardening and food-growing techniques. Information and supplies for food production and necessary products, such as seeds, organic pest-management programs, tools, organic fertilizers, books, classes and pots would be provided. The Horticultural Center in Fairmount Park could serve as a hub of this activity and make technical assistance available to citizens who want to grow and produce their own food.

Leverage Vacant Land

Vacant City-owned land presents an opportunity to create new commercial agriculture ventures and new community gardens in the city. Produce, trees—which could then be replanted on city streets—and even sedum for local green roofs could all be grown on land currently owned by the City. These types of uses would help reduce neighborhood blight, providing interim uses for vacant lots on which more traditional redevelopment might not occur for years.

City agencies, such as the Commerce Department, the PWD, the Redevelopment Authority and the Department of Public Health will work with the Mayor's Office of Sustainability to create a clear, transparent process for developing vacant land into community gardens or commercial-scale farms. The Mayor's Office of Sustainability will also explore the use of City-owned spaces and City equipment to facilitate getting supplies to people who want to grow food locally. This planning work will address such barriers as zoning, irrigation and liability insurance as well.

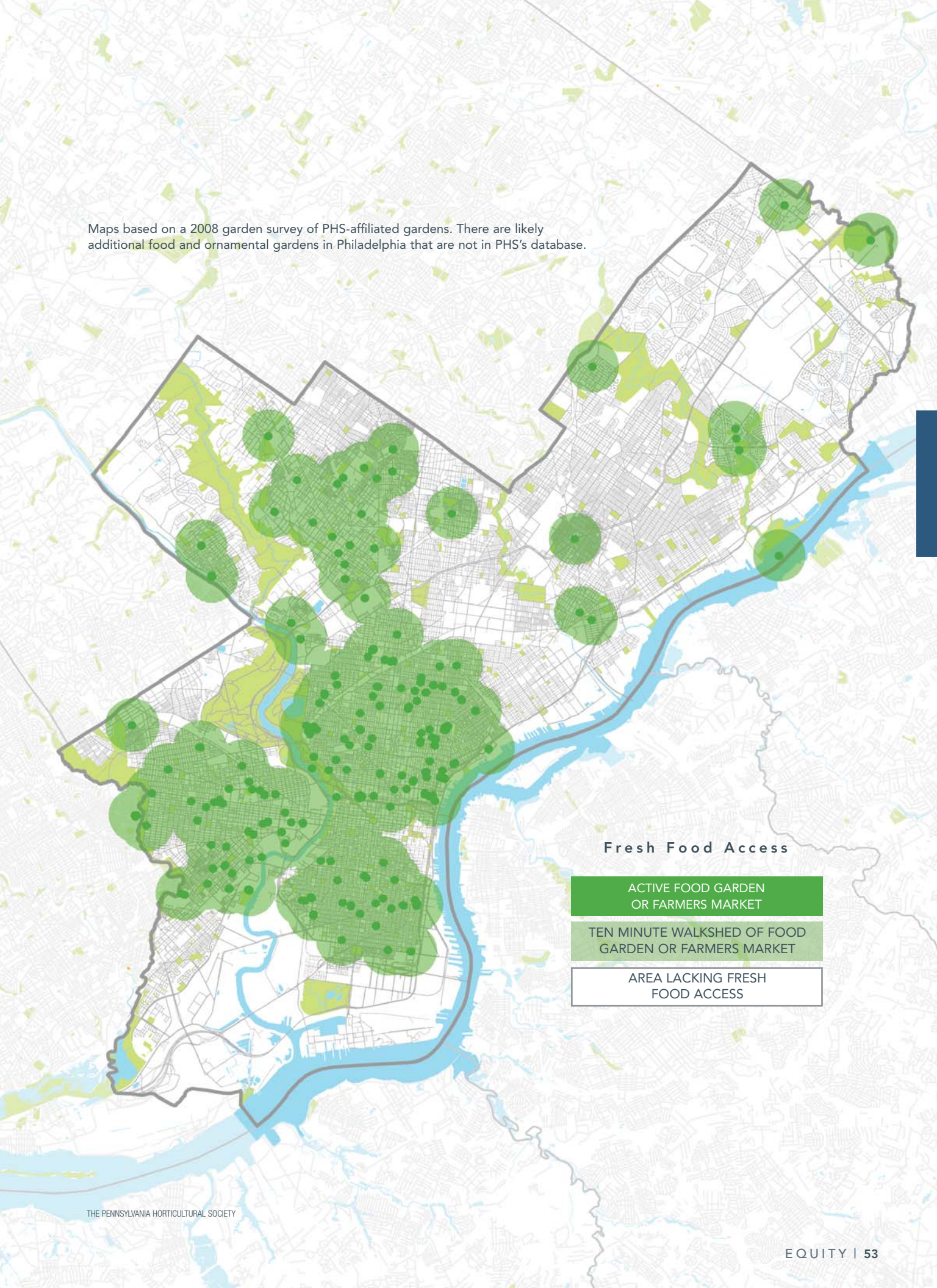
As a starting point for similar future activities, the Redevelopment Authority has asked for proposals from local organizations and commercial companies to develop temporary greenhouse structures on some of the land it owns. These greenhouses will grow fruits and vegetables, plants for green roofs and flowers for commercial sale.

Foster School-Based Efforts

Philadelphia's public schools offer many ways in which healthy eating habits and an interest in fresh food could be promoted. *Greenworks Philadelphia* supports the work of such organizations as the Food Trust, which partners with local schools to improve the quality of food served in cafeterias, cre-

LEFT TO RIGHT: PHOTOS BY PETER TOBIA

Maps based on a 2008 garden survey of PHS-affiliated gardens. There are likely additional food and ornamental gardens in Philadelphia that are not in PHS's database.



THE PENNSYLVANIA HORTICULTURAL SOCIETY

GREENSGROW FARM

Established in 1998 on an industrial brownfield, Greensgrow Farm uses hydroponic techniques to grow heirloom vegetables. It sells those vegetables through its Farm Stand (which operates like a community-supported agricultural program) and to local restaurants. It also grows a large variety of plants in its indoor nursery. Greensgrow also gives tours of the farm and offers lessons in composting and in raising bees, helping educate new generations of urban farmers.

Greensgrow is also establishing a small-scale commercial kitchen in a church a few blocks away from its farm. The kitchen will be used by Greensgrow staff, but will also be available for local entrepreneurs to rent so that they might test and prepare food products for sale. The space will also host business-development workshops focused on a variety of topics for would-be food-business owners.

ate school gardens and promote healthy food choices. The Mayor's Office of Sustainability will also encourage and assist local schools interested in creating on-site gardens.

CREATE DEMAND FOR LOCALLY GROWN FOODS

To increase demand for locally grown food, *Greenworks Philadelphia* supports local food-purchasing programs that have been created by Philadelphia's many hospitals and universities as well as nascent efforts to promote food-based economic development projects. Going forward, the Mayor's Office of Sustainability will promote the use of CSA buying clubs, especially in neighborhoods without access to fresh food from other sources. It will also use the Delaware Valley Regional Planning Commission's supply-chain analysis that maps the region's food distribution network. This analysis demonstrates how to connect Philadelphia to the region's food producers and processors, so that food access might be increased in all city neighborhoods.

PHOTO BY PETER TOBIA

Foster Commercial Farming

In order to create more opportunities for economic growth using commercial farming, *Greenworks Philadelphia* recommends that 12 commercial agriculture projects be established in the city over the next 8 years. In order to do this, the Mayor's Office of Sustainability, in partnership with other City departments and external organizations, will help develop the infrastructure necessary to support urban farming. This infrastructure includes distribution facilities, agricultural supply centers, reliable water sources and processing facilities. *Greenworks Philadelphia* also proposes that a new zoning designation be created in the city to allow commercial farming.

Encourage Distribution of Healthy Food in Neighborhood Stores

Given Philadelphia's urban form, most residents buy their food from corner stores and neighborhood markets, few of which sell locally grown produce. With our city's young people getting many of their daily calories from high-fat snack foods, much work must be done to improve the quality of those stores.

The Mayor's Office of Sustainability will work with the Department of Public Health to explore whether neighborhood grocery stores should be required to stock a certain amount of fresh and local produce (products grown within a 100-mile radius of Philadelphia) and reduce the amount of soda product sold in relation to square footage of the store. Larger grocery stores could be required to purchase a certain dollar amount per square foot of local product and limit the amount of products with high-fructose corn syrup stocked per square foot.

Support Food Cooperative Expansion

The City will continue to support and encourage the growth and expansion of food co-ops in neighborhoods by considering special financing and development incentives. Doing so will allow these stores time to build membership, adjust their business models so that they adapt to local preferences and create a demand for their products and programs. Since co-ops provide multiple community-development benefits in addition to the products they sell, supporting their expansion as part of neighborhood public health efforts makes sense.

ENTREPRENEURSHIP AND WORKFORCE DEVELOPMENT OPPORTUNITIES AND NEEDS

While sustainable food policy promotes environmental and community benefits, it also creates opportunities for economic development and entrepreneurship. The development of a Philadelphia agricultural sector could provide major economic and fiscal benefits for the city. A report done in 2007 by

CREATING A LOCAL MARKET

In order to foster the growth of urban farms, a local distribution network must exist to provide farmers with reliable and convenient access to their customers (and vice versa).

Three local organizations have created solutions to the challenge of accessing and providing local food on a commercial scale.

THE COMMON MARKET PHILADELPHIA (MARKET) describes itself as a wholesale consolidator, marketer and distributor of local food. By providing and guaranteeing large quantities of locally grown produce, the Market supports the region's local farms, helping make local food convenient and accessible to institutional and commercial buyers.

FARM TO CITY connects urban residents with locally grown food by operating an extensive community-supported agriculture (CSA) program. Under a CSA arrangement, residents provide payment to a local farmer up-front in exchange for receiving produce and other farm-raised or -produced products during the growing season. Farmers deliver the crops to prearranged locations for members to pick up, or members pick up their items directly at the farm. The up-front payments help farmers mitigate some of the risks that can result from weather uncertainty, allowing their farms to remain more financially, viable and sustainable.

The mission of the White Dog Café Foundation's **FAIR FOOD FARM TO INSTITUTION** project is to connect Philadelphia's major institutions with local farmers and help the former incorporate healthy, locally grown food into their operations and purchasing programs. In 2007, it joined with the Common Market to help Jefferson Hospital incorporate locally grown produce into its food-service offerings.

In 2008, in its second full summer of operation, Jefferson's Healthy Food in Healthcare project increased its use of local produce by more than 25 percent.

Urban Partners for the PWD found that 10 Philadelphia farms with $120,000 in annual sales would have a total annual direct and indirect economic impact of more than $2.4 million and support 46 full-time equivalent jobs.

In addition, food growth and production efforts foster local businesses that provide jobs for people with different skill levels and training needs. A few organizations, such as the Enterprise Center in West Philadelphia and Greensgrow Farm, are beginning to use food as the centerpiece of a strategy to build neighborhood wealth and economic opportunity.

Create an Urban Agriculture Workforce Strategy to Grow Green Jobs

The Mayor's Office of Sustainability will work with Philadelphia's Workforce Investment Board and colleges and technical schools to promote urban agriculture as a vocation, creating urban agriculture and food workforce job training programs. Youth workforce training dollars available to urban agriculture businesses could be used as well so that students could learn urban agriculture and entrepreneurship skills. The Mayor's Office of Sustainability will also connect would-be urban agriculture entrepreneurs with local university resources to help them start their own businesses.

Support Green Kitchen Development

Greenworks Philadelphia supports the creation of "green kitchens" at community development corporations and other local organizations. Green kitchens teach farm-to-table cooking techniques, encouraging entrepreneurship and better nutrition among program participants.

COMBATING HUNGER AND MORE IMMEDIATE NEEDS

The economic downturn combined with rising food prices has made hunger a critical issue for many Philadelphia residents. Enabling residents to grow their own food could be one part of a multipronged strategy to address hunger among the city's vulnerable residents.

One unique local project that addresses hunger is City Harvest, a partnership between the PHS, the Philadelphia Prison System, SHARE (a local food distribution organization), and the Health Promotion Council of Southeastern Pennsylvania. Through the program, prisoners use an on-site greenhouse to grow vegetable seedlings, most of which are then transported to community gardens located in different city neighborhoods. Once harvested, the fresh food is delivered through SHARE to local food cupboards. Some of the


PHOTO BY PETER TOBIA

THE FRESH FOOD FINANCING INITIATIVE

The Fresh Food Financing Initiative—a partnership between the Food Trust, The Reinvestment Fund and the Greater Philadelphia Urban Affairs Coalition, and the Food Trust's Healthy Corner Store Initiative—both work to increase the number of supermarkets and grocery stores in underserved communities. The Food Trust also makes the distribution of fresh fruit financially feasible for store owners by providing stores with refrigerated barrels in which to stock and display fresh-cut single-serving fruit, which it also supplies.

seedlings, however, stay at the prison where the men and women in the Roots-to-Reentry program replant them in an outdoor garden. They tend and harvest them, learning landscaping and horticultural skills. Besides working with prisoners to grow vegetables, City Harvest staff conduct on-site nutrition classes and cooking demonstrations for the prisoners.

Integrate Anti-Hunger Efforts into Food and Urban Agriculture Goals

In order to work toward and meet aggressive targets to increase Philadelphia's food security, *Greenworks Philadelphia* supports the anti-hunger policy platform (www.hungercoalition.org) recently released by Philadelphia's anti-hunger, nutrition and sustainable-food organizations. They have committed themselves to working together to promote access to school meals and end hunger in Philadelphia. The Mayor's Office of Sustainability and the Public Health Department will convene advocates regularly to develop an action plan to reduce hunger and to promote an anti-hunger agenda in Harrisburg and Washington.

