



NATIONAL VOLUNTEER FIRE COUNCIL

A Guide for **Going Green**  
in the Fire Service

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In today's world of rising fuel costs and global climate change, the concept of "going green" has become a part of everyday vernacular. This new "green" way of thinking is being cultivated all across the country, especially at the state and local level.

Green practices are not only good for the environment; they are also beneficial cost-saving measures. Many departments across the nation routinely deal with budget constraints and shortages. Simple green practices can help lower operating costs and positively impact the bottom line. Additionally, if a station has a large budget, is undergoing major renovations, or is being completely rebuilt, green construction is an option that can have cost-saving benefits throughout the life of the building.

Citizens and businesses across the country are taking steps to go green in their daily lives. The fire service is not immune to the changes taking place within a more environmentally conscious society. Sustainable, environmentally-friendly practices are gaining momentum in a world of energy and climate insecurity. The fire service is in a unique position to embrace these practices. Fire departments are pillars of the community, a place for interaction and education. While the first priority of firefighters will always be keeping their communities safe, fire departments also have the opportunity to act as an innovative leader in green practices within their communities and in the nation.



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# Tips for Going Green

Going green does not always have to be complicated or expensive. In fact, sometimes the little things really do make a big impact. Here are a few ideas your department can implement at relatively little cost that are beneficial to both the planet and the pocketbook.

- **Switch to compact fluorescent light bulbs.** This simple change significantly reduces greenhouse gas emissions while also slashing energy costs. Fluorescent bulbs use up to 75 percent less energy than incandescent light bulbs and last up to 10 times longer. According to ENERGY STAR, a program of the Environmental Protection Agency and Department of Energy, if every home in America replaced just one incandescent light bulb with its fluorescent counterpart it would save enough energy to light more than three million homes and save greenhouse emissions equal to 800,000 cars. Fluorescent bulbs are inexpensive and provide a quick return on investment. Additionally, simply turning off lights when a room is not being used can make an impact. If your department has the funds, installing light sensors will automatically regulate energy consumption.
- **Recycle.** By now everyone has heard the mantra of “Reduce, Reuse, and Recycle.” Recycling materials and waste is one of the easiest ways to reduce your environmental impact. The EPA estimates that on average, each one of us produces 4.6 pounds of waste everyday which adds up to 251 million tons of municipal solid waste per year. A simple change in disposal habits can significantly reduce this impact. Aluminum, paper, glass, and plastic are materials that are readily recycled in most municipalities. Check with your local government to determine what materials are collected for recycling and to receive the proper disposal bins.
- **Use recycled products.** Many products are now made of recycled materials. Paper products like paper towels, toilet paper, and copy paper can easily be found in stores. Look for products that are made either entirely or partially from recycled materials.
- **Go paperless.** Most offices have an abundance of paper waste, but with the improvement of technology paper is becoming less necessary for conducting business. Convert as many of your records as possible into electronic format and cut down on waste by using email rather than the fax machine or standard mail. Also be sure to recycle any paper you are ready to discard.
- **Insulate drafty windows or doors.** Cracks and poor insulation can dramatically impact heating and cooling costs. Insulating plastic sheets can be secured over the interior side of windows, and weatherstripping can be placed around doors. Installing a programmable energy-efficient thermostat can help regulate the interior temperature and cut down on energy costs. If your department has the financial means to do so, installing energy-efficient windows and doors will make a big difference in both the winter and summer months. Adding insulation to walls, foundations, and ceilings will also help conserve energy.
- **Adjust the thermostat.** Setting your thermostat a few degrees lower in the winter and a few degrees higher in the summer can help to save on expensive heating and cooling costs.
- **Save water.** Water bills can be expensive. Simple steps can help to reduce the overall cost of your department’s bill. Low-flow showerheads can be installed in locker rooms, and faucet aerators can be added to each faucet in the station to conserve heat and water while keeping water pressure high. Repair leaky faucets and running toilets, as those can drain water bills as well. If your station has landscaping, plant drought-tolerant native plants that do not require excessive watering.
- **Unplug appliances.** Unplugging appliances when they are not in use can save energy and cut costs. “Smart” power strips that recognize when an appliance is not in use and cuts off energy sources can also be purchased.



