



FAIRFIELD'S ABUNDANCE ECOVILLAGE

Harmonious Living With Nature

BY MINDY KRALICEK PHOTOS BY CLAY SMITH

What is most remarkable about this 15-acre village development is not what you see. It's what's built under, into, above and shared by the homes and inhabitants: *an abundant lifestyle that does not impact the environment.*

Situated on what was once a cornfield turned pasture, 14 attractive homes built in three clusters are cuddled by a medley of gardens, orchards, young shade trees and native prairie. A row of rural mail boxes stands at attention where the private drive enters Abundance EcoVillage.

Winding walkways of crushed limestone and pebbles and mowed trails connect the homes with a public orchard of hazelnut trees, kolomikta kiwis, persimmons, Asian pears and hardy sweet cherries. Another path meanders to two ponds, a small pavilion and a cedar structure that frames tranquility from any direction. Two wind turbines project into the blue sky, their blades turning slowly enough today to cut angel food cake. Collected on parking garage roofs, sapphire-hued solar panels absorb the sun's energy.

Principled Construction

"Whatever you do, do it the best that you can because that's the way to get along in the world," says the mother pig to her three children as they leave home to enter the world in the well-known fairy tale.

Essentially that is what the developers of Abundance EcoVillage demand. Homes are built way above construction standards and use 60 to 80 percent less energy than traditional homes.

Healthier, renewable materials are specified. Design uses passive solar energy. Walls and ceilings are well-insulated and airtight. The U.S. Department of Energy recommends a wall R-value of 18, but an ecovillage home has 10-inch walls on a double stud frame with a wall R-value of 30.4.

All homes feature southern-facing windows with overhangs that block direct sun in the summer, yet allow



for day lighting. During winter, the southern side of the house acts as a passive heating unit. Windows on the north and west are minimized. Windows and appliances meet Energy Star requirements or better.

Maharishi Sthāpatya Veda Architecture

Another aspect of the homes at Abundance EcoVillage is the alignment of homes to Sthāpatya Veda architecture from India. The central tenant is that the orientation, placement and proportion of the built environment have dramatic effects on occupants and should be built in harmony with nature. Therefore homes are designed to maximize positive natural effects and eliminate negative ones. As the sun moves across the sky, it radiates different qualities of energy at different times of the day. Amy Greenfield, designer of two homes in the village and

a resident, explains:

“By properly dimensioning rooms and allowing for the appropriate quality of sunlight according to each room’s purpose, we are able to enhance health, mental clarity and creativity.”

Examples include placing the door of the home east or north, never south. The rooflines of the homes run north-south. Yards are surrounded by a protective fence and considered part of the living space.

Permaculture Systems

“Living off the grid” is one way to describe it, but the primary reason for permaculture systems at Abundance EcoVillage is to live a quality lifestyle without damaging the earth’s systems.

Power for homes is collected from both wind turbines and solar systems. Energy is stored in batteries and inverted to alternating current (AC) for use in homes.



and watering yards and gardens.

The third system is water stored in wetlands on the property. During dry times, this water is available to trees and other deep-rooted plants. To date, the village has not run out of water.

Waste is managed onsite, held in a septic tank. Organic materials break down into sludge and scum which decompose slowly. The liquid material (effluent) is pumped from the septic tank into a gravel bed numerous times, where microorganisms break down the

pollutants, cleaning the water. It then flows to a wetland, which acts as a biofilter, removing sediments and other pollutants from the water. In the future an irrigation system will be set up to deliver this water with its additional nutrients to non-edible plants and the landscape.

“Wind primarily blows during the winter and solar energy is primarily collected in the summer,” says Michael Havelka, a village founder and overseer of the energy systems. “Used together, Abundance EcoVillage has reliable energy year-round for all residents.”

Most homes in the village have solar hot water systems. Two thermal solar collectors are installed on the roof of the home. Heat collected from the sun is stored in the solar hot water tank. When the hot water faucet is turned on, water from the solar tank flows into the secondary tank where the temperature is regulated.

Heating and cooling of homes is accomplished with Earth Air Tubes. Each home has 400 to 600 feet of tubing buried 8 feet deep where the ground’s stable temperature hovers around 56 degrees F. An air intake is attached to the west side of each home and four to six, 8-inch tubes travel underground 100 to 150 feet, then enter the home through the equipment room to the furnace fan. The furnace fan then distributes the air throughout the whole house.

During the winter the air comes in preheated, so the furnace only has to heat the air an additional 10 to 20 degrees. In the summer, the warm air from the intake is cooled as it passes through the tubes. Moisture from Iowa’s high humidity condenses and drains away from the air tubes through a drainage system. The air comes into the house cooled and dehumidified.