TARGET 11

Increase Tree Coverage toward 30 Percent in All Neighborhoods by 2025

> "Every owner or inhabitant of any and every house in Philadelphia, Newcastle, and Chester shall plant one or more trees." *William Penn's Shade Tree Law of 1700*

Many of the activities in the previous three sections involve tree planting, a significant priority for the Nutter Administration over the next seven years. Although Philadelphia has a long history of programs to encourage planting and maintence of trees, it lost many during the last half of the 20th century. The number of trees along streets decreased from an estimated 325,000 in 1976 to 134,000 today as trees died and were not replaced. A study by American Forests found that Philadelphia lost 1,638 acres of tree cover between 1985 and 2001.

Unlike in most cities, the majority of Philadelphia's trees are publicly owned. About 1.2 million of the 2.1 million city trees, 57 percent, are managed by Fairmount Park. In most urban and suburban areas, trees are on private land. In Philadelphia, the predominance of rowhouses, which account for 75 percent of the housing stock, limits planting on private property because backyards are small and front yards almost nonexistent. Along many rowhouse blocks, the only available space for planting is at the curb. Not surprisingly then, areas of the city that have more single-family, detached homes have greater tree cover.

The Department of Parks and Recreation spends $5 million per year on street trees. Pruning and removal are its major expenses, leaving approximately $380,000 annually to plant 600 to 800 street trees. Through the Commonwealth's TreeVitalize program and the work of private organizations and other city departments, many more trees are planted each year.

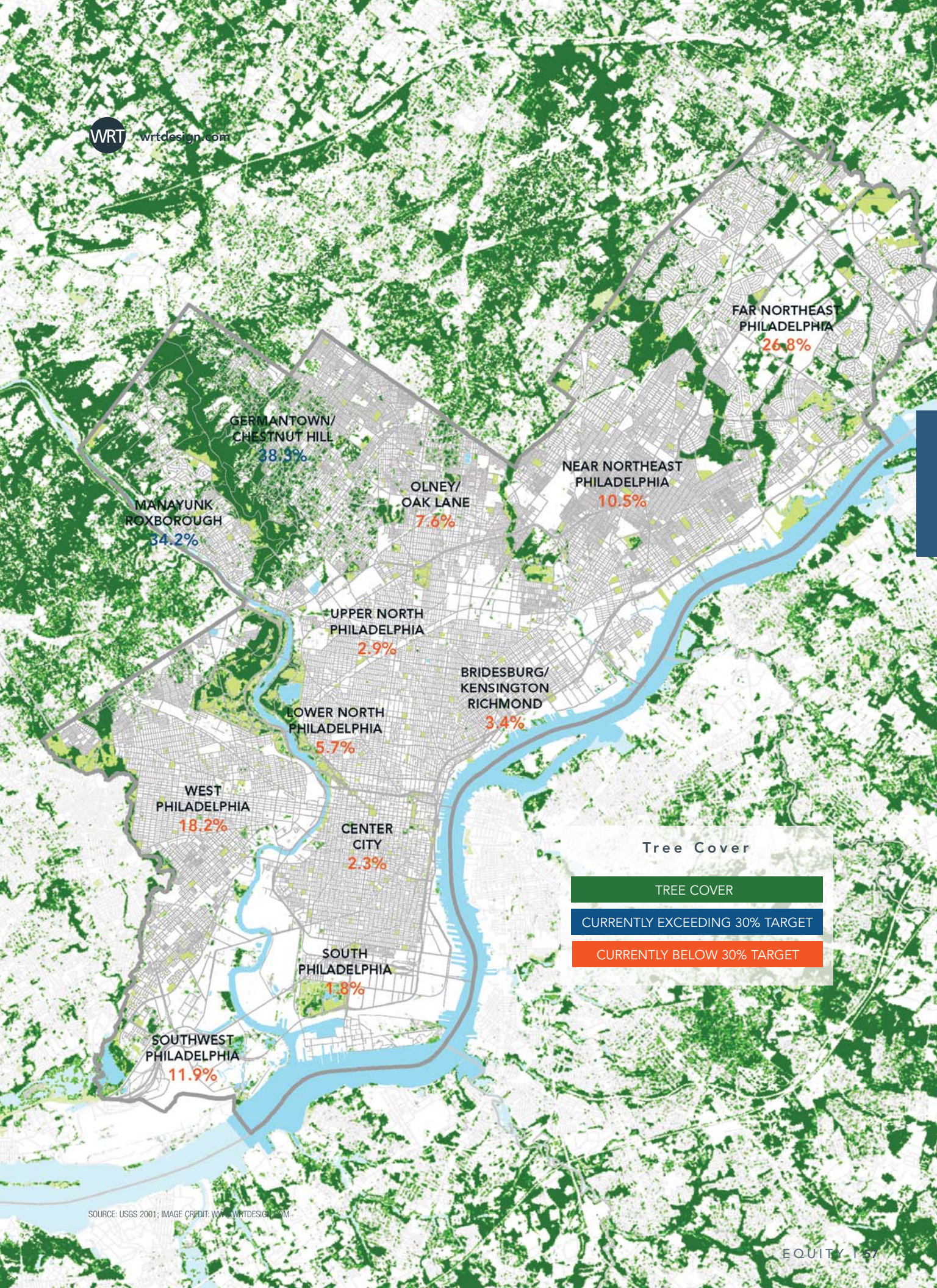
Yet the number of trees cut down annually is far greater than the number being planted: In recent years, the City's tree count has dropped by roughly 3,000 a year.

At nearly 16 percent, Philadelphia's tree cover is less than that of many other cities, including Boston, Washington, D.C., and New York. Yet the percentage varies across neighborhoods. Some, like Roxborough, Manayunk, Germantown, Mount Airy and Chestnut Hill, enjoy a tree canopy of more than 34 percent. But South Philadelphia and Center City have less than 2.5 percent (see map on page 57).

All told, Philadelphia has about 131,000 street trees, and two million more in public parks and squares and on private property. Given the strong evidence that trees provide significant benefits to a city—reducing the heat-island effect, improving health, controlling stormwater run off—the City should set a goal of having a 30 percent tree cover in every neighborhood within the next 20 years. A study by Susan Wachter at the University of Pennsylvania's Wharton School concluded that proximity to trees on a street boosted residential market values by as much as nine percent, or $7,443 based on the median value of a city residence.

Trees also help reduce air and surface temperatures. City neighborhoods that lack street trees experience urban heat-island effects during summer months, leading to higher energy demand to cool homes and heat-related illnesses and deaths (see map on page 59).

To achieve this increased tree canopy goal by 2025, nearly 300,000 trees must be planted in Philadelphia during the next seven years. Given the City's fiscal constraints, the goal cannot be reached without the significant involvement of citizens. Funds from the Federal Recovery Act of 2009 could be used to plant trees, especially in South and North Philadelphia and Center City, all of which have less tree cover than other city neighborhoods.



SOURCE: USGS 2001; IMAGE CREDIT: WWW.WRTDESIGN.COM

INITIATIVES

STREET TREES

National standards suggest that every mile of city street ought to be stocked with 180 trees. But Philadelphia has only 55 trees per mile, just 30.6 percent of the recommended standard, well below the stocking rate of other cities (refer to table to the right).

To help Philadelphia move closer to the recommended standard, thousands of street trees will need to be planted each year. Yet the current cost of $400 per tree—this amount includes a $160 sidewalk cutting charge—makes this goal prohibitively expensive for the City to go it alone. Fairmount Park's street-planting budget has been no more than $380,000 in recent years, yet would need millions more if it were to do all the work itself. Thankfully, many private partners exist in Philadelphia, and all stand ready to do their part to help line the city's streets with trees. Indeed, Philadelphia's nonprofit tree-planting organizations and its thousands of Tree Tenders and other volunteers are the envy of the nation. The City can help make the effort easier for itself and others. Specifically, *Greenworks Philadelphia* recommends the following tasks.

Change the Rules Involving Property-Owner Permission

Unlike in other cities, property lines in Philadelphia run all the way to the curb, with the City enjoying an easement for public works, such as fire hydrants, street lights and signs. Trees, however, are not a "public work." The home owner must therefore give permission in writing before the City or a nonprofit group can plant a tree in front of his or her house. City staff and nonprofit organizations often must go door-to-door seeking written permission from every owner on a block. That is time consuming, and in cases where owners are absentee or the property is a rental, permission is never received. Thus much of Fairmount Park's plantings are scattershot, based on requests from property owners.

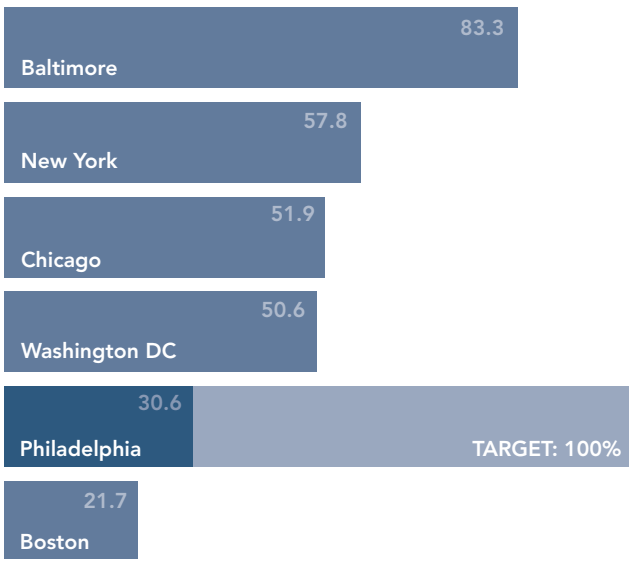
Greenworks Philadelphia proposes that the Department of Parks and Recreation work with the Law Department and City Council to change the regulations so that street tree plantings could occur without the express written consent of property owners. That would enable the Department of Parks and Recreation and private groups to target blocks that do not have many trees, particularly those where homes are vacant or not owner-occupied and along commercial corridors.

An "opt-out" system could also be used. Property owners within a targeted area could be notified in writing of upcoming street tree plantings and would be asked to respond only if they did not wish to have the trees in front of their home or business.

Prioritize Tree Planting in Low-Canopy, High-Crime Districts

As noted above, residents can ask the Department of Parks and Recreation to plant trees on their property, and the requests are answered on a first-come, first-serve basis. The

Percent of Streets Fully Stocked with Trees



SOURCE: GREENPLAN

Department of Parks and Recreation and private partners should set priorities for responding to those requests, focusing on specific streets and neighborhoods with very little tree canopy. Large-scale sidewalk planting could then occur in these areas, in addition to efforts that are sprinkled through the city.

Target Empty Tree Pits

Because the cost to cut and prepare a sidewalk for a tree is so high, the Department of Parks and Recreation should prioritize those places where trees once existed. In Center City, for example, 800 tree pits sit empty.

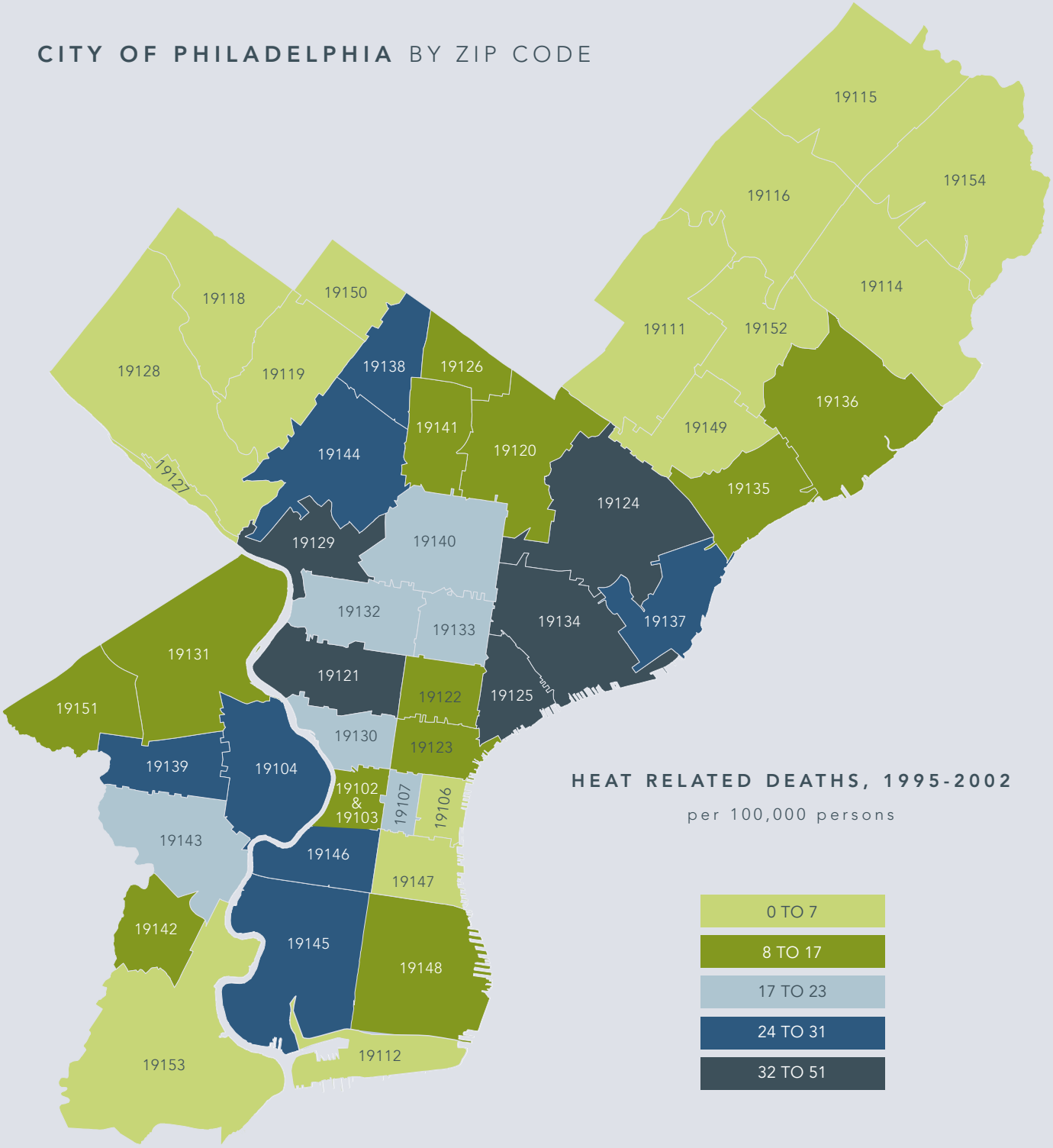
The Department of Parks and Recreation could work with Center City property owners to develop an "Adopt A Tree Pit" program to plant new trees.

