

## **CHAPTER 8:** **SUSTAINABILITY**

### **I. INTRODUCTION**

Sustainability links the issues of environment, economy and social equity together. An action or decision in any one of these areas will have consequences on the others whether anticipated or not. Sustainable actions are those that support, maintain, conserve and enhance the environmental, economic and social systems on which we depend. Achieving sustainability may demand substantial departure from past and present actions as well as a fundamental commitment to conserving finite resources.

Sustainability is defined as the use, development and protection of all our resources in a manner that does not deplete them while enabling the residents of Fairfield to meet their current needs and maintain a fulfilling quality of life without compromising or foregoing the ability of and opportunity for future residents to do the same.

In order to promote sustainable living, it requires a commitment to the following principles:

1. Living within limits.
2. Understanding the interconnections and interdependence of economic, societal and environmental decisions and actions.
3. Sharing the distribution and stewardship of resources and opportunities equitably throughout the public and private sectors.
4. Fostering and activating the will to make necessary changes.

Fairfield's quality of life depends on the preservation and enhancement of its environment. As such, the City needs to recognize the sensitive interface between the natural and built environments. The sustainability chapter of the comprehensive plan will promote balanced and sustainable practices in the community in order to accommodate the needs of the present without compromising the ability of future generations to meet their needs.

In addition, this chapter will recommend ongoing actions that will strengthen the City's natural and built environment in other ways including energy conservation and efficiency, air quality and healthy communities.

### **II. ENVIRONMENTAL FACTORS**

#### ***1.0 Air Quality and Climate Change***

Air quality can have an adverse impact on the health, economy and environment of any community. Air pollution is composed of a vast assortment of gases and particulates that can be grouped into three major categories: particulate matter, carbon

monoxide and ozone. When these levels exceed thresholds set by the Environmental Protection Agency (EPA) the area is classified as a non-attainment area and must enact measures to lower the levels. Fairfield is part of a regional non-attainment area.

As a member of the Ohio, Kentucky, Indiana Regional Council of Governments (OKI), Fairfield supports and promotes their efforts to improve air quality in the region. One such effort Fairfield has participated in is the Congestion Mitigation and Air Quality Program, which provides funding for projects that demonstrate measurable reductions in vehicle emissions.

Healthy air quality levels for the citizens of Fairfield can be obtained by utilizing local planning efforts such as minimizing the air quality impacts of new development projects and the impacts of new subdivision by applying dust control measures during demolition, grading, construction and post layout development. Also, in order to reduce negative air quality on the built environment, trees can be planted on both public and private property, fuel-efficient vehicles can be promoted and in lieu of driving promote walking or bicycling around town.

### 1.1 Climate Change

Greenhouse gases, which are linked to global warming, are made up mostly of carbon dioxide, methane and nitrous oxides. They contribute to global warming by trapping radiation from the sun. The bulk of the greenhouse gases emitted in the United States are associated with transportation (e.g. vehicles) and energy generation and usage (industrial, commercial and residential).

In 2008 Fairfield began benchmarking the ecological impact of greenhouse gas emissions related to City operations. The City developed a computer data base to convert electricity and natural gas usage at each building/facility into greenhouse gas equivalents. The figures will be compared to future usage so that the City will be able to track energy conservation efforts. Overall conversions of energy usage into greenhouse gas equivalents show that City operations produced almost 11,400 metric tons of greenhouse gases. This figure does not include gasoline or diesel fuels utilized by motor vehicles. Benchmarking efforts will need to be modified to include the City's fleet of vehicles. The reduction of greenhouse gases will not only impact the Earth's ecology, but will also reduce the energy costs for the City as well.

The preservation of mature trees absorbs large quantities of greenhouse gases and sequester them for many years. The destruction of mature trees releases stored greenhouse gases and it takes decades to replace them with smaller trees that absorb much less carbon dioxide in their early years.

The City of Fairfield established an environmental commission whose main purpose is to promote environmental stewardship. The commission is responsible for educating the public about the ecological, economic and aesthetic benefits of forests such as:

- helps reduce extreme summer temperatures by reducing urban heat islands
- helps in using less energy to cool buildings
- reduces noise pollution
- helps to moderate ozone levels by reducing elevated temperatures
- helps to moderate storm water run-off

## **2.0 *Community Health and Safety***

Active living and quality of life are key components of sustainable living. This is accomplished by providing accessibility to all residents and encouraging less reliance on motorized transportation. Two mechanisms for encouraging active lifestyles in any city are 1) requiring pedestrian and bicycle connectivity between developments, especially schools, that is safe and convenient and 2) recreational facilities that are easily accessible for pedestrians and bicyclists. In addition, this can be facilitated by limiting waivers for sidewalk installation.