Water supplies for the village come from collected rain water. There are three systems for collecting and storing water. Drinking, cooking and bathing water is collected from roofs and stored underground. Water in the storage tanks pass through a three-step purification process: charcoal and sediment filters and UV light purification. This system has received DNR drinking grade water approval and is monitored. No chemicals are used to treat the water.

The second system is water collected from a pond that is also used for swimming and is stocked with catfish, bluegill, and grass carp. The pond water goes through a gravel bed filtration system. This water is used for toilets

Paying for the permaculture systems

The cost to help pay for the energy, water and waste systems is built into the purchase price of the 70-foot by 70-foot lots. There is no pay-for-use structure for energy and water. The only additional cost is a \$100 per month homeowners’ association fee to pay for road maintenance, snow removal and grounds keeping.



The Sprouting of Abundance EcoVillage

Lonnie Gamble, an electrical engineer and sustainable living professor, conceived, created and founded Abundance EcoVillage with Michael Havelka, a biologist with interests in sustainable agriculture. They experimented with their own homes and sustainable technologies and word got around. People told them they wanted to live more sustainably, but lacked the knowledge or time to develop the systems to make it possible. “If you develop the systems, we’ll live there,” they heard frequently. In 2001 the first home in Abundance EcoVillage was built.

Havelka says the goal of the development has been to provide a neighborhood where energy, water, wastes recycling and landscaping work in tune with nature, rather than against it. The homes would be aesthetically appealing and comfortable so people of all walks of life would enjoy living there.

Changes in the village

The neighborhood changes with ideas and features that residents desire. Support for a community food co-op has faded, but the tool-equipment co-op is highly functional. A hothouse for raising plants is seeing less usage, but a nearby organic farm is a source of vegetables for residents who don’t grow their own.

Using biodiesel as a backup energy source proved to be burdensome, so the village hooked up to Fairfield’s electricity system. During periods when there is no wind

or sun, the village buys energy from the utility company, and when there is more power than can be stored, the village sells it back to the utility.

Original solar panels were stationary and placed on garages. Newer, additional solar panels are on a structure built so panels follow the sun. Costs of original solar panels were \$5 a watt, but those have dropped to \$2 to \$2.50 a watt.

Room for more

Abundance EcoVillage came to fruition about the same time the economy took its downward trend. Nevertheless, 14 homes have been built. All of the houses are occupied and two are rented. Although amenities have been slower to develop than expected (for instance the community building has yet to be constructed), the development is economically solid. Six lots are available for those interested in new home construction.

No particular lifestyle is required to live in the development, but “The commonality residents experience in the village is a greater awareness of nature and its daily changes,” says Greenfield. “Because our water and power depend on the weather, we’re constantly remarking about it.”

Interested in experiencing off-the-grid living?

The Sweetwater Luxury Bunkhouse at Abundance EcoVillage, Fairfield, is available for a minimum two-night



Residents built a small stage near the pond for entertainers. Picnics, speaking events, concerts and classes are a part of EcoVillage living for those who wish to participate. The community pond is used for fishing, swimming and a source of partially treated water used for watering lawns, gardens and toilets.



From her home in EcoVillage, Amy Greenfield said designing a home for the weather extremes in Iowa was a challenge, but the result are homes that will be energy efficient for generations. Windows on the south warm homes in the winter. Fences surround the homes and yards are considered part of the living space. The original wind turbine satisfied the energy needs of the first few residents; a second was added as more people joined the village. Several of the residents grow vegetables, nut and fruit trees in the public areas of the village.



Eco-building designer and resident Amy Greenfield



Outside of the ecovillage community, sitsvan older straw bale home, showing the area's historical interest in eco-design.



Solar-powered path lights





Solar panels are placed on community garage structures.

Definition of permaculture: the practice of producing food and energy in ways that do not deplete the earth's natural resources.



Abundance EcoVillage co-founder
Michael Havelka



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How to get there

Follow Highway 1 (N Fourth St) out of Fairfield's city center to 185th St. Turn right (east) and drive until you see an attractive stone welcome sign to Abundance EcoVillage on the north side. Follow the gravel road (not Leach Ave.) to the village.

Are homes in Abundance EcoVillage more expensive than what is typical?

"It depends on how you look at it," says Michael Havelka, one of the development's founders. "When you buy a lot in the village, you're basically paying for your water, power and waste management upfront in the \$40,000 cost. You also enjoy access to the community spaces like the orchard, pond, walking trails and pavilion."

"It depends on your focus," points out Amy Greenfield, building designer. "The homes are built using materials that are renewable and release fewer toxic chemicals and particles which affect people's health. Also, high standards are met in the methods, materials selection and construction of the homes. These will last longer and need fewer repairs than typical homes."

"In other words, if you want to get in a home cheaply, this home won't be for you," adds Havelka. "If you want to live with less expense over the long term, a village home is an economical choice."