Outside of Center City, the Department of Parks and Recreation must begin an effort to count its empty tree pits and determine where new trees should be planted. In Washington, D.C., volunteers surveyed neighborhoods for the Casey Tree Foundation, which is dedicated to increasing the capital's tree canopy, collecting data using their own handheld PDAs and downloading it into a centralized system. Given the large number of tree volunteers in Philadelphia, the Department of Parks and Recreation should consider employing similar tactics here. Once the survey has been completed, the Department of Parks and Recreation could extend an "Adopt a Tree Pit" program to neighborhoods beyond Center City, working with businesses, home owners and shopkeepers.

Strengthen and Increase Public-Private Maintenance Partnerships

Because responsibility for street trees rests with the City, the Department of Parks and Recreation should aggressively pursue maintenance agreements with neighborhood, civic and business groups. When community groups assume mainte-

CITY OF PHILADELPHIA BY ZIP CODE



HEAT RELATED DEATHS, 1995-2002

per 100,000 persons

- 0 TO 7
- 8 TO 17
- 17 TO 23
- 24 TO 31
- 32 TO 51

nance responsibility for a newly planted street tree, property-owner permission would not be needed. Moreover, when those groups have used a certified arborist to determine the proper location for a street tree, the Department of Parks and Recreation should not be required to conduct its own location survey.

Fully Stock Street Trees Adjacent to All City Facilities

The Department of Parks and Recreation will make sure that the sidewalks bordering city facilities are fully stocked with trees and that trees are planted within City-owned properties, especially libraries and recreation centers. Departments will be asked to support the effort by watering and maintaining the planted trees.

Revise the Zoning Code Regarding Trees for Surface Parking Lots

The Zoning Code requires owners of surface-parking lots to plant trees as screens if the lots are adjacent to residences. Similar requirements do not exist for commercial sites or streets. Nor are surface lots required to have shade trees within the lot itself. As noted above, *Greenworks Philadelphia* asks the Zoning Code Commission to change city regulations and require more trees to be planted on and around parking lots. That would help with stormwater runoff and decrease the surface temperature of those lots in the summer.

Decrease the Cost of Tree Planting

The Department of Parks and Recreation estimates that it costs more than $400 to plant a street tree and about $350 to plant a tree in a park. These costs do not include staff time required to survey the streets getting trees, obtain property-owner permission and review the type of trees to be planted. Trees are bought from nurseries as far away as Indiana and then planted by private contractors. In contrast, trees planted by such groups as the PHS or UC Green cost an average of $100 to $150 depending upon the species (this does not include the $150 sidewalk cutting costs). In part, the difference in cost is that groups like PHS use bare-root trees, which have a smaller trunk caliper than the Department of Parks and Recreation's preferred ball-and-burlap trees. Bare-root trees can also be planted more easily by volunteers. The Department of Parks and Recreation is trying to determine whether these trees are as durable as ball-root trees and live as long. So far, the results indicate that they do, and *Greenworks Philadelphia* proposes that the Department of Parks and Recreation begin to use them as soon as possible in locations where it makes sense.

ACCELERATE CITYWIDE TREE-PLANTING EFFORTS

Public Tree-Planting Campaign

Greenworks Philadelphia recommends that Philadelphia build upon the tremendous contributions already being made by such organizations as the PHS and UC Green to develop a large-scale public tree-planting campaign. The effort would rely upon nonprofits, corporations, individuals and community organizations, as well as Fairmount Park and other departments, and use technology to harness the power of those groups. One model for Philadelphia's effort is New York City's MillionTrees initiative, which planted 114,000 trees in its first year, including 15,000 in one weekend alone in November 2008. The MillionTrees Web site enables residents and businesses to "register" their own tree-planting activities, so that all trees planted in New York are counted toward the million trees goal.


PHOTO BY PETER TOBIA


PHOTO BY PETER TOBIA

In Philadelphia, an on-line clearinghouse could allow users to donate funds to many local organizations; request to have a tree planted; discover when volunteer-led plantings will occur; register for the PHS's Tree Tenders (volunteers who plant and maintain trees) classes; learn about caring for trees and register their own newly planted trees. The project would seek to plant trees everywhere—in parks, watersheds, street medians, schools, libraries and recreation centers. A great example of what is possible can be found in the Home Depot Foundation's generous $1 million donation for tree-planting efforts in Lower North Philadelphia. This work will be carried out by PHS and the Asociación Puertorriqueños en Marcha.

Create Urban Tree Forest Management Program

Until a few years ago, the Department of Parks and Recreation used an Excel spreadsheet to manage the requests to prune, plant and remove trees from city streets. It now has an in-house database to help process the more than 70,000

individual maintenance requests it receives each year. Staff collect requests by hand, and the data is then manually entered into the system. The Department of Parks and Recreation would like to be able to input data remotely, using handheld devices that would be GPS-based. The new system would be compatible with the City's 311 system so that requests could be made seamlessly. The estimated cost is $90,000 to $100,000. Given the current budget climate, Fairmount Park is seeking external funding for this effort.

The Department of Parks and Recreation should also explore using volunteers to map the city's street trees. Washington, D.C.'s Casey Foundation used its volunteers to do a similar inventory of existing trees. The Foundation's Web site now has an interactive map pinpointing each tree in the city, describing its species and evaluating its carbon-offset contribution and monetary value.

Initiate City-Based Growing

An inventive idea from the Redevelopment Authority calls for using vacant, city-owned land as arbors for trees that could then be transplanted to Philadelphia streets. If the Redevelopment Authority can work successfully with private-sector arborists, the cost of transporting trees would decrease because, as noted above, many now come from considerable distances. Moreover, the trees would become accustomed to Philadelphia's climate and soil before final planting.

PHOTO BY PETER TOBIA

UC Green, a volunteer-rich tree-planting organization based in West Philadelphia, is also beginning to grow its saplings in containers located on a secured site near Bartram's Gardens in Southwest Philadelphia. It will soon be able to use them to meet its own annual planting needs. Since it now receives the trees it plants from New York State, growing locally will cut its costs.

Green the Schools

The Philadelphia School District has a large role to play in creating more green space and planting more trees. After all, it is the largest owner of impervious pavement in the city. Many of its play areas and parking lots are barren, asphalt surfaces. *Greenworks Philadelphia* recommends that the school district use its volunteer organizations to develop service-learning opportunities for schoolchildren around tree planting. In addition, the School Reform Commission (SRC) must remove the legal barriers that make it difficult for outside groups to green school yards. Recently PHS raised $500,000 to green a few city schools, working with landscape architects to draw up plans for new urban oases. But school attorneys decided that PHS would be held liable for any damage caused by the project in perpetuity, even though PHS would not maintain the trees and other plantings. Not able to resolve the legal stalemate, PHS had to walk away from the project.

FUNDING

American Recovery and Reinvestment Act of 2009

As is being done in other cities, local nonprofits and city employees are working to determine whether any of the federal funding now available through the American Recovery and Reinvestment Act of 2009 can be used for tree planting. If funds are identified, organizations like the PHS are poised to work with the City to apply for these resources and use them to plant trees and conduct other greening work in Philadelphia.

Launch Local Carbon Offset Market

Working with the U.S. Forest Service, the Mayor's Office of Sustainability is developing an on-line tool to enable Philadelphia residents and business owners to calculate their carbon footprints. Users of the carbon calculator, which will be called *Erase Your Trace*, can then choose to offset their environmental footprints by donating funds to the Fairmount Park Conservancy for local tree-planting work.

WOMAN RIDING HER BIKE HOME FROM A FARMERS MARKET

PHOTO BY PETER TOBIA

economy

PHILADELPHIA CREATES A COMPETITIVE ADVANTAGE FROM SUSTAINABILITY

PHOTO BY PETER TOBIA

Public policies that favored suburban sprawl over urban density helped pull people and jobs away from Philadelphia. In 1950, Philadelphia had a population of more than 2 million people and had built an urban infrastructure capable of supporting 2.5 million. But when the century ended, the city held less than 1.5 million residents.

Yet cities like Philadelphia remain efficient organisms, using less energy and producing fewer greenhouse emissions per capita than their surrounding suburbs or newer sprawling metropolises. In a world where carbon emissions exact an environmental cost, water is becoming scarce and oil supplies are in decline, Philadelphia offers distinct competitive advantages.

Philadelphia's challenge then is to seize this moment. It must leverage its existing assets, particularly its transit system and walkable neighborhoods; invest in its existing infrastructure; and flex its economic muscles to attract new residents and companies. The burgeoning "green" economy, with jobs that range from low-skill weatherization to high-skill machining and design, represents an opportunity for Philadelphia to once again be one of the world's workshops.

TARGET 12

Reduce Vehicle Miles Traveled by 10 Percent

The Delaware Valley Regional Planning Commission (DVRPC) has estimated that passenger vehicles miles traveled (VMT) in Philadelphia totaled 6.4 billion miles in 2005—this estimate included commuter traffic in and out of Philadelphia, but not traffic merely passing through the city. The U.S. Department of Transportation estimated that average daily VMT per capita for the Philadelphia region was 20.3 in 2007, below that of most other major U.S. cities (see table on pg. 65). The Pennsylvania Department of Transportation breaks that figure down by county, showing Philadelphia's daily per-capita VMT to be less than 11.3 (see table on pg. 66).

Greenworks Philadelphia projects that local VMT will increase to 6.9 billion by 2015. The goal of *Greenworks Philadelphia* is to keep that total to 5.7 billion miles, a difference of 1.15 billion miles. That would require each Philadelphia household to decrease its driving by less than 1,100 miles per year. Through operational and capital improvements in public transit, Transit Oriented Development (TOD), investments in bike trails and the increased use of car-share services, Philadelphia will achieve this goal.

INITIATIVES

IMPROVING PUBLIC TRANSPORTATION

One of Philadelphia's greatest advantages is SEPTA, its dominant public transit agency. With more than 1,800 miles of transit routes in the city, nearly every resident has easy access to a bus, trolley, subway or train. And that access means that SEPTA riders are not only helping save the environment, they are also saving themselves a lot of money. According to the American Public Transportation Authority, SEPTA saves its daily commuters up to $11,000 per year per person on transportation costs.

Yet even with that potential savings, 52 percent of Philadelphia employees still drive alone to work, far more than the 25 percent who take public transit. But notably, more than 45,000 Philadelphians walked to work in 2007—one of the highest numbers in the nation.

In 2008, SEPTA's ridership grew 5.4 percent, thanks primarily to the summer's spike in gasoline prices. Compared to 2007, 11.8 percent more passengers rode regional rail trains and 3 percent more rode the system's buses, with suburban markets accounting for much of that increase.

Yet as gas prices dropped, the total number of passenger trips decreased as well—to 51.4 million in January and February 2009 from 51.6 million during the same months of 2008. SEPTA's leaders are keenly aware that to keep new passengers and add still more, they must make riding public transportation even more convenient and safe than it already is. SEPTA will

therefore undertake a number of projects designed to achieve a 6.48 percent increase in total passenger miles by 2015.

Develop New Fare Card Technologies

In fall 2008, SEPTA asked for bids to implement a new fare card system that would take advantage of "smart-card technology." These card systems are increasingly being used in Southeast Asia and Europe. In Hong Kong, for example, passengers use cash, credit or bank cards to load a transit pass, which itself looks like a credit card and contains a microchip. Upon entering a bus or train, the customer flashes the card at a scanner, and the amount of the ride is deducted from the balance on the card. This transaction takes seconds. When the card balance runs low, passengers simply refill it. Here in Philadelphia, a similar fare system would allow seamless travel among bus, trolley, subway and regional rail. SEPTA plans to have the new system up and running by 2012.

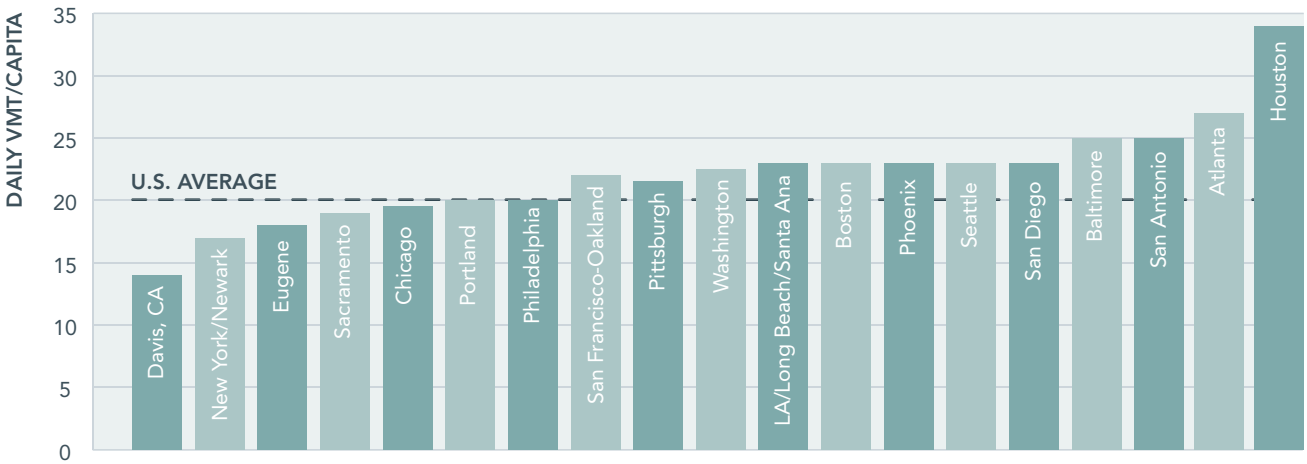
Further Improve Service and Safety

When it faced budget shortfalls in previous years, SEPTA was obligated to cut service on many of its routes. Today, as ridership rises and public funding has increased, *Greenworks Philadelphia* recommends that SEPTA work within its budget to begin to restore some of those previously eliminated trips and services, such as the trackless trolley.