- **Use energy efficient products and practices.** Buying new energy-efficient products such as appliances for your department is another simple way to reduce costs. Look for the ENERGY STAR label to ensure low emissions and high consumer quality. According to ENERGY STAR, Americans saved enough energy in 2009 alone to avoid greenhouse gas emissions equivalent to those from 30 million cars and saved nearly \$17 billion on their utility bills.<sup>1</sup>

- **Use natural and renewable energy sources.** The initial cost of implementing natural energy sources such as solar, wind, and geothermal energy may be large, but the savings will be well worth it in the long run. Alternative energy systems can provide electricity for homes, businesses, fire stations, and remote power needs. Installing solar panels is an option to harness the sun's energy to produce electricity for consumption. Geothermal heat pumps can also be installed to regulate the heating and cooling of a structure.<sup>2</sup> If a station does not want to install an alternative energy system, check with the power company about receiving energy from natural sources. Some companies offer the option of purchasing "green power." If retail electricity competition is allowed in your state, you may be able to purchase a green power product from an alternative electricity supplier.

Even if your state is not implementing electricity market competition, you may still be able to purchase green power through your regulated utility by tapping into "green pricing" programs. Green pricing refers to an optional utility service that allows customers to support a greater level of utility investment in renewable energy by paying a premium on their electric bill to cover any above-market costs of acquiring renewable energy resources.<sup>3</sup>

- **Make cleaning supplies or buy non-toxic varieties.** Household ingredients such as baking soda, vinegar, lemon, and soap can be used to make effective, non-toxic cleaning products. Not only is making your own cleaning products easy, it also saves money and improves indoor air quality. If making cleaning

products is not preferable, search for brands that are non-toxic and made from natural ingredients.

- **Use biodiesel fuels.** Biodiesel is a clean burning alternative fuel, produced from domestic, renewable resources such as plant oils, animal fats, used cooking oil, and even new sources such as algae. Biodiesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a biodiesel blend. Biodiesel blends can be used in compression-ignition (diesel) engines with little or no modifications. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics.<sup>4</sup> Although biodiesel can cost more than petrodiesel, diesel drivers can transition to biodiesel without purchasing new vehicles. As an alternative to diesel, biodiesel provides significant greenhouse gas emission reductions. The B100 blend reduces lifecycle greenhouse gas emissions by more than 50 percent, while B20 reduces greenhouse gas emissions by at least 10 percent.<sup>5</sup>

- **Conduct an energy audit.** An energy audit helps to determine how much energy a structure consumes and what measures can be taken to become more energy efficient. An audit can be completed simply by conducting a detailed walkthrough of the station searching for air leaks; checking insulation levels in ceilings, walls, and floors; inspecting heating and cooling systems; and ensuring the proper light bulbs are being used. If conducting an energy audit on your own seems difficult, a professional can be brought in to do a thorough inspection. Make a list of potential problem areas before the auditor arrives and have copies of utility bills on hand. Your state or local government should be able to help you locate a company that specializes in energy audits.<sup>6</sup>

<sup>1</sup>[www.energystar.gov/index.cfm?c=about.ab\\_index](http://www.energystar.gov/index.cfm?c=about.ab_index)

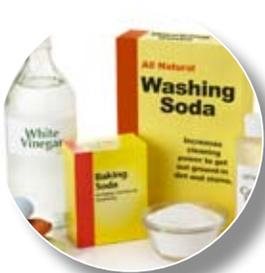
<sup>2</sup>[www.eere.energy.gov/basics/renewable\\_energy/geothermal.html](http://www.eere.energy.gov/basics/renewable_energy/geothermal.html)

<sup>3</sup><http://apps3.eere.energy.gov/greenpower/buying/index.shtml>

<sup>4</sup>[www.biodiesel.org/](http://www.biodiesel.org/)

<sup>5</sup>[www.epa.gov/otaq/renewablefuels/420f09064.pdf](http://www.epa.gov/otaq/renewablefuels/420f09064.pdf)

<sup>6</sup>[www.energy.gov/](http://www.energy.gov/)



# Green Construction

Many departments take simple steps like recycling and using energy efficient light bulbs and appliances while others have the opportunity to start from scratch with the construction of a new station. Green construction is a growing trend in towns and cities across the country. In some places, mayors and township administrators are starting to require green standards in public buildings, including fire stations.

According to the Environmental Information Administration's 2008 Annual Energy Outlook report, the impact of the nation's buildings on resources is profound. Building resource consumption is roughly 40 percent of primary energy use, 72 percent of electricity consumption, and 39 percent of carbon dioxide emissions – surpassing both transportation and industry. Furthermore, the 2000 U.S. Geological Survey found that 13.6 percent of the nation's potable water consumption occurs in U.S. buildings.