## **3.0 *Energy Conservation and Efficiency***

The continuous rising cost of energy production, together with diminishing fossil fuel sources (non-renewable resources) have required cities to consider conserving and searching for alternative energy resources. Urban communities are in the best position, through their planning and regulatory processes, to promote and implement effective energy conservation and efficient sustainability programs in the following ways:

1. Installing lighting and/or retrofitting energy efficient lights for all street lights and traffic control lights.
2. Retrofitting all overhead lights in city offices.
3. Reducing lighting and equipment use where possible in all city facilities.
4. Acquiring hybrid vehicles.
5. Distributing conservation/efficiency information to architects, builders, contractors and the general public in the form of publications, educational programs and kiosk centers in city buildings.
6. Using life cycle cost analysis to identify city assets for replacements with more energy efficient replacements.

### **3.1 Renewable Energy Resources**

Due to the limited supply of finite non-renewable energy resources, the maximum feasible conservation and efficient use of electrical power and natural gas resources for new and existing residences, businesses and public uses need to become the norm. Such alternative energy sources include solar energy, wind power, geothermal and biomass technology.

In order to maximize solar energy, structures need to have an acceptable balance of access to the sun and protection from it. Both active and passive solar techniques should be incorporated into any layout. Active techniques use solar collectors (typically located on roofs) and additional electricity to power pumps to distribute the sun's energy

while passive techniques rely on the siting of the buildings and use of building elements such as walls, windows, roofs and exterior building elements and landscaping to control heat generated by solar radiation. In order for each approach to be viable, there needs to be unobstructed solar access for a certain period of time each day.

Wind power development is expanding in the United States and technologies are being developed and improved, increasing the ability to harness wind in a variety of urban and rural settings. Unfortunately, the City of Fairfield is not located in a region of the country that is suitable for wind energy according to the U.S. Department of Energy. The duration of sustained wind is not sufficient to power a wind turbine effectively.

Other renewable energy resources include geothermal technology, which uses the earth's thermal energy for space and water heating and biomass technology, which uses food crops, municipal waste and methane from landfills to create energy.

In addition, the City should analyze the impact of alternative energy systems on land use.

#### **4.0 Green Buildings**

The planning, construction and maintenance of buildings has an extraordinary effect on environmental resources. Facility construction requires significant quantities of water, wood and energy. In addition, buildings can be a significant source of interior and exterior urban air quality problems and can generate large quantities of waste. A green building is one that is designed, constructed, renovated and maintained in an ecological and resource efficient manner; provides opportunities not only for conservation and efficient resource use, but also creates healthier structures and long-term cost savings. Components of green building design consist of the following:

- Site Planning – solar orientation, protection of existing vegetation and use of ecologically appropriate landscaping
- Energy Efficiency – architectural design to mitigate heating, cooling and lighting loads
- Material Efficiency – selection, substitution and reuse of sustainable construction materials
- Water Efficiency – employ water saving design techniques and devices

Policies promoting the use of green building principles and practices include the preservation of existing structures, the reuse and recycling of materials from deconstructed buildings, water and energy conservation, and the use of sustainable materials can reduce overall initial consumption of resources. In addition, it can introduce significant resource/financial efficiencies and savings to the operation, maintenance and lifetime usability of structures.

There are many environmental and financial benefits of green buildings such as lower operating costs and increased asset value, less waste sent to landfills, conservation

of energy and water, healthier and safer for occupants, reduction in harmful greenhouse gas emissions, tax rebates and demonstration of an owner’s commitment to environmental stewardship and social responsibility.

**4.1 Leadership in Energy and Environmental Design**

The U.S. Green Building Council, a non-profit organization, established Leadership in Energy and Environmental Design (LEED) Green Building Rating System for homes, neighborhoods, commercial buildings and schools. The rating system is a third party certification program and nationally accepted benchmark for design, construction and operation of high performance green buildings. In addition, it provides building owners and operators with the tools needed to have an immediate and measurable impact on their building’s performance.

It promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, material selection and indoor environmental quality. Some examples of these areas are green roofs, captured rain water for landscape irrigation, solar energy to off-set building energy costs, recycled building materials and building design that maximizes interior day lighting.

**5.0 *Recycling***

Recycling involves processing used materials into new products in order to prevent waste of potentially useful materials; reducing the consumption of fresh raw materials; and reducing energy usage, air pollution and water pollution by reducing the need for conventional waste disposal. Recycling extends the life of landfills by reducing the amount of waste being disposed. The primary method for collecting recyclables in Fairfield is through curbside collection, which is kept separate from the general waste designed for the landfill. Common residential recyclable items include glass, aluminum, paper and plastics while industrial recyclable items include residential plus metals, textiles and some hazardous materials.

Fairfield residents recycled more material in 2008 than any other community in Butler County. Together, residents diverted almost 2,000 tons of recyclable materials from the landfill. The table below lists the top recyclers in Butler County.