Public transportation riders in other cities get real-time information about delays through their iPhones and Blackberries. SEPTA just recently began to post similar information on its newly redesigned Web site—a step in the right direction. It has also pledged to link its data to the new and easy-to-use Google Transit application that allows people in participating cities to enter their location and desired destination and learn instantly what transit route to take and when the next bus, train or trolley departs. Using these existing technology resources would help make using public transit more convenient and less mystifying for passengers.

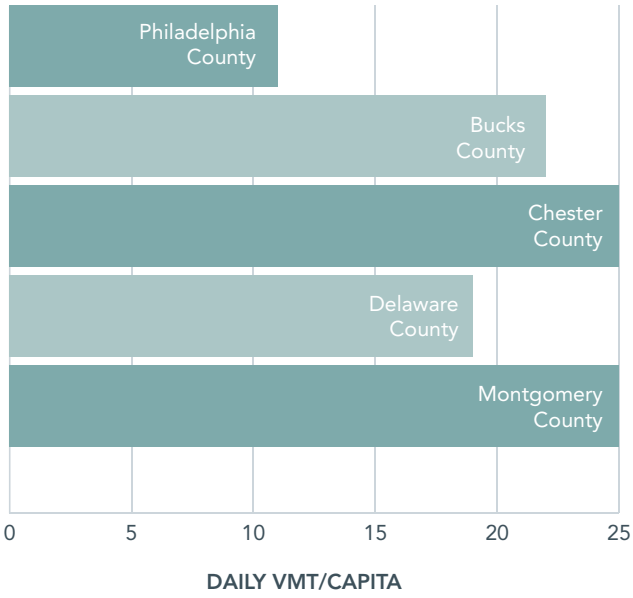
In 2007, the Center City District (CCD) entered into an agreement with SEPTA and the City's Department of Public Property to clean the 3.5 miles of underground walkways within the Suburban Station concourse and under South Broad Street. The results have been remarkable and come at no extra expense to the City or SEPTA. In 2008, CCD unveiled a subway-stop identification system that helps both tourists and locals easily locate SEPTA stops. Both these "lollipops" and cleaner transit stops are simple but important steps that help passengers feel comfortable about using transit and induce even more people to get out of their cars and on to SEPTA. *Greenworks Philadelphia* recommends that SEPTA work to expand such efforts throughout its system.

Daily VMT Per Capita—Selected U.S. Metro Areas (2007)



SOURCE: FEDERAL HIGHWAY ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION

Daily VMT Per Capita—Philadelphia Region



SOURCE: PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

Invest in Current Transit Infrastructure

Using federal Recovery dollars, SEPTA will repair and renovate existing stations and depots so they are safe and inviting. Work will be done at the Fox Chase station ($4.9 million) and at two subway stations on the Broad Street line, Spring Garden and Girard, both constructed in the 1930s ($36.7 million total). Seven stations on the R8 line will also be restored and repaired. In addition, SEPTA will spend $5.2 million to upgrade train-control computers on the Green Line, eliminating the frequent delays that deter would-be trolley riders.

SEPTA is also beginning to consider ways to transform its City Hall station into a more modern, safer transit hub and better connect what happens underground to a reimagined Dilworth Plaza, which is poised to become a greener, more inviting public space.

Finally, using funds from the Delaware River Port Authority, PATCO, southern New Jersey's transit system, will reopen its long-abandoned subway stop at 7th and Arch Streets, enabling travelers from New Jersey to easily access Philadelphia's historical district.

These improvements to existing infrastructure should help attract more riders to the lines and spur private investment in adjacent neighborhoods.

Ensure Sustained Transit Funding

In 2007, Governor Rendell signed Act 44, which called for a dedicated stream of funds for the state's transit agencies, as well as highway improvements. Passengers have responded well to the service improvements and investments that SEPTA has already made using the increased monies it has received from Harrisburg. However, those funds could dissipate if cities like Philadelphia do not remind the state legislature of the value of public transportation to the local economy and the environment.

In addition, with the reauthorization of the federal Department of Transportation bill slated for fall 2009, the City must work with its congressional delegation to make capital funding for public transportation a priority.

Plan for an Expanded System

While SEPTA is right to focus on fixing existing infrastructure, it must also think about expanding its subway and light rail lines. For example, the Penn Praxis plan for the Delaware River calls for the creation of a light-rail line down Delaware Avenue/Columbus Boulevard, using existing rails. As part of the City's master-planning process for the Central Delaware River, this idea should be fleshed out and preliminary cost estimates—both capital and operating—determined.

Other proposals for new rail include extending the Broad Street subway line to the Navy Yard, where 7,000 people currently work. There are plans for even more private investment at this 1,600-acre site, including residential units, which may help the proposed expansion make sense from a cost-benefit perspective.

EFFORTS IN NEIGHBORHOODS

Increase Transit-Oriented Development

In many ways, Philadelphia is one big transit-oriented development (TOD). Many neighborhoods grew up around trolley lines (West Philadelphia) and rail stations (Germantown, Mt. Airy and Chestnut Hill). Just as other cities have tried to foster commercial and residential development around newly created public rail stations, Philadelphia must do the same with the assets it already has.

Working with nonprofit partners like Neighborhoods Now, the Nutter Administration is committed to investing in areas adjacent to transit hubs that SEPTA will be renovating. Pilot efforts are being planned for Girard Avenue & Front Street, 46th & Market streets and the Temple University station. In those locations, SEPTA will upgrade stations, making them aesthetically pleasing, well-lit and secure. The City's Streets Department will support these efforts through investments in lighting, sidewalks, bike lanes, street furniture (including bike racks), signage and greening. Car-sharing parking spots will be created. The target areas may also be rezoned to accommodate mixed residential and commercial uses.

The Pennsylvania Community Transportation Initiative has set aside $60 million for TOD projects. According to TOD advocates, these public investments will encourage private-sector development in adjacent areas. Philadelphia is well positioned to attract a portion of these public dollars.

Upgrade Commercial Corridors

Philadelphia enjoys many neighborhoods where residents can easily walk to retail stores. Unfortunately, such convenience does not exist everywhere in the city. A number of commercial corridors remain blighted and offer little to attract nearby residents. The City Commerce Department's ReStore Philadelphia program aims to revitalize such corridors through loans and technical assistance. In March 2009, the Commerce

1990–2008 Comparison (Bikes per Hour) at Schuylkill Bridges and Major Intersections

COMMUTING TO WORK	1990	2005	2006	2007	2008
Broad and Chestnut	x	79	44	x	126
38th and Spruce	x	x	129	163	188
Walnut Street Bridge	32	74	118	94	137
South Street Bridge	60	70	107	114	160
Chestnut Street Bridge	18	52	74	108	121
Market Street Bridge	19	46	73	68	68
Spring Garden Bridge	x	x	59	x	115
Schuylkill Crossings Total	x	x	430	x	601
Schuylkill Crossings (w/o Spring Garden)	129	x	371	x	486
Schuylkill Bridges	32	61	86	96	120
All Counted Bridges and Intersections	32	64	86	109	131

SOURCE: BICYCLE COALITION OF GREATER PHILADELPHIA

Department teamed up with LISC, a national financial intermediary, to create a revolving loan fund to improve struggling commercial corridors. With $2 million from the City and $3 million from LISC, the money will supplement the Commerce Department's $1.2 million Facade Improvement program and $12 million in federal tax credits for businesses that build in commercial corridors.

PHOTO BY PETER TOBIA

A SPOTLIGHT ON BIKES AND PEDESTRIANS

With plenty of flat surfaces, Philadelphia is an easy city to bike in. So it's no surprise that the city has a growing and thriving bicycle scene. About 11,000 Philadelphians currently bike to work each day, about 1.2 percent of the workforce. That number, however, obscures the high ridership found in Center City and does not count non-work bike trips. More than four out of five Philadelphians who commute on a bicycle live within four miles of City Hall (see map on p. 69).

And ridership is increasing rapidly. The Bicycle Coalition of Greater Philadelphia measured a 104 percent increase in cyclists crossing Schuykill River bridges during rush hour from 2005 to 2008, an annual growth rate of 27 percent (see table above). The Coalition credits the 2005 SEPTA strike, the 2008 rise in gas prices, completion of the Schuykill River Trail, awareness of global warming and a growing urban bicycle culture.

Philadelphia enjoys 205 miles of bicycle lanes and 32.1 miles of multi-use trails, although there are only four miles of dedicated lanes in Center City. Mayor Nutter created the position of Bicycle and Pedestrian Coordinator to work with nonprofit partners to increase the number of bike riders in Philadelphia and develop a citywide system of on- and off-street bike trails. The goal will be to encourage Philadelphia's drivers—particularly those who make trips between one and five miles—to get out of their cars and onto bikes.

Develop a Pedestrian and Bicycle Master Plan

The Philadelphia City Planning Commission is developing its vision for a continuous bicycle network in the city. This work involves revisiting and remapping the Bicycle Network's 1998 plan, examining how the physical environment has changed in the interim years. The new plan will also propose citywide policies for sidewalk design and uses within sidewalk space to protect pedestrian corridors. These recommendations could then be incorporated into the City's zoning code.

Build an East-West Bicycle Corridor

Although Philadelphia has an extensive bicycle network, little of it serves bicyclists in or near Center City, with its dense concentration of attractions and many residents.

The possibility of expanding Center City bicycle opportunities complements an effort that the Pennsylvania Environmental Council has undertaken to evaluate ways to route the East Coast Greenway through Pennsylvania and Philadelphia. The East Coast Greenway is a 3,000-mile bicycle and pedestrian trail that stretches from Maine to Florida, passing through the centers of the major cities of the East Coast. (It could be considered an urban counterpart to the Appalachian Trail.) One goal of the Greenway is to bring users into the center of cities where most tourist attractions are located. In Philadelphia, the Greenway planners would like to develop a safe pathway from the Schuylkill to the Delaware rivers through Center City.

To facilitate this concept, and to begin to address the problem of extending the bicycle network into Philadelphia's downtown neighborhoods, the Bicycle and Pedestrian Coordinator is evaluating how best to establish an east-west bike route in Center City.

Develop More Off-Road Bike Trails

Off-road trails have been shown to attract bicyclists, runners, walkers and others whenever and wherever they are built. The existing trails in Philadelphia are heavily used, even though they do not yet form a true network. Trail networks are valuable as recreational spaces, but they also form for bicycle commuters a sort of bicycle freeway system that allow bicyclists to travel more conveniently and comfortably than they can travel on city streets.

The Department of Parks and Recreation is currently making plans to complete the missing connection at Ridge Avenue between the trail that runs along the Wissahickon Creek and the Schuylkill River Trail. An extension of the Schuylkill River Trail through Manayunk is also being considered. Further south, the Schuylkill River Development Corporation (SRDC) will be letting a contract in May to develop a bike and pedestrian trail within the DuPont Crescent. It is also developing plans for an extension of the existing trail, which ends at Locust Street, to South Street where it will connect with bicycle and pedestrian facilities that are being incorporated into the new South Street Bridge. The SRDC is also coordinating the preparation of final design plans for a trail bridge that the Streets Department proposes to construct over the CSX railroad line adjacent to Schuylkill River Park. This bridge is needed to allow trail users to enter and exit the trail when rail cars block the at-grade crossing at Locust Street.

Along the Delaware River, a bike trail from Oregon Avenue to Penn's Landing is being created by the Center City District and will open in 2009, the first step in creating greater public access to Philadelphia's less hidden river.

Further north, the Delaware River City Corporation is developing plans for a continuous multi-use trail that would extend from Penn Treaty Park north to the Bucks County boundary.

Explore the Creation of a Bicycle-Sharing Program

Originating in European cities such as Paris and Lyon, the idea of a bike sharing program here in Philadelphia has gained momentum over the past two years. A bike sharing program enables a person to rent a bicycle at one of many unmanned stations located throughout a city and then return it to another location close to one's final destination. In January 2009, the Bicycle Coalition, using support from the William Penn Foundation, commissioned a study to explore what operational models might be appropriate for use in Philadelphia. Among other things the plan will define and estimate the size of the target market, assess the applicability of current bikeshare operational models, estimate capital and operating costs and determine what level of public investment would be needed to support such a program. The City will be working closely with the Bicycle Coalition over the next several months to work through these issues and hopes to have preliminary recommendations by late 2009.

