

Model Sustainable and Renewable Energy Ordinance

1. Purpose and Objective

- A. The purpose of this Chapter is to provide for the use of alternative energy systems and facilities to establish fossil fuel consumption reduction strategies related to the land development, installation, and construction of residential and non-residential developments in (municipality), subject to reasonable conditions to protect the public health, safety, and welfare. This Chapter applies to alternative energy systems to be installed and constructed on any property.
- B. (Municipality) seeks to incentivize the inclusion of alternative energy systems as a component of new residential and new non-residential development while regulating the use of potentially intrusive facilities, equipment, and machinery.
- C. (Municipality) seeks to promote sustainable site and building design strategies which maximize opportunities for solar orientation and building energy supply design that includes alternative energy sources.
- D. (Municipality) seeks to improve the resiliency of the traditional power delivery grid by allowing for alternative energy sources on an individual lot or in a community-based system to supplement and or provide up to 100 percent of required energy needs.
- E. (Municipality) seeks to improve air quality and supports the reduction of greenhouse gas emissions by reducing dependency on energy produced by the consumption of fossil fuels.
- F. (Municipality) seeks to incentivize the inclusion of alternative energy systems by providing bonuses for increased density, reductions in township permit fees and an expedited review of land development applications as applicable and as further defined in this Chapter, Section 6, Bonus Provisions.

2. Definitions

- A. *Alternative Energy*. A renewable, sustainable, clean source of energy generated from solar, water, wind, geothermal, or similar sources, which can provide energy and utility provisions to a permitted use.
- B. *Alternative Energy System*. A private system capable of converting solar, water and/or wind into a viable energy source and utility provisions for a permitted use. Such systems may include solar panels, wind turbines, geothermal systems and/or other similar alternative energy systems.
- C. *Applicant*. A person or entity filing an application under this Chapter.
- D. *Attached Alternative Energy System*. A system that is physically mounted, attached and/or connected (except utility and energy transfer connections) to a permitted principal, accessory building, or structure in accordance with all pertinent zoning, utility and building code requirements.
- E. *Biomass fuels*. Biomass fuels are organic materials produced in a renewable manner. This includes woody fuels such as forestry residue, yard waste, or dedicated biomass crops such as switchgrass.
- F. *Boring/Borehole*. A penetration of soil and/or rock that is augured, drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed which is generally cylindrical in shape and whose diameter is generally smaller than its depth of penetration.
- G. *Building Integrated Photovoltaic (BIPV) Systems*. A solar energy system that consists of integrating Solar PV modules into the building envelope, where the solar panels themselves act as a building material (roof shingles) or structural element (i.e., façade).

- H. *Closed Loop Geothermal System*. A type of geothermal heating and/or cooling system that utilizes a pressurized heat exchanger consisting of pipe, a circulating pump, and a water-source heat pump in which the heat transfer fluid is not exposed to the atmosphere. The heat transfer fluid is potable or beneficial reuse water and may have approved antifreeze added.
- I. *Cool Roof*. A cool roof is one that has been designed to reflect more sunlight and absorb less heat than a standard roof. Cool roofs can be made of a highly reflective type of paint, a sheet covering, or highly reflective tiles or shingles.
- J. *Emerging Energy*. A source of clean energy, other than solar, water, wind, geothermal sources, which can provide energy and utility provisions to a permitted use while producing zero or near-zero emissions.
- K. *Emerging Energy Facility*. A private facility capable of converting renewable energy sources into a viable energy source and utility provisions for a permitted use.
- L. *Facility Owner*. The entity or entities having an interest in the alternative and/or emerging energy facility, including their successors and assigns.
- M. *Freestanding Alternative Energy Facility*. A facility that is not physically mounted, attached and/or connected (except utility and energy transfer connections) to a permitted principal building. All such facilities shall be considered a separate or accessory structure that has the ability to convert and convey energy to the principal use in accordance with all pertinent zoning, utility and building code requirements.
- N. *Geothermal System*. A system that uses a heat pump to extract heat from the earth in heating mode and/or reject heat into the earth in cooling mode. It is also called a geothermal heat pump system, a ground-coupled heat pump system, an earth-source heat pump system, and a GeoExchange system.
- O. *Green Roof*. A green roof is a layer of vegetation planted over a waterproofing system that is installed on top of a flat or slightly-sloped roof. Green roofs are also known as vegetative or eco-roofs.
- P. *Green Wall*. A green wall is a vertical greening typology, where a vertical built structure is intentionally covered by vegetation. Green walls include a vertically applied growth medium such as soil, substitute substrate, or hydroculture felt, as well as an integrated hydration and fertigation delivery system. Green walls generally fall into one of two categories: soil-less or modular.
 - (1) *Soil-less* – vegetation growing on a vertical structure, mimicking growing conditions found in nature.
 - (2) *Modular* – pockets of plants and climbing plants and soil media in prefabricated modules to produce a green wall.
- Q. *Ground Source Heat Pump*. A geothermal heat pump that uses the earth itself as a heat source and heat sink. It is coupled to the ground by means of a closed-loop heat exchanger installed horizontally or vertically underground.
- R. *Landowner*. Any person(s) or entity owning property within (Municipality).
- S. *Meteorological Tower*. A structure designed to support the gathering of wind energy resource data, and includes the tower, base plate, anchors, guy cables and hardware, anemometers (wind speed indicators), wind direction vanes, booms to hold equipment anemometers and vanes, data logger, instrument wiring, and any telemetry devices that are used to monitor or transmit wind speed and wind flow characteristics over a period of time for either instantaneous wind information or to characterize the wind resource at a given location.
- T. *Near-zero emissions*. Emissions released into the atmosphere through a particular source of energy at a rate not exceeding the emissions that are permanently removed through technology-

