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Who's Got the Power?

Municipal regulation of residential alternative energy

By Alan W. Flenner

The use of alternative energy is part of a movement toward more sustainable living. Many people are seeking to sever their homes from the National Electric Power Grid and shut off the flow of oil and gas to their homes.

The motivating factors behind this movement include pollution prevention, saving money and a desire to lead a more self-reliant life.

Encouraged by government incentive programs, the trend toward residential energy independence is shifting from the backwoods to the urban jungle. As alternative energy systems become more prevalent in built-up areas, so do concerns about real and perceived nuisances associated with alternative energy. Consequently, local governments are being called upon to regulate the use of alternative energy systems in residential areas to protect the air, land and water for the benefit of the public.

Because local government has a role in both promoting and regulating alternative energy systems, municipalities must learn to integrate the systems into land use and building code programs.

A classic example of promoting alternative energy are solar access regulations that ensure buildings do not block sunlight to neighboring properties.

The most prevalent residential alternative energy systems include solar, wind, geothermal, micro-hydroelectric and wood-fired systems. The viability of these options is influenced by geographic location, governmental regulation, community acceptance and cost. Alternative energy characteristics that a municipality may seek to regulate include location, dimensions, appearance, noise, emissions and operations.

The primary enabling authority for the municipal regulation of alternative energy systems in Pennsylvania is the Pennsylvania Municipalities Planning Code, or the MPC.

The many purposes of the MPC include promotion of public safety, regulation of land use, conservation of energy and effective utilization of renewable energy resources. The MPC defines renewable energy to include solar, wind, geothermal and hydro-electric energy.

A municipality's subdivision and land development ordinance may include provisions for encouraging the use of renewable energy and energy efficient buildings. A zoning ordinance may permit, prohibit and regulate uses of land; the dimensions, location, construction, removal and use of structures; and the intensity of uses upon the land and within structures.

In October 2010, Lancaster County published a "Municipal Guide to Planning For and Regulating Alternative Energy Systems." With respect to residential applications, this document addresses accessory solar, wind, and wood-fired energy systems. On Oct. 21, 2010, Rapho Township in Lancaster County became one of the few Pennsylvania municipalities to adopt a comprehensive alternative energy ordinance that regulates the placement, construction, operation and maintenance of alternative energy systems.

Solar

There are two primary forms of solar energy systems: photovoltaic systems and thermo-solar systems.

Photovoltaic systems convert sunlight into electricity. A photovoltaic system may be installed on a building or ground mounted. Solar-thermal systems use solar energy to heat water or air. Solar-thermal systems are most often used for residential hot water systems.

Roof mounted solar energy systems present some particular concerns with respect to fires. The systems may create obstacles for firefighters to access and penetrate the roof of a structure to ventilate and suppress a fire. California has developed fire safety guidelines for solar energy systems that suggest a three-foot setback from roof edges and ridges to provide adequate access and smoke ventilation space.

A local solar ordinance can help ensure the integration of solar systems into new and existing building construction.

On Dec. 1, 2009, the Governor's Solar Working Group published "Solar Energy Systems, a Guide for Pennsylvania Municipal Officials." This is a comprehensive guide on the operation and regulation of solar energy systems. The group also developed a

model solar zoning ordinance for municipalities to use to promote the use of solar energy while reasonably regulating it.

Monroe County developed its own model solar energy ordinance. This model includes provisions with respect to zoning districts for solar systems, distinctions between roof and ground mounted systems, and system height, surface area, and yard setbacks.

Lancaster County's alternative energy guide includes zoning language for accessory solar energy systems. It recommends solar energy systems as an accessory use in all zoning districts contingent on compliance with applicable dimensional restrictions and certain design and installation requirements. The zoning language defines an accessory solar energy system as one that supplies electricity and heat for on-site use.

Wind

A wind energy system converts wind energy into electricity through the use of a wind turbine generator. The wind turns the blades of a turbine to turn a generator to produce electricity. Small wind energy systems are often mounted at the top of a pole. However, some systems may be installed directly onto building roof tops.

Residential wind energy systems are often identified as a conditional or accessory use. Some municipalities allow wind energy systems in all zoning districts while others limit the systems to certain specific zoning districts. System height may be limited to a specified elevation or may vary based on distance from occupied structures and property lines.

Issues with respect to wind energy that are within the scope of municipal regulation include turbine noise, appearance and structural integrity. Regulations may require wind energy systems to be painted a non-obtrusive, non-reflective color such as white or gray to avoid or mitigate negative visual impacts.

The American Wind Energy Association has developed a model ordinance for accessory wind energy systems. This ordinance limits accessory wind energy systems to one per parcel and establishes a property line setback equal to the height of the system. It limits turbine noise to the level specified in the municipality's noise ordinance, if one exists.