Ecovillages in America

The ecovillage concept has been popular since the 1970s, but many projects, then and now, disperse after several years due to personality and interest conflicts, lack of technical expertise among residents to operate off-the-grid energy systems, changing values and lack of sustainable financial resources. However, many ecovillages are thriving in the United States and around the world. Each one operates according to common goals. Domestic examples include:

Bay View Ecovillage in Milwaukee, Wisc.

10 members living in two duplexes focus on social connections and environmental action.

Berea College Ecovillage in Berea, Ky.

College students in family housing have performance goals to reduce their ecological footprint.

Dancing Rabbit Ecovillage in northeastern Missouri

Fifty people live ecologically sustainable and socially rewarding lives.

Earthaven near Asheville, N.C.

Located on 320 acres 40 minutes southeast of Asheville, N.C. Fifty residents live on the land. They are dedicated to caring for people and the earth by learning and demonstrating a holistic, sustainable culture. Earthaven provides workshops on starting and designing an ecovillage.

Ecovillage at Ithaca, upstate New York

Located in the Finger Lakes region, two 30-home duplex neighborhoods are an alternative model for suburban living while minimizing ecological impacts.

The Sweetwater Luxury Bunkhouse, where guests can try out Abundance EcoVillage living. **RIGHT:** Michael Havelka points out the water system used for watering yards and gardens, and in toilets. This minimally treated water supply comes from the pond.





The average southeast Iowa home uses about 1,500 kilowatts of energy a month, while the typical home at Abundance EcoVillage uses about 250 kilowatts per month. This electrical savings comes from high performance design implemented into the home prior to construction.



Larry Larson, in an attic, shows how air from the lower floor is vented to the attic.

CLOSE-UP: Earth Air Tubes

An environmental-friendly way to heat and cool homes

Earth air tubes have been in use for more than 25 years, but not so much in Iowa. Larry Larson of Fairfield has worked with the systems and developed an almost foolproof installation system. His system has worked extremely well for Abundance EcoVillage residents and other Fairfield homeowners. He also helps with earth air tube system installations around the country.

Larson installs a one-way open-air system. The high density, polyethylene corrugated air tubes range in size from 6 inches to 12 inches in diameter, depending on the size of the home. The tubes are placed at least 8 feet below ground level in a snake-like fashion with 2 feet of space between them. Down there, the ground temperature hovers 12 degrees above or below the average Iowa ground temperature of 56 degrees. The furnace fan delivers the air through the underground air tube system. The winding tubes create enough air turbulence so the air has every opportunity to take on the temperature of the surrounding earth.

Iowa's high humidity requires that a drainage system be in place. As water condenses in the air tubes, it drips out of a slit on the bottom of each tube. This requires a special trench profile that carries the water by gravity to either daylight, or a less preferred destination: a sump pump.

Installation

Four earth air tubes 100 feet to 150 feet long, depending on the size of the home, are placed with 2 feet between them on filter cloth covering a bed of 4 inches to 6 inches of pea gravel. Sand is poured to lock the tubes in position. Then the trench is backfilled.

The area of excavation to install the earth air tubes is large and probably only practical for new construction. Installation typically occurs at the same time as the home's foundation. Soil types can cause a wide variance in tube performance, so an expert is needed for the installation.

Once installed, residents can drive over the buried tubes or plant gardens above them.

Interior Ventilation

The interior ventilation system should only be designed and installed by a contractor familiar with interfacing with an earth air tube system. A forced-air duct system is required with earth air tubes. Air duct delivery to rooms should be placed low and air duct returns should be placed high. Passive exhaust to the outside is required in a central area high in the home, such as an attic. The system is designed to operate continuously. Adjustments only need to be made seasonally.

A switch marked for summer or winter ventilation changes the operation. In summer, return ducting is closed off and the

hottest air is released outside. In winter, the warmest air should be returned and mixed with fresh air coming in from the tubes.

Energy Efficiency

Customers say their heating and cooling bills are less than \$200 per year, but other factors are at play with these claims. Engineering for maximum energy efficiency of walls, floors, the roof and basement or crawl space are critical for air tube performance.

"A concrete basement is a big energy drain on a house," says Larson. "Standard Portland concrete has virtually no R-value and it will wick ground moisture. As much as 23 percent of the heat loss of a house can occur through an uninsulated concrete basement.

"I recommend pressure-treated wood for basements, footings and floors. The treatment is not a petroleum-based material, and the end product doesn't give off gas or leach into the environment. Wooden foundations are warm, easy to finish and insulate, and they sequester carbon.

"Another concern is vapor," says Larson. "I recommend that a house using air tubes vapor barrier all the home's walls, floors and ceilings shared with the outside. The earth air tube system removes the need for humidifiers and dehumidifiers, the air is always fresh, and there are no problems with radon or mold." 🐾