driven or enhanced natural processes.

- U. *Nonparticipating Landowner*. Any landowner except those on whose property all or a portion of an alternative and/or emerging energy facility is located pursuant to the provisions of this Chapter.
- V. *Operator*. The entity responsible for the day-to-day operation and maintenance of the alternative and/or emerging energy facility.
- W. *Occupied Building*. A building located on a parcel of land utilized as a permitted use in accordance with the provisions of (Municipality).
- X. *Private Energy and Utility Provider*. A principal use owned, operated and/or maintained by a private or independent utility company for the purposes of providing energy within a defined service area or grid system in accordance with the provisions established by the Public Utility Commission and the Public Utility Code.
- Y. *Solar Easements*. Legal agreements that protect access to sunlight on a property.
- Z. *Solar Energy*. Radiant energy (direct, diffused, or reflected) received from the sun at wavelengths suitable for conversion into thermal, mechanical, chemical, or electrical energy.
- AA. *Solar Energy System*. An energy system that consists of one or more solar collection devices, solar energy related "balance of system" equipment, and other associated infrastructure with the primary intention of generating electricity, storing electricity, or otherwise converting solar energy to a different form of energy. Solar energy systems may generate energy in excess of the energy requirements of a property if it is to be sold back to a public utility in accordance with the law.
- BB. *Solar Energy System, Ground-Mounted*. A solar energy system where an array is mounted onto the ground.
- CC. *Solar Reflective Index*. The solar reflectance index (SRI) is a measure of the constructed surface's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black surface (reflectance 0.05, emittance 0.90) is 0 and a standard white surface (reflectance 0.80, emittance 0.90) is 100.
- DD. *Sustainable*. The avoidance of the depletion of non-renewable natural resources to maintain an ecological balance.
- EE. *Thermal Mass Wall*. Above grade, exterior building walls that are made of concrete block, concrete, insulated concrete form, masonry cavity, brick, earth, adobe, compressed earth block, rammed earth, and solid timber or logs. The insulation must be at least 50 percent on the exterior or integral to the wall and the wall must exhibit a weight greater than 15 pounds per square foot.
- FF. *Wind Energy System*. A device, which includes a tower structure and associated mechanism(s) and supporting components, which is installed above ground for the purpose of generating mechanical or electrical energy, and may include, but not be limited to, vertical or horizontal plane, wind driven turbines, helixes, meteorological towers, and windmills.
- GG. *Wood-Fired Boiler*. An alternative energy facility designed to burn wood or other organic biomass fuels, which transfers heated air or liquid through a piping or ventilation system to a principal use. All such systems are generally contained within an accessory structure that is not intended for habitation by humans or animals. An outdoor wood-fired boiler may also be known as outdoor wood-fired furnaces, outdoor wood-burning appliances, outdoor hydraulic heaters, and/or hot water stoves.

3. Applicability

- A. This Chapter shall apply to all alternative and emerging energy systems that are proposed to be constructed after the effective date of this Chapter.

- B. Alternative and/or emerging energy systems constructed prior to the effective date of this Chapter shall not be required to meet the requirements specified under this Chapter. Any physical modification to an existing, alternative, or emerging energy system that alters the size, type and generating capacities of the system shall require a permit and shall comply with the applicable provisions specified under this Chapter.
- C. Alternative and/or emerging energy systems may be considered as an accessory use within all zoning districts (except where otherwise noted), provided that the principal use is a permitted use or conforming use within the zoning district on which the alternative and/or emerging energy system is located.
- D. Alternative and/or emerging energy systems may be considered as a principal use within all zoning districts, where that alternative and/or emerging energy system is part of a larger subdivision and is intended to provide energy to more than one dwelling unit or non-residential use within the zoning district in which the alternative and/or emerging energy system is located.
- E. Alternative and/or emerging energy systems may be utilized as the primary energy source by the principal use of the lot on which it is located. Surplus energy may be exchanged, transferred, and/or sold to a public or private utility company, provided that such surplus energy is exchanged, transferred, and/or sold in accordance with the provisions established by the Public Utility Commission and Public Utility Code, 66 Pa.C.S.A. §101 et seq.
- F. Private energy and utility providers, as defined under Subsection 2., shall comply with all provisions established by the Public Utility Commission and the Public Utility Code, 66 Pa.C.S.A. §101 et seq.