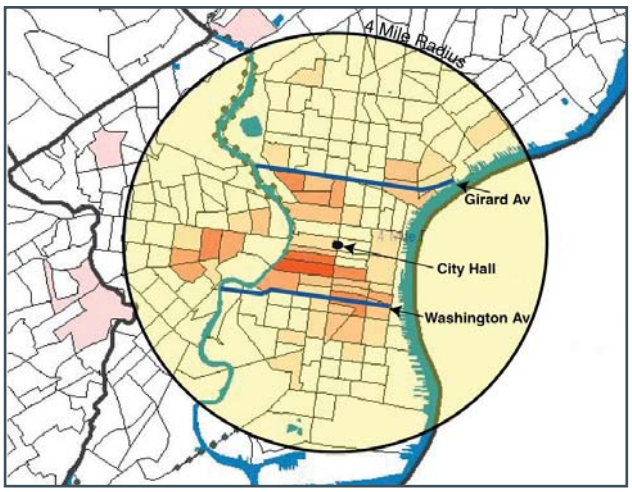
Expand the Number of Bike Racks

More than 1,400 new bike racks (designed by John Dowlin, a resident of Powelton Village and one of the leaders in the local biking movement) have been installed this past year in commercial districts, at SEPTA bus stops and train stations, outside civic institutions and on college campuses. In each case, community or business organizations or nonprofit groups have agreed to maintain the racks.

PHOTO BY PETER TOBIA

Bike Commuters 2000 Census

83% OF PHILADELPHIA BICYCLE COMMUTERS LIVE WITHIN 4 MILES OF CITY HALL



SOURCE: BICYCLE COALITION OF GREATER PHILADELPHIA

To bring even more racks to city neighborhoods, *Greenworks Philadelphia* supports MOTU's interest in working with the Parking Authority to reuse parking meter poles when the multi-space parking stations are installed. The MOTU would also like to continue to work with artists to develop creative and interesting designs for bicycle racks similar to the racks that artists have designed in the New Kensington neighborhood.

Create Bike Parking Stations

With more and more commuters using bicycles, more new racks will be needed along city streets. In areas with a high density of jobs and therefore a high demand for parking spaces, bike parking stations that could serve 50 or more bicyclists in a concentrated facility will need to be developed. One possible location is the below-ground, unused public space between the Municipal Services Building and the SEPTA concourse at Suburban Station. Access to that space with a bike is currently difficult. But elevators to a parking lot below the adjacent Love Park are about to be replaced and could be built to accept bicycles. The parking station itself would be owned and managed by a private entity. The City's Bicycle and Pedestrian Coordinator will advance this effort, coordinating with the Planning Commission and Public Property.

Design and Implement Complete Streets

In planning and (re)designing streets in Philadelphia, all modes of travel will be taken into consideration, including bicycles, pedestrians and transit vehicles, as well as cars—in other words, "complete streets." Intersections will be constructed with shorter distances between curbs, making it easier for cars to see pedestrians and pedestrians to cross streets. At intersections with traffic lights, more pedestrian signals with countdowns will be installed. Residential garage parking fronting on residential streets will be discouraged in dense urban neighborhoods so that the sidewalk area can remain a preserve for pedestrians. In commercial districts, access to parking and loading facilities will be designed to minimize disruption to pedestrian routes. *Greenworks Philadelphia* supports the work of the Planning Commission in these efforts to make streets friendlier for pedestrians.

Increase Traffic-Calming Measures

Traffic-calming refers to those roadway design elements that can be used to control vehicle speeds and, where appropriate, divert vehicle trips so that streets can better relate to the neighborhoods they were designed to serve.

There are numerous areas in Philadelphia where the use of traffic-calming measures would be appropriate, especially in areas located outside of Center City where traffic volumes are less dense and vehicle speeds can be higher.

Traffic-calming may be especially appropriate in University City, where a number of streets have been improved to provide enhanced access to Center City. As infill development begins to take place on the strip of land on the west bank of the Schuylkill River, planners have designed important traffic-calming measures that narrow lanes of traffic, offer rational pedestrian systems and green the area with trees and planters. These measures will enhance the anticipated redevelopment of Philadelphia's "Left Bank."

EXPAND CAR SHARING PROGRAMS

Car sharing services are emerging as an inexpensive and convenient means to travel within Philadelphia, enabling city residents to get rid of their own cars and associated insurance, gasoline and maintenance costs. Car sharing helps reduce the

number of cars on Philadelphia's streets and their attendant congestion, especially in high-density neighborhoods. *Greenworks Philadelphia* recommends that the City work with car share entities to expand this model into other neighborhoods, particularly low income, over the next seven years.

Change Tax Classification

In Pennsylvania, car sharing companies are classified for tax purposes as car rental businesses. But because the business model is different—multiple car share users "rent" the same car on any given day versus multiday, single-user rentals for companies like Avis and Hertz—car-share companies end up paying more. This is particularly true of the $2 flat fee per reservation charged by the Commonwealth anytime a new driver gets behind the wheel. A number of states have begun to reclassify car-sharing companies for tax purposes, recognizing the difference in their business model and their local versus tourist customer orientation. *Greenworks Philadelphia* proposes that a similar reclassification occur in Pennsylvania.

Provide On-Street Parking Spots

The Streets Department will continue to work with car sharing companies to provide designated on-street parking for their vehicles.

Reduce Parking Ratios for Buildings with Designated Bike and Car Share Spots

The current zoning code requires residential and commercial developers to create on-site parking spaces to accommodate residents or tenants. The current requirements overstate the use of automobiles in dense urban neighborhoods, particularly given the introduction and popularity of car sharing services in Philadelphia. Developers have begun to receive waivers for a few parking spaces from the Zoning Board of Adjustment when they include spots for car share services. As part of its Zoning Code review, the Zoning Code Commission should consider easing its current parking requirements when car share and bicycle spots are offered.

TARGET 13

Increase the State of Good Repair in Resilient Infrastructure

Even as Philadelphia envisions a future of new parks, a transformed Delaware riverfront, greened streets and new public buildings, *Greenworks Philadelphia* acknowledges that much of the city's existing infrastructure needs to be replaced or renovated. Assets are said to be in good repair "when no backlog of needs exists and no component is beyond its useful life." Using this definition, courtesy of SEPTA, over the next seven years *Greenworks Philadelphia* recommends that more of the City's infrastructure move into a state of good repair. Two departments, Streets and Public Property, will be primarily responsible for this effort, given their management of most City-owned buildings, streets and bridges.

The Department of Public Property has much work to do. Only 40 percent of its $4 billion inventory could currently be considered to be in a state of good repair. In 2007, the Pennsylvania Intergovernmental Cooperation Agency (PICA) issued an analysis of City-owned buildings, concluding that the City should be investing $143.2 million through fiscal year 2012, with HVAC systems accounting for $46 million, or 27 percent, of this total. These estimates were developed by a team of local architects and engineers who surveyed 3.5 million square feet of city facilities. Yet the City had only $91 million in capital funds available over that period. The report noted, for example, that 30 of the City's fire-department facilities lacked fire-detection systems and that the Central Library roof leaked so much that the building's ceilings were crumbling. A separate report by the City Controller's office in 2007 focused on Philadelphia's recreation centers and found numerous safety hazards, including exposed electrical wiring, as well as extensive water damage and unusable restrooms. These deficiencies exposed the City to lawsuits that cost taxpayers more than $4 million between 2003 and 2007.

	CAPITAL VALUE EQUAL TO...	AMOUNT IN SOGR* EQUAL TO...
SEPTA	$25 billion x SOGR = 65%	$16.25 billion
PUBLIC PROPERTY	$4 billion x SOGR = 40%	$1.6 billion
PWD	$18 billion x SOGR = 94%	$16.9 billion
STREETS/BRIDGES	$10 billion x SOGR = 67%	$6.7 billion
	TOTAL= $57 BILLION	**TOTAL= $41.45 BILLION, OR 73%**

***SOGR**=STATE OF GOOD REPAIR

SOURCE: CITY OF PHILADELPHIA PLANNING COMMISSION

At the time the PICA report was being prepared for release, the City agreed to create a facilities-management database to monitor and track the condition of its many buildings, allowing it to more systematically work through its deferred maintenance needs. It also pledged to develop an asset-tagging database so that Public Property could easily access basic information about its inventory. Currently the department must operate without a complete picture of the age of certain systems or structures and when parts might need service or replacement. Public Property has begun to survey its equipment and has to date inspected 50 percent of its existing inventory. However, this information has not yet been entered into a newly acquired asset-management system, called MAXIMO, because of insufficient resources.

There are two notable examples of departments that have worked to bring their infrastructure into a state of good repair. The Streets Department inspects all of the City-owned bridges on a two-year cycle and methodically works through a needed repair schedule. Unfortunately, however, Philadelphia's roads are currently not similarly inspected and inventoried.

The PWD, which operates as an enterprise fund, also has worked diligently over the past two decades to bring its infrastructure into a state of good repair. Today its 15-year average of water-main breaks per 1,000 miles is 231.2, below the national average of 270. The PWD replaces roughly 20 miles of water pipes and 8 miles of sewer pipes per year, systematically working through its infrastructure.

The current situation is a far cry from where the department was in the early 1980s. Facing a rapidly aging distribution system, the PWD undertook a comprehensive assessment of its distribution system infrastructure. This work led to the creation of a condition assessment tool that it still uses today and that enables the department to prioritize its water main–replacement work. The department has also utilized MAXIMO for its water and wastewater treatment buildings and pumping stations with excellent results. This system gives facility management and operating staff the ability to maintain the department's properties cost-effectively.

A capital facilities-assessment program was also developed to assess PWD's "bricks and mortar." Trained staff conduct inspections on a three-, five-or ten-year frequency according to a carefully developed schedule. Historical data are kept to monitor the deterioration of a defect from one inspection period to the next for comparison. These records give the department a chance to prioritize capital projects and to maintain system reliability while maximizing assets' useful life.

Finally, over the past 10 years a Geographic Information System (GIS) was created for all of the department's street and facility information. This system is now up and running and helps employees manage the department's records electronically.

As a result of this work, the PWD estimates that 94 percent of its infrastructure is in a state of good repair.

An estimated 73 percent of the City's buildings, streets, bridges, rail and water utility infrastructure is currently in a state of good repair. *Greenworks Philadelphia* seeks to raise that level to 80 percent by 2015.

Philadelphia must also begin to consider ways to adapt its infrastructure to changes in global climate. As noted in a 2008 report released by the Pew Center on Global Climate Change, "The question is no longer 'Is there human-caused climate change?' but 'What can be done to react and adapt to it?' " Although the report was aimed at the private business community, its advice to "identify and analyze emerging risks" applies to cities as well.

INITIATIVES

Investment in Public Property Management Systems

The City of Philadelphia owns 11.4 million square feet of buildings in 1,230 structures spread throughout every neighborhood. Its inventory consists of structures that were built in the 1800s and some built as recently as this past year. It owns libraries, recreation centers, fire and police stations, senior centers, health clinics, high-rise office buildings, prisons and even a forensic lab. Managing all these different types of buildings is a difficult and expensive job.

Greenworks Philadelphia supports the Department of Public Property's development of a facilities-management information system. Although the creation of this would cost between $2 million and $3 million dollars, it would avoid far larger future costs. The system would enable the department to better predict when facility repairs or major capital investments are needed and move more methodically through the City's deferred maintenance needs.

ESCOs will also be employed to help the City pay for some of its HVAC system upgrades or such items as window replacement since many of those investments would yield energy efficiencies.

Improve Road Maintenance and Upgrade Bridges

Smooth roads and sound bridges are safer for pedestrians and cyclists, more comfortable for transit riders and reduce wear and tear on every kind of vehicle. With updated data on road and bridge condition, the Streets Department can make wiser choices in how it invests its capital dollars. Currently, the City road repaving program is driven by data that is several years old. The City has recently started a roadway inspection program with the goal of updating all roadway condition data by the Fall of 2010. Using this information, and asset management software, the Streets Department will create a system to better plan its road maintenance program.

However, improved information is simply a first step. Significant financial resources are required to bring hundreds of miles of City roads and dozens of bridges into a state of good repair. The costs of asphalt, concrete and steel have reached record levels in recent years and the local labor market's wages have risen with inflation. These price increases

Paving Cost Ranges per Mile

PAVING TYPE	STREET TYPE	
	RESIDENTIAL	ARTERIAL
Recycled Asphalt[1]	$189,750	$522,720
Conventional	$310,500	$855,360

[1] The application of recycled asphalt, also known as hot-in-place asphalt is limited to certain settings. SOURCE: MAYOR'S OFFICE OF TRANSPORTATION AND UTILITIES

have, in turn, decreased the amount of work the City can accomplish with the same funding level. The estimated cost to upgrade the structurally deficient bridges is more than $230 million. The estimated cost to clear the repaving backlog in FY 2011 would require a roughly $35 million commitment with millions more each year to maintain a quality system. New methods, such as the use of recycled or hot-in-place asphalt, offer the City a way to decrease repaving costs. This system, which remixes asphalt that is milled from the existing roadway, reduces costs, construction impacts, energy consumption, and thousands of tons of asphalt waste every year.

Acknowledge Climate Change in Infrastructure Planning

Global climate change will create different weather patterns, storm-surge potential and rising sea levels, all of which could yield a very different Philadelphia in 50 years than the one we know today. A 2008 report by the Union of Concerned Scientists focused on what global climate change meant for Pennsylvania, using analyses conducted by the Northeast Climate Impacts Assessment (a collaborative scientific research effort) to support its conclusions. The report asserts that rising ocean levels caused by increasing global temperatures will have a severely negative impact on the Delaware River. River salinity would change, affecting drinking-water quality and manufacturing processes that draw water from the Delaware. Adjacent infrastructure—ports, oil refineries and the Philadelphia International Airport—could be affected as the river also rises and as the potential for severe storms and attendant surge increases.

With much of its infrastructure already lying within the 100-year flood plain, the City must begin to incorporate climate-change impact models into its long-range investment planning. What steps should be taken now to prevent catastrophic losses to Philadelphia's multibillion-dollar public and private infrastructure?