Green buildings can reduce energy use by 24 to 50 percent<sup>7</sup>, carbon dioxide emissions by 33 to 39 percent, water use by up to 40 percent, and solid waste production by up to 70 percent<sup>9</sup>. In addition to being beneficial to the environment and the bottom line, green buildings also provide a more positive work environment. Since most people in the United States spend, on average, 90 percent or more of their time indoors, green buildings can enhance the occupant's experience by providing better indoor air quality and natural lighting.<sup>10</sup>

Green building is on the rise in the public sector. Government buildings are in a unique position to set an example for the private sector and other public buildings across the nation. Not only do green buildings in the public sector convey the importance of environmental sustainability, but they also result in a significant reduction of costs and millions of dollars in tax-payer savings. Building green is a responsible way to improve the environment and potentially assist in expanding markets for sustainable practices.

## United States Green Building Council's LEED Rating System

Designed by the United States Green Building Council (USGBC), the Leadership in Energy and Environmental Design (LEED) Rating System is the accepted standard for determining the environmental friendliness of a building.

Many townships and municipalities have turned to these standards for guidance. But is “going green” worth the extra cost to comply with these standards? According to the USGBC, an upfront investment of two percent will result in a savings of twenty percent over the building's lifespan. Several new fire stations have been or are now being built as LEED certified structures.

<sup>7</sup>Turner, C. & Frankel, M. (2008). Energy performance of LEED for New Construction buildings. Final report.

<sup>8</sup>Kats, G. (2003). The Costs and Financial Benefits of Green Building: A Report to California's Sustainable Building Task Force.

<sup>9</sup>GSA Public Buildings Service (2008). Assessing green building performance: A post occupancy evaluation of 12 GSA buildings.

<sup>10</sup>The Total Exposure Assessment Methodology (TEAM) Study. EPA 600/S6-87/002. U.S. Environmental Protection Agency. 1987.



There are different LEED rating systems depending on the scope of your project. For projects pertaining to the building or modification of an entire building, there are rating systems for new construction projects and for existing buildings' operations and maintenance. For projects that only apply to specific building components such as mechanical/electrical/plumbing systems, there are rating systems for commercial interiors and for core and shell construction. It is important to examine each rating system to determine which one is applicable to your project.

LEED Certification is awarded to completed green projects based on a points system. Points are awarded when a project satisfies the green building criteria outlined by the USGBC. Point totals for each project are out of a total of 110 and are used to determine which level of LEED Certification the completed project has earned. The four levels of LEED Certification are:

- Certified (40-49 points)
- Silver (50-59 points)
- Gold (60-79 points)
- Platinum (80-110 points)

USGBC provides checklists for project managers to decide what green practices are feasible for their construction project and what level of LEED Certification is realistic. The 2009 LEED Rating System checklists include a variety of green practices listed in seven defined categories:

- **Sustainable Sites:** Points are for green practices that reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust generation.
- **Water Efficiency:** Points are for green practices that increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.
- **Energy and Atmosphere:** Points are for green practices that verify that the project's energy-related systems are installed and calibrated to perform according to the owner's project requirements, basis of design, and construction documents.

- **Materials and Resources:** Points are for green practices that facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

- **Indoor Environmental Quality:** Points are for green practices that enhance indoor air quality in buildings, and improve the comfort and well-being of occupants.

- **Innovation and Design Process:** Points are for green practices that provide design teams and projects the opportunity to achieve exceptional performance above the set requirements.

- **Regional Priority Credits:** Points are for green practices that address geographically-specific environmental priorities.

Points are awarded in each category for each completed item on the checklist. The total number of points added from each category is the final point total and determines the level of LEED Certification for the project.

Becoming a LEED Certified building requires dedication and meticulous documentation. All projects must officially be registered with USGBC and extensive preparation should be completed before construction begins. The USGBC has a variety of resources, educational tools, and reference guides to help navigate the process of LEED construction and Certification. Access all of these resources and more at [www.usgbc.org/](http://www.usgbc.org/).



# Snapshots: How Departments are Going Green

Departments all over the country are seizing the opportunity to go green. The following departments are examples of a growing number of environmentally-conscious fire stations:

## **City of Denton Fire Department Station No. 7** Denton, TX

The City of Denton chose one of their fire stations to be the first green building in the city. According to an article from WFAA-TV, Denton will construct a LEED Certified fire station from the ground up – the first of its kind in North Texas.

- Fire Station No. 7 will be 30 percent more energy efficient and use 35 percent less water than its predecessor.
- The facility will use recycled construction materials and have cisterns to store rainwater for water conservation purposes.
- A geothermal well system will use the earth's natural temperature to control the temperature inside the building.
- Construction cost the city an additional \$200,000 up front, but it is estimated the green building will save the city over \$1 million over the years.