4. Land Use and Dimensional Regulations

- A. The following provisions shall specifically apply to **wind energy systems**:

Editorial note: Based on research by the American Wind Energy Association (AWEA) and the Distributed Wind Energy Association (DWEA), wind energy systems should be placed where winds are the least obstructed and are the strongest. More importantly, wind energy systems should be erected in such a way that the lowest part of the rotor (blade) is at least 30 feet higher than any wind obstacles within a 500-foot radius. Wind obstacles are trees, buildings, or other natural or man-made elements that may interrupt wind flow. Furthermore, the efficacy of wind energy systems is likely to be compromised at lower heights such as 30 – 60 feet. This often leads to tower heights ranging from 45 to 160 feet. Municipalities will need to weigh the benefits of allowing this technology in residential districts and may want to consider limiting the application to agricultural uses and or industrial uses as applicable. This section does not address commercial wind farms used for generating electricity to the wholesale marketplace.

- (1) Wind energy systems shall be permitted by conditional use as an accessory use provided that such systems are located on a lot with a permitted use in accordance with the applicable provisions of this Chapter.
- (2) Wind energy systems shall be located no less than 100 feet (or 1.1 times the height of the device, whichever is greater) from a side or rear property line, no less than 100 feet (or 1.1 times the height of the device, whichever is greater) from overhead utility lines, no less than 150 feet (or 1.1 times the height of the device, whichever is greater) from a street line and no less than 1.5 times the height of the device, from any occupied building on the lot. In no case, however, shall a wind energy system be located within a front yard as defined in the zoning ordinance or within the minimum required side and/or rear yard.
- (3) Wind energy systems attached to the roof or walls of an occupied structure are prohibited.

- There shall be a maximum of one device on a single parcel or multiple parcels in same ownership, and shall not exceed that which will produce up to a maximum 100 KW of output, as determined by the public utility providing electric service to (Municipality).
- (4) Maximum height of the structure, including all moving and rotating parts, shall be 100 feet, measured from the undisturbed ground elevation at the base of the device, to the highest point of the arc of the blade, helix, or to the top of the tower, whichever is greater.
 - (5) Minimum distance between the undisturbed ground at the base of the device and any protruding blade shall be 15 feet, as measured at the lowest point of arc of the blades.
 - (6) All ground-mounted electrical and control equipment shall be labeled and secured to prevent unauthorized access. The tower shall not provide steps or a ladder readily accessible to the public for a minimum height of 10 feet above the ground surface.
 - (7) When a building is necessary for storage cells or related mechanical equipment, the building shall not exceed 150 square feet in area, shall not exceed 8 feet in height and must not be located in any required front, side, or rear yards.
 - (8) No artificial lighting (unless required by the Federal Aviation Administration), signage, or any forms of advertising shall be utilized or attached to the wind energy system.
 - (9) Design and location of a wind energy system shall consider, to the greatest extent possible, the aesthetics of the surrounding environment. (Municipality) may require submission of illustrations and photos depicting the color, size, shape, and architectural features of the proposed device; and submission of color photographs of the proposed tower location taken from view of all adjoining properties and roads. The wind generator and the tower shall remain painted or finished in the color or finish that was originally applied by the manufacturer unless a different color of finish is approved by (Municipality).
 - (10) A site plan, prepared, signed, and sealed by a qualified professional licensed in the Commonwealth of Pennsylvania, shall be submitted, which identifies property lines, lot area, location of existing natural and manmade features, location of the proposed wind energy device, ownership information for adjoining properties, and setback measurements from property lines, street lines, and occupied buildings.
 - (11) All utility lines, including electrical wires other than wires necessary to connect the wind generator to the tower wiring, the tower wiring to the disconnect junction box, and the grounding wires, must be installed underground in accordance with National Electric Code (latest edition) and the prevailing standards of the servicing utility company.
 - (12) Any wind energy system that is defective, or has been abandoned, that is deemed to be unsafe by the Township Building Code Official shall be required to be repaired by the owner to meet federal, state, and local safety standards, or be removed by the property owner within six months of written notification from (Municipality). If the owner fails to remove or repair the defective or abandoned wind energy system, (Municipality) may pursue a legal action to have the system removed at the owner's expense.
 - (13) A wind energy system, including tower, shall comply with all applicable state construction and electrical codes, and the National Electrical Code. Prior to issuance of a building/zoning permit for installation of the device, applicant must submit to (Municipality) all documentation required by (Municipality) Building Code Official to verify that the design of the device complies with the Pennsylvania Uniform Construction Code (UCC), including, but not limited to, documentation of the structural integrity of the foundation, base, tower, and all appurtenant structures, and electrical design. Design information must be signed and sealed by a licensed professional engineer in the Commonwealth of Pennsylvania, and/or

equipment manufacturer.