As was noted by a British company, Risk Solutions Ltd., in the Pew Center on Global Climate Change report, "Successful adaptation [to climate change] over the long term, however, requires recognizing and acting on threats from an early stage—often before they occur—and identifying appropriate proportionate responses." *Greenworks Philadelphia* acknowledges that Philadelphia must begin to understand those threats better.

TARGET 14

Double The Number of Low- and High-Skill Green Jobs

Greenworks Philadelphia calls upon the City to implement a strategy to take advantage of both the increased demand for affordable energy and the expected growth in the nation's renewable-energy sector. For Philadelphia's economy to capture those opportunities, its traditional economic development and training programs must be retooled. And Philadelphia must market itself as a "green" city that offers its businesses a competitive advantage because of its efficient public-transportation system, walkable neighborhoods and thriving central office district, temperate climate, plentiful water and access to freight rail and ports.

INITIATIVES

ECONOMIC DEVELOPMENT

But what precisely is a green job? *Greenworks Philadelphia* uses this definition promoted by the Apollo Alliance, a coalition of labor, environmental and business leaders: A green job is a well-paid, career-track opportunity that contributes directly to preserving or enhancing the environment. It could entail retrofitting buildings, installing solar panels, constructing transit lines or landscaping. While some green jobs are new occupations, most are existing jobs that demand new skills. For example, construction companies need workers who have both traditional carpentry skills and up-to-date training in energy-efficiency. Solar-installation employers need electricians.

Using a similar definition, a study released by the U.S. Conference of Mayors last year (see table below) found that in 2006, the Philadelphia metro area had 14,379 green jobs, and predicted that by 2038 it should have 113,772, a nearly 10-fold increase. But how does Philadelphia turn "should"

SOLAR BURSTS IN PENNSYLVANIA

The solar sector is particularly poised for growth here in Philadelphia over the next 18 months. A recently extended federal investment tax credit, coupled with a 35 percent cost rebate from the Commonwealth should make solar Photovoltaic (PV) systems affordable for both residential and commercial consumers. Their demand for system installations will spur the creation of new companies and new jobs.

Industry figures suggest that each megawatt of new solar PV creates 33 jobs: 20 to manufacture component parts and 13 to install and maintain the systems. The state's Advance Energy Portfolio Standard requires that 800 megawatts of solar energy be developed by 2019. With five megawatts of solar energy already being produced in the state, achieving the remaining 795 megawatts will lead to 15,900 manufacturing jobs and 10,335 installation and maintenance jobs here in Pennsylvania.

Philadelphia is well-positioned to capture a significant share of those jobs, because it is so close to other booming solar markets in New Jersey, Maryland and New York and is becoming a growing hub for the industry. The region has already attracted some key "magnet" companies, such as SunTechnics, a subsidiary of Conergy, one of the world's largest solar PV integrators. Other solar companies include AEPolysilicon, a Taiwanese silicon manufacturing company, and RSI Silicon. The Nutter Administration will work to attract even more of these companies.

into "will?" How does it double the number of low- and high-skilled green jobs in the short term? What policies, incentives and training programs should drive green development strategy?

As described in Section One, new federal investments in energy-efficiency and renewables, as well as related state mandates, will help create potentially substantial demand for green labor in Pennsylvania. Markets for energy-efficiency are already beginning to emerge. Industry experts agree that $1 million invested in energy-efficiency creates 21.5 new jobs. That means Pennsylvania's recent allocation of $92 million for energy-efficiency activities statewide could generate almost 2,000 positions.

While government can foster and stabilize market demand, private employers will ultimately be the ones creating green jobs. In Philadelphia, the emerging green economy consists of architectural and landscaping firms; urban agriculture and food distribution; small but growing weatherization and solar-installation companies; global-scale facilities for making wind, solar and biofuel technology; and, finally institutions doing path-breaking research and development. The Building Owners Management Association; the American Society of Heating, Refrigeration and Air-Conditioning Engineers; the Regional Labor Council of the AFL-CIO; the Delaware Valley Green Building Council; and many other private-sector employer and labor associations are working with the City to implement a green-jobs strategy.

Green building and retrofitting industries are growing in the region, thanks in part to new consumer demand and efforts by the Delaware Valley Green Building Council (DVGBC). Green building is becoming a market-driven industry as more and more residents and businesses seek to buy or rent energy-efficient and sustainable buildings. The DVGBC has promoted this growth through events and educational materials designed to help businesses understand the benefits and financial feasibility of building to LEED standards.

To foster a Green Economy in Philadelphia, *Greenworks Philadelphia* proposes and supports the following initiatives:

Conduct a Market Analysis

Through a grant from the John S. and James L. Knight Foundation, the Mayor's Office of Sustainability will study how legislation, regulations and the use of existing and potential development incentives will create demand for green jobs and businesses. This work will enable the City's Commerce Department to direct its efforts toward growing green jobs most effectively. The analysis will be completed in the fall of 2009.

Green Jobs 2006

25,021	NEW YORK
24,287	WASH., DC
21,250	HOUSTON

Los Angeles	20,136
Boston	19,799
Chicago	16,120
Philadelphia	**14,379**
San Francisco	13,848
San Diego	11,663
Pittsburgh	9,627

SOURCE: U.S. CONFERENCE OF MAYORS, GREEN JOBS IN METRO AMERICA, OCTOBER 2008

Create a Stakeholder Task Force

The City has created an internal group to share information about the green economy and help develop a strategy for future work. That group is being expanded to include representatives from business and economic development organizations, academic institutions, and labor, environmental and energy groups.

Raise Awareness

The Mayor's Office of Sustainability and the Commerce Department will begin to host an annual Green Economy Conference with key outside groups, such as the Energy Coordinating Agency and the Sustainable Business Network, to explain the City's strategy and highlight opportunities for green businesses.

Re-brand Philadelphia for Business Development Efforts

The City will develop brochures and other marketing material in partnership with external organizations that promote the city and region as a business location. These materials will describe the local green economy and highlight opportunities for job and business growth. Philadelphia will be branded as a city that has "gone green."

THE CENTER OF EXCELLENCE IN DISTRIBUTED POWER PRODUCTION AND MANAGEMENT

The development of distributed-power production and management systems is a key component of a smart electricity grid. A group of institutions located at the Philadelphia Navy Yard intends to establish a consortium that would address the development, education, and commercialization of new and improved technologies for distributed power-systems management and cyber security. The Center for Distributed Power Production and Management will bring together the considerable technical and business expertise of its founding members, which include the U.S. Navy, Ben Franklin Technology Partners, Penn State University, the Delaware Valley Industrial Resource Center, the Philadelphia Industrial Development Corporation, and the City's Commerce Department.

SMART ENERGY INITIATIVE

The Smart Energy Initiative (SEI) trains workers in solar PV installation, silicon and wind-turbine manufacturing, energy-efficiency, residential energy auditing, green building and LEED certification. Managed by the Chester County Economic Development Council, the initiative began in 2007 with the merger of similar existing efforts, one based in Philadelphia and the other in Chester County. From a core of 15 energy companies, it has since grown to more than 300, including Conergy, a solar-power company; Gamesa, a wind-turbine manufacturer; and Liberty Property Trust, a national real-estate developer with a local headquarters. To date, SEI has trained more than 300 workers. It is also working with the Philadelphia Area Labor-Management (PALM) committee that oversees the program to increase the number of Philadelphia high school students taking union apprenticeships. PALM has begun to explore with SEI how to build career ladders to construction-related green jobs.

JOIN

Philadelphia's Job Opportunity Investment Network (JOIN), funded through the National Fund for Workforce Solutions, is working to identify, recruit and evaluate new and marginally-employed workers and pair them with green job opportunities. JOIN will use community organizations to recruit potential trainees, assess their current skills and provide pre-training and work-preparation skills, such as improving literacy. The organizations will also assist trainees as they move through the course work and become employed. Partners include the Philadelphia Workforce Investment Board, the Smart Energy Initiative, the Greater Philadelphia Federation of Settlements, Energy Coordinating Agency, the Sustainable Business Network and the Mayor's Office of Sustainability.

Support and Connect Energy Research and Academia

Working with universities, venture-capital firms and research incubators like the Ben Franklin Technology Partners of Southeastern Pennsylvania (Ben Franklin) and the University City Science Center, the Mayor's Office of Sustainability and the Commerce Department will identify incentives and funding that would foster growth and innovation by renewable-energy and green-technology firms. Ben Franklin already provides capital and other support for emerging technologies and businesses that focus on energy. This effort is being funded by Governor Rendell's Alternative Energy Investment Act of 2008.

WORKFORCE DEVELOPMENT

Some of the earliest green jobs are likely to come from increases in federal weatherization funds, thanks to the American Recovery and Reinvestment Act of 2009. As banks and energy companies offer loans to help home owners weatherize, demand will rise for certified weatherization specialists. The total could be more than 800 workers needed within two years.

Demand for higher-skilled workers will require changes in construction and facilities-management programs, which do not currently offer energy-efficiency and renewable-energy classes. Neither do most of the city's vocational high schools and post-secondary training institutes.

There are also jobs directly connected to the "greening" of neighborhoods, such as planting trees, growing food in urban gardens and building infrastructure to manage stormwater runoff. These tasks provide entry-level opportunities for men and women entering the workforce or returning to it. Sustainable South Bronx and Chicago's Green Jobs Corps are examples of successful programs that could be replicated here. The latter specifically targets ex-offenders.

Fill the Need for Green Jobs

The City's economic-development agencies and departments are working with the Philadelphia Workforce Investment Board (WIB) to identify the skills needed by green employers and the training gaps that exist in current workforce-development programs. The WIB will then work with Community College of Philadelphia, local technical schools, high schools and workforce-training programs to ensure their curricula begin to reflect the emerging economic opportunities. Energy sector–specific efforts will include low-skill training in energy retrofits and high-skill training for energy auditors and solar-panel manufacturing.

PHOTO BY B. KRIST FOR GPTMC

Some of this new training is already beginning. Through a grant from the Knight Foundation, the Energy Coordinating Agency is creating a new 64,000-square-foot green-jobs training center in Kensington that will work with 200 men and women each year to give them the skills needed to retrofit buildings. Its first class of 20 trainees—many of them federal Temporary Assistance for Needy Families recipients—began work on April 13.

In addition, efforts will be made to train local workers in urban horticulture skills through partnerships with Penn State's cooperative extension, Delaware Valley College and W.B. Saul High School.

Diversifying Our Workforce

Demand for jobs related to energy-efficiency and weatherization creates an opportunity to provide new job training and career ladders to a diverse population of workers, both in union and non-union settings. The City is committed to using the recommendations from the Mayor's Advisory Commission on Construction Industry Diversity to begin the process of working closely with our building trades and other organizations so that everyone has an opportunity to participate in creating the city's new green infrastructure.

Create a Regional Green Jobs Training Center

The City will seek to establish a Regional Green Jobs Training Center based in Philadelphia to help satisfy the likely demand for workers that will be created by the new state and federal funding. The Center will work with multiple academic and workforce partners, such as the Community College of Philadelphia, to design a curriculum. It will also coordinate the efforts of various groups that would provide green-job training and skills.

Create a Green Job Corps

The Sustainable Business Network has begun work to develop a Green Job Corps here in Philadelphia. This initiative, which is also being funded by the Knight Foundation, will train workers for such jobs as green-roof installation and maintenance, brownfield remediation, urban forestry, and wetlands and estuary restoration.

SKYLINE WITH SCHUYLKILL RIVER PARK IN FOREGROUND

PHOTO BY PETER TOBIA

engagement

PHILADELPHIANS UNITE TO BUILD

A SUSTAINABLE FUTURE

TARGET 15

PHILADELPHIA IS THE GREENEST CITY IN AMERICA

Over the past nine months, the Mayor's Office of Sustainability has engaged in conversations with hundreds of Philadelphians from every city neighborhood. Through those discussions, which have also taken place on-line, Philadelphia's citizens have helped shape the ambitious goals, targets and initiatives that form *Greenworks Philadelphia.* Now it is time to expand that dialogue. In the coming months and years, we will reach out to residents and businesses who might not yet know what sustainability means, but who also have a stake in Philadelphia's future. Through this engagement, Philadelphians will come to understand that green isn't only about the environment; it's alson about finding a job and being able to afford to heat and cool your home.

The Mayor's Office of Sustainability now moves from planning and launching *Greenworks Philadelphia* to the more difficult job of implementation. Success with all the targets will require the effort and input of many partners—from our U.S. senators and representatives and their legislative counterparts in City Hall and Harrisburg, to countless local nonprofit organizations, businesses and residents. And nothing will be possible without the dedication and efforts of the City's workforce, particularly those operating departments that are already engaged in many of the described initiatives.

But Philadelphia's success is most dependent upon its citizens. Without their involvement, hard work, determination and enthusiasm, *Greenworks Philadelphia* will go nowhere. Thankfully, the city already benefits from the efforts of countless volunteers and civic organizations. In every neighborhood, citizens are planting trees, cleaning lots, caulking windows, recycling, encouraging bike riding and starting new green businesses. We must build on that foundation and expand its reach.

The Mayor's Office of Sustainability will now partner with other City departments, non- and for-profit partners to develop social marketing and education campaigns on a number of different fronts, including working with the Philadelphia School District to integrate sustainability into classroom les-

sons. The office will use new Web-based technologies to engage residents through two-way virtual communications and organizing tools. It will develop neighborhood-based competitions to help make reaching some of these targets fun and educational. And it will deploy good old-fashioned shoe leather to hit the streets and tell people directly how they can weatherize their homes or plant a tree. Through these efforts, every Philadelphian will be involved in the work needed to make the city more sustainable.