<b>Community</b>	<b>Tons Recycled</b>
Fairfield	1,958
West Chester Twp.	1,869
Hamilton	1,587
Oxford	1,115
Liberty Twp.	1,036

**Table 8.1**

Not only have these materials been diverted from dwindling landfill space, vast amounts of energy and resources have been conserved through the use of recycled materials. Conversion and recycling of waste materials into useful products, as well as reductions in the general waste streams, are recognized as sustainable actions providing benefits to society and the environment.

The City is in a strategic position to become a leader in the community in promoting recycling. This can be accomplished in a variety of ways:

- Encourage employees to recycle at all City facilities.
- Provide recycling containers in common areas that are open to the public in all city buildings and at all parks.
- Disseminate information to residents and businesses regarding the benefits of recycling and further reducing the solid waste stream.
- Encourage the recycling and reusing of building materials, including recycling materials generated by the demolition and remodeling of buildings.
- Partner with schools and institutions in Fairfield to ensure that they understand and are adhering to the City's recycling goals and providing adequate recycling opportunities.

### **III. RESOURCES FOR SUSTAINABILITY**

As mentioned in the introduction of this chapter, sustainability links the issues of environment, economy and social equity together. Issues that were addressed in this chapter include climate change, community health and safety, energy conservation and efficiency, green buildings and recycling. However, there are many more issues such as public health, social welfare, social equity and local food production that can impact a community. Located in the Appendix is a resource guide that provides a comprehensive list of websites that provide knowledge in all fields of sustainability.

### **IV. GOALS, OBJECTIVES AND POLICIES**

The following goals, objectives and policies provide a basic framework for all sustainability related decisions. This section incorporates strategies from the sustainability plan created by the Fairfield Environmental Resources and Community Forest Commission.

#### **1.0 Goal: Develop and maintain a sustainable future for Fairfield.**

##### *Objectives and Policies for Sustainability*

**Objective 1:** Reduce the City's consumption of energy and fossil fuels.

**Policy 1:** Promote energy efficient systems and explore innovative energy technologies to reduce dependency on non-renewable energy.

**Policy 2:** Continue to monitor the City's carbon footprint so as to lower the emissions of greenhouse gases.

**Objective 2:** Explore opportunities for adding hybrid/alternative fuel vehicles to the City's fleet.

**Policy 1:** In order to be more sustainable, each calendar year the City's Fleet Manager will review all vehicle replacement/additions as to whether a comparable hybrid vehicle (or similar fossil fuel savings concept, i.e. electric, hydrogen) is available, which will meet the needs of the City. Vehicle replacements will continue to follow the current replacement schedules for the individual vehicles. Each vehicle replacement decision will be based in part on a cost savings calculation over the life of the vehicle utilizing:

- Vehicle cost
- Fuel savings over the life of the vehicle
- Duty cycle
- Tax credit for carbon emissions

Each decision may be superseded by Federal, State or Local legislation requiring emission reduction or alternative fuel vehicle policy.

**Objective 3:** Provide educational opportunities to promote sustainable practices.

**Policy 1:** Prepare a newsletter, brochure, webpage and other materials for residents and businesses.

**Policy 2:** Communicate sustainable practices to residents, city employees and stakeholders.

**Objective 4:** Promote sustainable building practices such as green building standards.

**Policy 1:** Have a City employee become certified in LEED standards.

**Policy 2:** Encourage sustainable practices in the design, construction and maintenance of public/private buildings and infrastructure and encourage others to embrace green building practices and LEED certification where practical.

**Objective 5:** Promote sustainable waste management practices.

**Policy 1:** Promote the use of recycled and recyclable products and ensure that goods purchased are made, used and disposed of in an environmentally sustainable way.

**Policy 2:** Focus on reducing, reusing and recycling solid waste prior to disposal.

**Objective 6:** Promote healthy air quality levels for the citizens of Fairfield.

**Policy 1:** Encourage the preservation of existing mature trees and the planting of new trees on both public and private property.

**Policy 2:** Provide pedestrian and bicycle connectivity between developments and uses.

**Objective 7:** Encourage the investigation of sustainability resources to discover what other aspects of sustainability may be beneficial to the City.

**Objective 8:** Develop an implementation plan that establishes benchmarks and indicators that can measure the progress of attaining the goal of maintaining a sustainable future for Fairfield.

**Objective 9:** This chapter shall be used to assist in determining the funding priority for sustainable improvements to City facilities.

**Policy 1:** Improvements, based on their priority, shall be included in the five year Capital Improvement Plan.

**Objective 10:** Continue to maintain and initiate new inter-government relations and coordination with all surrounding jurisdictions, government agencies, non-profit entities and the private sector.