In 2006, Pennsylvania developed a model local ordinance for wind energy facilities. The model includes three parts: a zoning ordinance, a subdivision and land development ordinance and a free standing ordinance. Although designed for wind energy facilities

that are a principal use (i.e., wind farms), the model ordinance may be adapted for use in regulating residential wind energy systems. Aspects of a wind energy system that are addressed by the model include structural design, appearance, safety features, noise and property and building setbacks.

A model ordinance addressing residential wind energy systems is also available through the Pennsylvania State Association of Township Supervisors, or PSATS. In this model, residential wind energy systems are permitted by conditional use approval as accessory structures. The model limits wind energy systems to one per parcel. System height is limited to a maximum of 45 feet and a property line setback is established at a distance of 125 percent of the system's height.

In the 2009 Pennsylvania Commonwealth Court case of *Tink-Wig Mountain Lake Forest Property Owners Association v. Lackawaxen Township Zoning Hearing Board*, residents appealed the grant of a zoning permit for a wind turbine accessory use on a lot within their neighborhood. The zoning officer issued the permit based on his decision that a residential wind turbine was a permitted accessory use under the applicable zoning ordinance because it provided an essential residential service and was similar to other customary subordinate residential uses.

In upholding the permit, the Commonwealth Court agreed with the zoning officer comparing personal wind turbines to solar panels, outdoor fireplaces and television antennas.

Heat

A geothermal energy system uses the stable temperature of the Earth and a heat pump to provide greater efficiency in the heating and cooling of buildings. The most common form of geothermal energy system in Pennsylvania is the shallow well system.

In this system, a fluid circulates through tubes within wells to transfer heat to and from the earth. The system extracts heat from the earth in winter and sheds heat to the earth in summer.

Currently, there are no federal or Pennsylvania state-wide regulations regarding well construction for geothermal energy systems. Because of the lack of regulatory oversight, the Spring Creek Watershed Association in Centre County developed a model ordinance for geothermal energy systems based on a PSATS model ordinance for wells.

The Spring Creek Model Ordinance was adopted by the Centre Region Council of Governments in March 2010 and subsequently by most member municipalities. The primary purpose of the ordinance is to ensure that the space between a bore hole and well casing is sealed with an impermeable substance to prevent surface pollutants from reaching groundwater.

Water

Pennsylvania has many rapidly moving streams that are ideal sources for water power. Water power was once the driving force behind Pennsylvania industry. However, it fell into disfavor in the 20th century with the increased use of convenient fossil fuels. Because of the current cost and pollution concerns associated with fossil fuels, water power is poised to spring forth as an attractive alternative energy source.

A hydroelectric power system uses the energy in flowing water to generate electricity. A small scale or micro-hydro electric system may be used to provide power to an individual residence if the home is located near a stream.

The common elements of a micro-hydro electric system include a water source, a penstock (i.e., pipe to convey water), a turbine and an electric generator.

Most micro-hydro systems are "run of the river systems" that divert water directly from a stream to the turbine. The moving water rotates the turbine to turn the generator to generate electricity. Micro-hydro electric systems are generally designed to divert less than 20 percent of the water flow from a source stream and to return the water back to the stream after passing through the turbine.

Micro-hydro electric systems must comply with federal and state regulations with respect to the control and diversion of water flows and the physical alteration of streams and stream banks. To date, there is little if any local regulation of micro-hydro electric systems. However, there are a number of companies offering micro-hydro installations throughout Pennsylvania.

Fire

Perhaps the most controversial alternative energy source in Penn's Woods is the outdoor wood-fired boiler, or OWB. OWBs, also known as hydronic heaters, are designed to burn wood or other fuel to heat water to warm a building.

OWBs resemble a small shed with a short smokestack on top. OWBs are popular in many areas of Pennsylvania because of the plentiful and renewable supply of wood.

However, smoke from OWBs can contain fine particulate matter, carbon monoxide and other pollutants. Complaints about the emissions from OWBs have been received in 53 of 67 Pennsylvania counties, including suburban Philadelphia counties.

There are no federal regulations applicable to OWBs. However, there is a voluntary program that encourages OWB manufacturers to develop cleaner burning, more efficient units.

On Oct. 1, 2010, Pennsylvania issued OWB regulations requiring specific emission standards, establishing a 50-foot setback and minimum stack height of 10 feet and limiting the fuel to clean wood. Municipalities are authorized under the Air Pollution Control Act to enact more stringent regulations than the state regulations.

On Oct. 13, 2010, East Whiteland Township in Chester County enacted an ordinance regulating outdoor fires. The ordinance bans the use of OWBs in the township and imposes a 25-foot setback requirement from structures and property lines for patio wood-burning units such as chimineas.

The movement to disconnect from the grid indeed represents a residential energy paradigm shift from a modern era perspective of "You light up my life" to a post-modern philosophy of "I've got the power." Municipalities must now keep alternative energy use and public health, safety and welfare in concert. •

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