Specific engagement ideas have already been described in some of the previous sections, but they bear repeating here:

- A neighborhood-based recycling competition will be developed that tracks increased tonnage amounts by community.
- A block- or neighborhood-based energy-efficiency contest will be created, tracking household electricity, natural gas and water demand and determining who can decrease demand the most over a predetermined period.
- A social marketing campaign will be implemented that uses both traditional and new on-line and social networking technologies to encourage people to make their homes more efficient. Users of the Web site will be able to add their own testimonials, sign up for weatherization classes or schedule their own events.
- A citywide tree-planting campaign will be accelerated that uses Web 2.0 technology to facilitate volunteer activities and engage communities
- PECO and PGW will be encouraged to include information on their bills that compares a household's energy usage to a comparable house in the neighborhood. How much better are you at conserving energy than your neighbor?

While these efforts would be fun, the underlying messages would connote the seriousness of the issues and the imperative for action.

As is evident throughout this document, each one of the targets put forth in *Greenworks Philadelphia* can be easily measured. This was no accident. Targets that are grounded in readily available data will help Philadelphia assess its progress toward *Greenworks Philadelphia*'s objectives and provide the City government with management tools that will determine what is working and what initiatives need to be dropped. These data will hold us all accountable.

The Mayor's Office of Sustainability will track progress toward *Greenworks Philadelphia*'s targets with annual written reports that will describe the initiatives under way and both the outputs and outcomes that they have generated to date. The report will describe not just how many homes have been also weatherized, for example, but also how much energy demand was reduced as a result. This annual review will also examine the financial and environmental impacts of the initiatives proposed or already under way, helping City staff and the public determine what efforts yield the highest return on investment and where scarce resources should be dedicated. Finally, the annual review will reflect upon *Greenworks Philadelphia*'s goals and, in some instances, redirect or halt a project altogether, while introducing promising new methods to meet its targets.

But measurement will not occur only once a year. Relevant data will be made available to the public regularly and in forms that can be easily accessed and understood. The Mayor's Office of Sustainability has created and will manage a *Greenworks Philadelphia* Web site. This regularly updated site will feature data related to each of the targets, allowing residents to monitor progress and identify where more work must be done. For example, the Web site will post and track the amount of trash recycled in Philadelphia each month as well as the tonnage going to landfill. Information about City departments' monthly energy use will also be placed on-line. This openness and transparency will hopefully encourage all citizens to contribute to Philadelphia's sustainability effort and exchange constructive ideas about what else can be done to accomplish our goal of becoming the greenest city in America.

The launch of *Greenworks Philadelphia* represents only the first step in a long-term effort to rebuild Philadelphia as an even more vibrant, competitive and sustainable city. It offers up a number of ideas and proposals, some of which may ultimately give way to more promising ventures in coming years. especially since energy technology and economic forces are changing so rapidly.

But the core objective will never change. It cannot. Becoming environmentally smarter is not a choice but an imperative. *Greenworks Philadelphia* demands work, lots of it, from all of us. But we Philadephians have never been scared by hard work. And we know that someday soon, through our efforts, the workshop of the world will be transformed into the greenest city in America.

Becoming environmentally smarter
is not a choice but an imperative.
Greenworks Philadelphia demands work,
lots of it, from all of us. But we Philadephians
have never been scared by hard work.
And we know that someday soon,
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greenest city in America.

SUMMARY

INITIATIVES

CITY ENTITIES

AMS	Air Management Services
B&PC	Bicycle & Pedestrian Coordinator
Budget	Office of Budget
City Council	Philadelphia's City Council
Commerce	Commerce Department
Law	City Law Department
Public Property	Department of Public Property
Parks & Rec	Department of Parks and Recreation
Fleet	Fleet Management
HR	Human Resources
L&I	Licensing & Inspections
MOS	Mayor's Office of Sustainability
MOTU	Mayor's Office of Transportation and Utilities
OHCD	Office of Housing & Community Development
PGW	Philadelphia Gas Works
PHCD	Philadelphia Housing Development Corporation
PHA	Philadelphia Housing Authority
PHL	Philadelphia International Airport
PWD	Philadelphia Water Department
Planning	Philadelphia City Planning Commission
Procurement	Procurement Department
Public Health	Department of Public Health
RDA	Redevelopment Authority
Records	Records Department
School District	Philadelphia School District
Streets	Streets Department
SEPTA	Southeastern Pennsylvania Transportation Authority
ZCC	Zoning Code Commission

PARTNERS

DRCC	Delaware River City Corporation
DRWC	Delaware River Waterfront Corporation
Parking Authority	Philadelphia Parking Authority
PECO	PECO Energy
PHS	Pennsylvania Horticultural Society
PIDC	Philadelphia Industrial Development Corporation
PRPA	Philadelphia Regional Port Authority
PWDC	Philadelphia Workforce Development Corporation
SRDC	Schuylkill River Development Corporation
WIB	Workforce Investment Board

		Also Meets Targets	Lead City Agency	Partners	Target Completion Date
ENERGY	**TARGET 1:** LOWER CITY GOVERNMENT ENERGY USE BY 30 PERCENT				
	Energy Efficient Capital Investments				
	Triplex + City Hall ESCO project	2,5	MOS	Public Property	2010
	Target smaller, satellite buildings for ESCO investment (50 buildings)	2,5	MOS	Public Property	2015
	Implement Target Energy Budgets	2,5	MOS	Finance	2010
	Encourage Conservation Among Employees	2,5	MOS	Public Property	Ongoing
	Install New Lighting				
	Install motion sensing switches and timed lighting in City buildings	2,5	Public Property	MOS	2015
	Replace Yellow/Green Traffic Signal lights with LED	2,5	Streets	–	2010
	Upgrade Recreation Center Outdoor Lighting	2,5	Public Property	Parks & Rec, MOS	2015
	Include Energy Conservation In Future Building Maintenance Contracts	2,5	Public Property	MOS	2010
	Identify Less-Expensive and Alternative Electrical Sources	4,5	MOS	Procurement	2011
	Develop Energy Load/Demand Management Practices	2,5	MOS	Public Property	2011
	Create Capital Budget Energy Guidelines	2,5	MOS	Public Property, Finance	2010
	Use Future Energy Costs to Inform Building Acquisition/Expansion Decisions	2,5	Public Property	Finance, MOS	2010
	City Employee Car Management Plan	2,5,6,12	MOS	–	–
	Reduce City Fleet by 500 additional cars	–	Fleet	–	2009
	Increase average MPG in city fleet	–	Fleet	–	Ongoing
	Continue Car Sharing Program	–	Fleet	–	Ongoing
	Develop gasoline usage budgets for departments	–	Fleet	MOS, Finance	2011
	Investigate Conversion of City Buildings from Steam Loop to Natural Gas	5	MOS	–	Ongoing
	Five Year Strategic Energy Plan (Water Department)	2,4,5	PWD	–	2010
	TARGET 2: REDUCE CITYWIDE BUILDING ENERGY CONSUMPTION BY 10 PERCENT				
	Develop Energy-Efficiency Building Guidelines	3	L&I	MOS, Planning	2010
	Tie the Energy-Efficiency Code to Tax Abatements	3,5,6,7,8	Finance	Commerce, MOS	2010-11
	Grant Floor Area Ratio Bonuses	5	Planning, ZCC	Commerce	2011
	Fast Track LEED-Certified and Energy Efficient Buildings	–	L&I	–	2010
	Electronic Plan Development Review	–	L&I	–	2011
	Disclose Building Energy Use During Real Estate Transactions	4,6	MOS	Commerce	2011
	Create a Sustainable Energy Authority	3,4,5,7,8	MOS	Law	2011
	Reposition the Philadelphia Home Improvement Loan Program	3,5,14	RDA	MOS	2010
	Create Revolving Loan Fund for Tenant Improvement Work	3,5,14	Commerce	–	2010
	Develop Power Purchase Pools for Small Businesses	3,5	Commerce	MOS	2011
	Install Smart Meters	1,3,5,14	PECO	–	–
	Include Feedback on Utility Bills	3,5	PECO, PGW	–	2010
	Create Neighborhood Competitions	3,5	MOS	PECO, PGW	2010
	Develop a Citywide Energy-Efficiency Marketing Campaign	3,5	MOS	PECO, PGW	2010
	Work with School District to develop curriculum around sustainability (focusing on energy savings, recycling, trees)	5,7,10,11	School District	MOS	2011
	TARGET 3: RETROFIT 15 PERCENT OF HOUSING STOCK WITH INSULATION, AIR SEALING AND COOL ROOFS				
	Expand Current Low-Income Housing Weatherization Efforts	3,5,14	PHDC	OHCD	2010
	Use the Sustainable Energy Authority to Create a Scalable Weatherization Program	3,5,14	Future Energy Authority	MOS	2011
	Expand Scope of PGW's Weatherization Program and Increase Size	5,14	PGW	–	2010

		Also Meets Targets	Lead City Agency	Partners	Target Completion Date
ENERGY	**Build Energy-Efficiency into Public and Low-Income Housing**	3,5,14	PHA, RDA, OHCD	–	2010
	TARGET 4: PRODUCE AND GENERATE 20 PERCENT OF ELECTRICITY USED IN PHILADELPHIA FROM ALTERNATIVE ENERGY SOURCES				
	Promote Renewable Power Purchase Agreements for Public Buildings	5,14	MOS	–	Ongoing
	Reduce Regulatory Barriers to Solar Installation	2,5,14	MOS	–	2010
	Write a Guide for Solar Development	2,5,14	MOS	–	2010
	Report Solar Financing Options	2,5,14	MOS	–	Ongoing
	Explore Vertical Axis Wind Turbines for Public Roofs	5,14	MOS	–	2011
	Create Biogas Cogeneration Facility at Northeast Wastewater Treatment Plant	5,7	PWD	–	2011
	Recycling Deicing Fluid	5,7	PWD, PHL	–	Ongoing
	Install Geothermal System at Sewer Maintenance Facility	5,14	PWD	–	2011
	Explore ways to capture water power at Fairmount and Flat Rock dams (without compromising aesthetics)	5	PWD	–	2012
ENVIRONMENT	**TARGET 5:** REDUCE GREENHOUSE GAS EMISSIONS BY 20 PERCENT				
	Explore Opportunities for Philadelphia in Proposed Federal Cap and Trade Legislation	1,2,3	MOS	–	Ongoing
	TARGET 6: IMPROVE AIR QUALITY TOWARD ATTAINMENT OF FEDERAL STANDARDS				
	Retrofit Diesel Vehicles				
	Replace filters and add diesel oxidation catalyst equipment on all City's diesel vehicles	5	Fleet	AMS	Ongoing
	Require equipment used by private contractors on public works projects to adhere to AMS standards	5	AMS	Procurement	2010
	Increase the Use of Biodiesel Fuel in City Fleet				
	Purchase 420,000 gallons of biodiesel and increase by 5% every year	5	Fleet	Streets, AMS	Ongoing
	Increase the Fleet's Gas Mileage	5	Fleet	Procurement	2011
	Develop a Compressed Natural Gas Facility	5,14	AMS	MDO	2011
	Develop CNG fueling station	5,14	AMS	MDO	2011
	Purchase 15 CNG Trash Trucks	5	Fleet	Procurement	2011
	Purchase Hyrbrid Diesel Buses				
	SEPTA purchases 440 Hybrid Diesel buses	5	SEPTA	–	2010
	Facilitate Use of Electric Cars				
	Permit electric cars on city streets	5	MOS	State Legislature	2010
	Plugs in parking lots, city streets	5	Parking Authority	MOS	2011
	Increase the Number of Hybrid or CNG Taxis				
	Initiate Queuing Preference at Airport for Hybrid and CNG taxis	5	PHL	AMS	2011
	Congestion Reduction				
	Better enforce Anti-idling and double-parking regulations	5	Streets	Parking Authority	2009
	Expand Center City loading areas	5	Streets	–	2010
	Parking Policies				
	Consider the creation of demand pricing schemes	5,12	Streets	Parking Authority	2009
	Parking for Bicycles and Motor Scooters				
	Set aside at least 200 feet for on-street bicycle parking and 430 for motor scooters	5,12	Streets	–	2009
	Develop Green Ports Plan	5	PRPA	–	2009
	Implement Airport Green Plan				
	Increase purchase of renewable energy to 10% of total demand (from 8%)	4	PHL	–	2011
	Decrease emissions from rental car fleet	5	PHL	–	2010