## **City of Lawrence Fire Department** Lawrence, KS

According to the city's web site, emergency vehicles in Lawrence recently launched a pilot program that installed solar panels on the roofs of fire trucks and ambulances to save money on gas and cut down on emissions. Crews are able to turn off the trucks when at a routine stop to avoid using fuel while idling and keep the on-board computers powered.

## **North Menomonie Fire Station** Menomonie, WI

According to the Dunn County News, the Menomonie Fire Station was built with several green features, including:

- Storm water management in the form of a rain garden that will accept water from the roof of the building
- Translucent windows to bring natural light farther into the building to help control electricity costs
- Tinted and reflective glass to cut down on heat absorption and to reduce cooling costs
- Carpet and porcelain tile made of recycled material
- A white roof that reflects heat and light and reduces cooling costs
- Energy efficient furnaces and gas water heaters and heat tape on hot water lines
- Motion sensors throughout the building
- Fluorescent lighting throughout the building

## **Throckmorton Ridge Fire Station** Mill Valley, CA

According to Swinerton Incorporated, the construction management company used for the Throckmorton Ridge Fire Station, the station is a LEED Silver Certified structure using a variety of green features, including:

- Photovoltaic solar power system
- Underground geothermal system
- Low-VOC (Volatile Organic Compounds) materials
- Recycled-content materials



### **City of Columbus Fire Station 10** Columbus, OH

According to the Columbus City Council, the new Station 10 was the city's first LEED Certified project. The LEED Gold Certified station incorporates a variety of green features, including:

- Energy-efficient lighting
- HVAC systems
- Water usage efficiency
- Recycled building materials
- Triple pane windows
- Polished concrete floors
- Insulation

### **Berkley Hills Fire Station** Berkley, CA

The City of Berkley made the Berkley Hills Fire Station the first city building to achieve LEED Certification. City of Berkley leaders and planners see green building as a sound investment and made sure the fire station was outfitted with several green features, including:

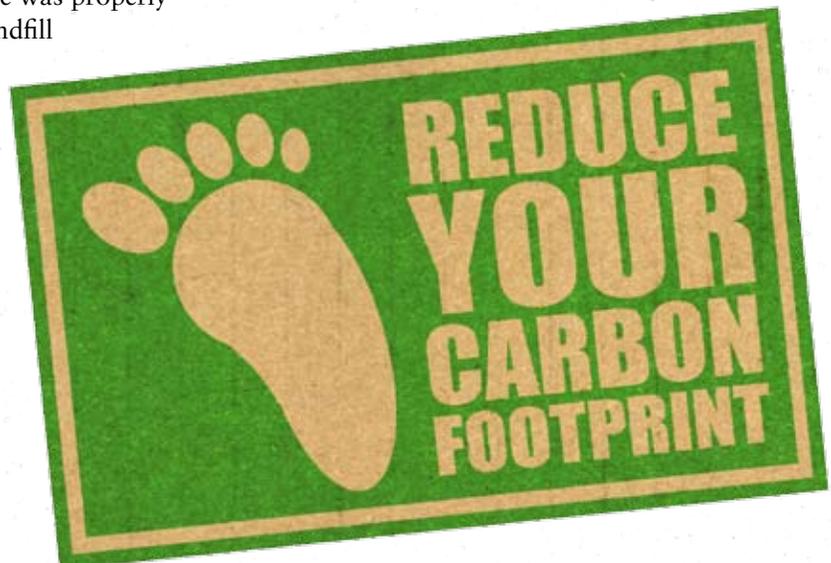
- Landscaping that conserves water and reduces waste
- Permeable paving that reduces storm water runoff, recharges groundwater aquifers, and allows soil microbes to naturally filter and treat pollutants
- The installation of extra insulation, high-performance windows, and high-efficiency lighting, appliances, and mechanical systems
- 75 percent of construction waste was properly recycled and diverted from the landfill

### **Southwood Volunteer Fire Department** Onondaga, NY

The Southwood Volunteer Fire Department buys 100 percent of its energy from green sources according to the United States Environmental Protection Agency (EPA). The department is a member of the EPA's Green Power Partnership and buys wind and solar generated electricity. Though it costs the department about \$170 more a year in energy costs, the department is excited about and committed to green practices.

### **Manhattan Beach Fire Department** Manhattan Beach, CA

The City of Manhattan Beach is undertaking a going green movement and the fire department has become a champion for the cause. The department formed a "Green Team" to identify ways to increase energy efficiency, recycling and waste reduction, and water conservation. Personnel have signed a going green pledge and have distributed information about recycling and water conservation. They also handed out reusable grocery bags for everyday use. Fire personnel are committed to working with the department and the city to continue to promote green practices throughout the community.