		Also Meets Targets	Lead City Agency	Partners	Target Completion Date
ENVIRONMENT	Prohibit use of airplane idling for power at gates	5	PHL	–	Ongoing
	Use tugs to back-up aircraft at gates	5	PHL	–	Ongoing
	TARGET 7: DIVERT 70 PERCENT OF SOLID WASTE FROM LANDFILLS				
	RECYCLING				
	Incentives for Recycling	5	Streets	MOS	2010
	Expand Plastics Recycling	5	Streets	–	2011
	Increase Recycling at City Facilities	5	Streets	MOS	Ongoing
	Increase Oversight of Recycling in Commercial Buildings	5	Streets	–	2009
	Introduce Public Space Recycling	5	Streets	–	Ongoing
	Continue Event Recycling	5	Streets	–	Ongoing
	Expand Recycling at Transit Stations	5	SEPTA	–	Ongoing
	Construction and Demolition (C&D) Waste Management Program	5	L&I	Commerce	2011
	Electronic Recycling	5	Streets	–	2010
	Composting				
	Encourage household composting	–	MOS	Streets	2010
	Continue leaf composting in Fairmount Park	–	Parks & Rec	Streets	Ongoing
	REDUCING SOLID WASTE				
	Saving Money and Reducing Trash (SMART)	5	Streets	MOS	2010
	Other Waste-Minimization Efforts				
	Impose a small fee on/Ban plastic bags	5	City Council	MOS	2009
	Ban styrofoam containers	5	City Council	MOS, Health	2010
	Anti-Littering Campaign				
	Use internet to harness private sector to assist in regular city cleaning efforts	5	Streets	MOS	2010
	Paperless Office				
	Process municipal payroll electronically	–	HR	–	2010
	Place more public records, plan and documents on-line	–	Records	L&I	Ongoing
	Sustainable Procurement Policy	1,2,5,14	Procurement	MOS	2010
	ENERGY-FROM-WASTE				
	Study Energy-from-Waste Alternatives	4,5	Streets	MOS	2013
	Include Sustainability Criteria in Solid Waste Contracts	4,5	Streets	MOS	2010
EQUITY	**TARGET 8:** MANAGE STORMWATER TO MEET FEDERAL STANDARDS				
	GREEN INFRASTRUCTURE				
	Maintain Recent Stormwater Regulatory Changes	–	PWD	–	Ongoing
	Implement New Stormwater Fees	11,12	PWD	–	2010
	Increase the Number of Green Roofs				
	Require Roofs that Receive Tax Credit to be Able to Capture First Inch of Rainfall	2,3,5,11	City Council	PWD	2010
	Extend Green Roof Tax Credit to Residential Buildings	2,3,5,11,14	City Council	PWD	2010
	Create Building Code Guidance for Green Roofs	2,3,5,11	L&I	PWD	2010
	Install green roofs on public buildings where possible	2,3,5,11	Public Property	PWD, MOS	Ongoing
	Create Green Streets				
	Use Green Infrastructure Methods on City Streets	5,11,14	PWD	Streets	Ongoing
	Carry out Market Street, Lancaster Avenue, Passyunk Avenue demonstration projects	5,11,14	PWD	Streets	2011
	Transform Vacant Land				
	Increase amount of green, open space (see Target 9)	2,5,6,9,10,11,14	RDA	OHCD, Parks & Rec	Ongoing
	Create Wetlands	5,6,9,11,14	–	–	–
	Create new tidal/non-tidal wetlands along Delaware and Schuylkill Rivers	5,6,9,11,14	PWD	PWDC, SRDC, Parks & Rec	Ongoing

	Also Meets Targets	Lead City Agency	Partners	Target Completion Date
Create Urban Wetlands Registry	–	PWD	–	–
Restore Waterways				
Restore at least one mile of creeks and streams per year	5,6,9,11,14	PWD	Parks & Rec	Ongoing
Upgrade sections of Cobbs, Mill and Tacony Creeks for recreational usage	5,6,9,11,14	PWD	Parks & Rec	2011
Green Surface Parking Lots	2,11,14	–	–	
Allow the use of pervious pavement	–	ZCC	Planning	2010
Change Zoning Code to require more tree screening	2,11,14	ZCC	Planning	2011
Expand the Rain Barrel Program	–	PWD	–	Ongoing
Control Pollution and Trash on the Rivers	9	PWD	–	Ongoing
TARGET 9: PROVIDE PARK AND RECREATION RESOURCES WITHIN 10 MINUTES OF 75 PERCENT OF RESIDENTS				
CREATE OPEN SPACE AS PART OF NEIGHBORHOOD DEVELOPMENT				
Explore the Use of Innovative Financing for Open Space Development	2,5,6,8,9,11,14	Parks & Rec	RDA	2010
Prioritize New Green Space Creation Within Low-Served Neighborhoods	2,5,6,8,9,11,14	Parks & Rec	RDA, OHCD,PHA	Ongoing
DEVELOP PARKLAND AND OPEN SPACE CONNECTIONS ALONG THE CITY'S CREEKS AND RIVERS				
Schuykill River	2,5,6,8,9,11,14	SRDC	Commerce, Parks & Rec	Ongoing
Delaware River	2,5,6,8,9,11,14	DRWC, DRCC	Commerce, Parks & Rec	Ongoing
TARGET 10: BRING LOCAL FOOD WITHIN 10 MINUTES OF 75 PERCENT OF RESIDENTS				
INCREASE ACCESS TO FRESH FOOD				
Expand the Number of Neighborhood Farmers' Markets	12,14	MOS	–	–
Publicize Local Food-Source Efforts	12,14	MOS	–	–
Provide Technical Assistance	14	MOS	–	–
Leverage Vacant Land	8,14	RDA	MOS	–
Foster School-Based Efforts	–	–	–	–
CREATE DEMAND FOR LOCALLY GROWN FOOD				
Foster Commercial Farming	8,14	MOS	Commerce	–
Encourage Distribution of Healthy Food in Neighborhood Stores	–	–	MOS	City Council
Support Food Cooperative Expansion	–	–	MOS	Commerce
ENTREPRENEURSHIP AND WORKFORCE DEVELOPMENT				
Create an Urban Agriculture Workforce Strategy	14	MOS	WIB, PWDC	–
Support Green Kitchen Development	14	MOS	Commerce	–
COMBATING HUNGER				
Integrate Anti-Hunger Efforts Into Food and Urban Agriculture Goals	–	MOS	Public Health	–
TARGET 11: INCREASE TREE COVERAGE TOWARD 30 PERCENT IN ALL NEIGHBORHOODS IN 2025				
STREET TREES				
Change Street Tree Rules involving Property Owner Permission	2,5,6,8,14	Parks & Rec	Law	2010
Prioritize Tree Planting in Low-Canopy, High-Crime Districts	2,5,6,8,14	Parks & Rec	–	Ongoing
Target Empty Tree Pits	2,5,6,8,14	Parks & Rec	–	Ongoing
Strengthen and Increase Public-Private Maintenance Partnerships	2,5,6,8,14	Parks & Rec	–	Ongoing
Fully Stock Street Trees Adjacent to All City Facilities	1,2,5,6,8,14	Public Property	Parks & Rec	2012
Revise the Zoning Code Regarding Trees for Surface Parking Lots	2,5,6,8,14	ZCC	Parks & Rec	2010
Decrease the Cost of Tree Planting	2,5,6,8	Parks & Rec	–	Ongoing
ACCELERATE CITY-WIDE TREE PLANTING EFFORTS				
Public Tree Planting Campaign	2,5,6,8	Parks & Rec	PHS	2010
Create Urban Tree Forest Management Program	2,5,6,8	Parks & Rec	PHS	2010
Initiate City-Based Growing	2,5,6,8,14	Parks & Rec	RDA, PHS	2011

EQUITY

		Also Meets Targets	Lead City Agency	Partners	Target Completion Date
ECONOMY	**Green the Schools**	2,5,6,8,9,14	School District	Parks & Rec, PWD	Ongoing
	Explore Tree Planting Money in American Recovery and Reinvestment Act of 2009	2,5,6,8,14	Parks & Rec	MOS	2009
	Launch Local Carbon Offset Market	2,5,6,8,14	MOS	Parks & Rec	2009
	TARGET 12: REDUCE VEHICLE MILES TRAVELED BY 10 PERCENT				
	PUBLIC TRANSIT				
	Develop New Fare Card Technologies	5	SEPTA	–	2012
	Further Improve Service and Safety	5,14	SEPTA	–	Ongoing
	Invest in Current Transit Infrastructure	5,13,14	SEPTA	–	2010
	Ensure Sustained Transit Funding	5,13,14	SEPTA	Legislative Office	–
	Plan for an Expanded Transit System	5	SEPTA	MOTU, Commerce	2010
	Make Transit-Oriented Development Investments	5,13,14	MOTU	SEPTA, Commerce	2010
	PEDESTRIAN & BIKE FRIENDLY STREETS				
	Upgrade Commercial Corridors	5,13,14	Commerce	Streets	2011
	Develop a Pedestrian and Bicycle Master Plan	5	Planning	B&PC	2010
	Build an East-West Bicycle Corridor	5	B&PC	Planning	2011
	Develop More Off-Road Bike Trails	5	Parks & Rec	Planning, B&PC	Ongoing
	Explore the Creation of a Bicycle-Sharing Program	5	B&PC	Planning	2009
	Expand the Number of Bike Racks	5	Streets	B&PC	Ongoing
	Create Bike Parking Stations	5	B&PC	Planning	2010
	Design and Implement Complete Streets	5	Streets	Planning	Ongoing
	Increase Traffic-Calming Measures	5	Streets	Planning	Ongoing
	EXPAND CAR SHARING				
	Change Tax Classification for Car Share Programs	5	State Legislature	MOS, Fleet	2010
	Provide On-Street Bicycle Parking Spots	5	Streets	B&PC	2011
	Reduce Parking Ratios for Buildings with Designated Bike and Car Share Spots	5	City Council	ZCC	2009
	TARGET 13: INCREASE THE STATE OF GOOD REPAIR IN RESILIENT INFRASTRUCTURE				
	Investment in Public Property Management Systems	1,2,5	Public Property	–	2010
	Improve Road Maintenance and Upgrade Bridges	–	Streets	–	Ongoing
	Acknowledge Climate Change in Infrastructure Planning	1,5	Planning	MOS	Ongoing
	TARGET 14: DOUBLE THE NUMBER OF LOW- AND HIGH-SKILL GREEN JOBS				
	ECONOMIC DEVELOPMENT				
	Conduct a Green Jobs Market Analysis	–	MOS	Commerce	2009
	Create a Green Economy Stakeholder Task Force	–	Commerce	MOS	2009
	Raise Awareness about Green Jobs	–	Commerce	MOS	Ongoing
	Re-brand Philadelphia for Business Development Efforts	–	Commerce	MOS	2010
	Support and Connect Energy Research and Academia	–	Commerce	–	2009
	WORKFORCE DEVELOPMENT				
	Fill the Need for Green Jobs	–	WIB, PWDC	MOS	Ongoing
	Diversify the Green Workforce	2,3,5	WIB, PWDC	–	Ongoing
	Create a Regional Green Jobs Training Center	2,3,5	Commerce	MOS	2009
	Create a Green Jobs Corps	2,3,5,8,9,10,11	Commerce	MOS	2010
ENGAGEMENT	**TARGET 15:** PHILADELPHIA IS THE GREENEST CITY IN AMERICA				
	ENGAGE				
	Reach Out to Stakeholders	–	MOS	–	Ongoing
	Develop Social Marketing and Public Education Campaigns	–	MOS	–	Ongoing
	EVALUATE				
	Use Data to Measure Results	–	MOS	–	Ongoing
	Publish Annual Review	–	MOS	–	Ongoing
	Create Regularly Updated Website	–	DOT	MOS	2009

SUMMARY

REDUCTIONS

Initiative Name	GHGs reduced ($MTCO_2E$)	Renewable MWh Generated	MWh Reduced	MMBTU Reduced (Electricity only)	MMBTU Reduced (electricity not included)	VMT Reduced	Waste diverted from landfills (tons)
Triplex + City Hall ESCO project (decrease energy demand by 20%)	7,514	–	9,667	33	28,563	–	–
Target smaller, satellite buildings for ESCO investment (50 buildings)	12,070	–	13,959	48	60,946	–	–
Create Dept Target Energy Budgets (decrease demand by 10% in FY 2010)	167,016	–	22,113	75	88,539	–	–
Replace City Hall interior lights with LED	661	–	1,065	4	–	–	–
Replace Yellow/Green Traffic Signal lights with LED	5,756	–	9,274	32	–	–	–
Develop 5-year strategic energy management plan for PWD	62,253	–	50,876	174	578,691	–	–
Reduce City Fleet by 500 additional vehicles	4,887	–	–	–	68,085	–	–
Increase average MPG in city fleet	8,985	–	–	–	125,188	–	–
Develop gasoline usage budgets for departments	5,990	–	–	–	83,459	–	–
Develop 2.3 MW of Solar Energy by 2011	1,781	2,869	–	–	–	–	–
1 MW project at Baxter Treatment	774	1,248					
1 MW project at Navy Yard	774	1,248	–	–	–	–	–
Construct a 4 mW biogas cogeneration facility in Northeast Phila	171,664	32,587	–	–	–	–	–
Weatherization of 100,000 Homes	239,797	–	258,176,651	880,889	1,500,880	–	–
Purchase 420,000 gallons of biodiesel in FY09 and increase by 5% every year	1,019	–	–	–	–	–	–
Fleet conversions to CNG	15,671	–	–	–	–	–	–
SEPTA purchase 460 Diesel Hybrid buses	16,796	–	–	–	–	–	–
Incentives/Mandates for Hybrid Taxis	43,197	–	–	–	–	–	–
Increase Curbside Recycling Diversion to 25%	358,788	–	–	–	–	–	93,980
Implement Pay-As-You Throw program	591,808	–	–	–	–	–	227,552
Explore possibility of building waste-to-energy facilities in city (one average facility)	36,458	195,402	–	–	–	–	329,885
Public Transportation System—Operations (reduce VMT by 10% by switching those miles to public transit)	214,365	–	–	–	–	679,359,689	–
Bike & Pedestrian Programs (1% VMT reduction)	34,995	–	–	–	–	69,133,068	–

GREENWORKS PHILADELPHIA

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ACKNOWLEDGMENTS

Greenworks Philadelphia represents the hard work and aspirations of the many Philadelphians who believe that the city's best days lie ahead. Their efforts to make Philadelphia the greenest city in America inspired the Mayor's Office of Sustainability, and to all of you, we say thanks. We also salute our colleagues in City government who created the Sustainability Working Group long before most people even knew what going green meant. *Greenworks Philadelphia* would not have been possible without the groundwork that you laid. We gratefully acknowledge and thank the members of the Mayor's Sustainability Advisory Board, who provided helpful feedback and guidance through the many drafts and iterations of the framework's goals and targets. Finally, *Greenworks Philadelphia* would never have been created without the generous support of the William Penn Foundation, which, like its namesake, believes that Philadelphia should be a green country town.

DESIGN: Willie • Fetchko Graphic Design

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