# A Closer Look: Spotlight on Green Departments

 **Tualatin Valley Fire and Rescue Station 53**  
Beaverton, OR

After years of planning, 14 months of construction, and \$2.25 million dollars, the green Station 53 came to fruition. Replacing an outdated, undersized, and potentially unsafe building, Station 53 offers state-of-the-art features and a safe environment for personnel.

Station 53 showcases a variety of green features. The structure was built using local, low-Volatile Organic Compounds (VOCs) and recycled materials. Close attention was paid to reducing energy and water consumption within the station. A 3,000 gallon cistern collection system irrigates native and drought-resistant landscaping and rain water is captured and used for toilets. The station has an on-demand water heating system and solar panels are used to preheat water. Low flow shower heads are also installed in the living quarters. Special precautions are used to ensure surface water is protected from potentially hazardous runoff. When crews wash apparatus, a valve is switched within a special trench drain that diverts suds from runoff into the sewer and not into surface water.

The station is equipped with optical sensors that automatically control lighting based on the amount of natural light entering the room. Motion sensors can

also be found throughout the building. The facility has a hybrid HVAC system that is able to harvest energy from different parts of the building that are not being used and reroutes the flow to where heating or cooling is needed. The driveway and parking lot is made of concrete instead of asphalt. Concrete is more reflective and reduces the “heat island effect” (exposed surfaces such as pavement that are significantly warmer than shaded or moist areas), saves energy by reducing the demand for air conditioning, and improves air quality. Station 53 also uses ENERGY STAR products for personnel.

Station 53 is using technology to create a healthier environment for personnel and to reduce its carbon footprint. The green technologies found throughout the station will ultimately lead to lower energy and water costs, but the motivation for the project was not dollars and cents. Project managers decided to make Station 53 green simply because it was the right thing to do for the environment, the community, and fire personnel – any other benefits were simply icing on the cake.



A solar water heating system is used in Station 53 that preheats water to reduce energy costs.





### Dale City Volunteer Fire Department Station 10

Dale City, VA

Dale City Volunteer Fire Department's Station 10 is the first fire station in Prince William County to achieve a LEED Gold rating and is only the second station on the East Coast and the ninth in the nation to do so. Station 10 was opened in August 2009 after two years of design and planning. At a cost of \$7.5 million, the green building is located blocks away from the original volunteer station that housed firefighters for over 40 years. The station replacement project presented the opportunity to build a fire station that honored the station's history and relationship with the community while demonstrating a commitment to green practices and health and safety.

Station 10 boasts a long list of green features. All materials used during construction contained a low amount or no Volatile Organic Compounds (VOCs) and debris, dust, and mold were prevented from accumulating during construction. Local environmentally-friendly materials were carefully selected for construction within a 500 mile radius. Specifically, 22.21 percent of the materials used for the station were manufactured from recycled materials and 95.84 percent of the wood used originated from Forest Stewardship Council (FSC) certified forests. In addition, 96 percent of waste was recycled during the construction process and the floors are covered with 100 percent recycled floor tile.

Project managers paid particular attention to reducing the station's energy and water consumption. The station collects rain water for landscaping irrigation in an 11,000 gallon underground cistern to support native and drought-resistant landscaping. There are two vegetated green roofs at the station that help to filter rain water and provide cooler roof temperatures that assist in stabilizing temperatures inside the building. The station is equipped with motion sensor lighting, ENERGY STAR appliances, automatic faucets, low-flow toilets, and waterless urinals. As a result of these efforts, water consumption has been reduced by 43.7 percent and energy consumption has been reduced by 23.1 percent. The station also has an aggressive recycling program that includes cardboard, paper, glass, metals, and batteries.

Not only have firefighters working in Station 10 become more educated regarding green practices, but the new and improved facility provides a healthy and safe environment for personnel. The green station sends a positive message to the community and in turn interest in the station from community members has increased.



Station 10 has two vegetated roofs that help filter rain water and provide cooler roof temperatures.



## Additional Resources

There are many ways a department can take steps to go green, help the environment, and save money. For more information on green practices, inspiration, or to investigate additional ideas, visit the following sites:

### **Environmental Protection Agency**

The Environmental Protection Agency has information on a variety of green practices and issues at [www.epa.gov](http://www.epa.gov).

### **Department Of Energy**

The Department of Energy offers information on energy sources, energy efficiency, and the environment at [www.doe.gov](http://www.doe.gov).

### **ENERGY STAR**

ENERGY STAR is a program of the Environmental Protection Agency and Department of Energy that informs consumers about energy efficient products, home improvement tips, and energy management resources at [www.energystar.gov](http://www.energystar.gov).