- (14) The use shall not interfere with the reception of any radio, television, or other communication equipment, nor inhibit solar access to adjacent properties.
- (15) A clearly visible warning sign concerning voltage must be placed at the base of all pad-mounted transformers and substations.
- (16) Visible, reflective, colored objects, such as flags, reflectors, or tape shall be placed on the anchor points of guy wires and along guy wires up to a height of 10 feet from the ground.
- (17) All wind energy systems shall be equipped with a redundant braking system. This includes both aerodynamic over speed controls (including variable pitch, tip, and other similar systems) and mechanical brakes. Mechanical brakes shall be operated in a fail-safe mode. Stall regulation shall not be considered a sufficient braking system for over speed protection.
- (18) All wind energy systems shall primarily serve on-site generation needs unless otherwise approved by (Municipality). If a hookup to a public or community utility system is proposed, electrical plans must be signed and sealed by a certified electrical engineer, at the applicant's expense, and submitted to the utility company and (Municipality) for approval.
- (19) The applicant shall make reasonable efforts to minimize shadow flicker at the property line.
- (20) A nonparticipating landowner shall not intentionally block, interfere, or disrupt the functional operation from an existing wind energy system. If such action or event should occur, the matter shall be resolved as a civil dispute between the landowners and (Municipality) shall not be held responsible.

B. The following provisions shall specifically apply to **solar energy systems**:

- (1) Solar Energy Systems as described in this Section are permitted in all zoning districts as an accessory use to a permitted principal use subject to the standards for accessory uses in the applicable zoning district and the specific criteria set forth in this section.
- (2) All solar energy systems within a historic district or on a historic resource property are not permitted unless written approval or a Certificate of Appropriateness has been granted by the Historical Architectural Review Boards (HARB) or Historical Commission as applicable. Where a Historical Architectural Review Board or Historical Commission does not exist, then solar energy systems shall be installed in accordance with the guidelines as set forth by the National Park Service publication: *Solar Panels on Historic Properties (latest edition)*.
- (3) Solar energy systems designed and permitted as an attached alternative energy facility are permitted provided that all structural components of the solar energy system do not exceed the allowable building height requirements of the zoning district in which it is located by a maximum of 15 feet. The building height shall be measured from the average ground elevation of the building to the average height of the solar panel(s) or other structural components of the solar energy system.
- (4) A site plan, prepared, signed, and sealed by a qualified professional licensed in the Commonwealth of Pennsylvania, shall be submitted, which identifies property lines, lot area, location of existing natural and manmade features, location of the proposed solar energy system, ownership information for adjoining properties, and setback measurements from property lines, street lines, and occupied buildings.
- (5) Solar energy systems designed and permitted as a freestanding, ground-mounted alternative energy facility shall be located in accordance with the applicable building setbacks for the zoning district in which it is to be located, and shall not exceed 15 feet in height, as measured from the ground surface to the highest extended point of the structure. All such solar energy systems shall comply with the building and lot coverage requirements

- of the zoning district on which it is located. Ground-mounted solar systems and any related appurtenances must be screened and or fenced in accordance with the National Electric Code (latest version).
- (6) Solar energy systems designed and permitted as a building-integrated photovoltaic (BIPV) system shall be limited to glazing and roofing installations only.
 - (7) Solar energy systems shall be located, designed, and installed as per the manufacturer's specifications, as well as all zoning, building code, utility requirements, and in accordance with the National Electric Code (latest version adopted in Pennsylvania).
 - (8) Solar energy systems shall be located behind the front façade of the building occupying the permitted use. No ground-mounted solar energy system shall be permitted in the front yard of the lot on which it is located.
 - (9) A solar energy system may exceed the applicable maximum accessory structure height if it will cover an impervious surface parking area. Height may not exceed the height of the primary structure that the parking area serves by more than 15 feet. Minimum height of the parking canopy must allow clearance for emergency service and service vehicles.
 - (10) For purposes of determining compliance with building coverage standards of the applicable zoning district, the total horizontal projection area of all ground-mounted and free-standing solar collectors, including solar photovoltaic cells, panels, arrays, and inverters, shall be considered pervious coverage so long as pervious conditions are maintained underneath the solar photovoltaic cells, panels, and arrays.
 - (11) A nonparticipating landowner shall not intentionally block, interfere, or disrupt the functional operation of an existing solar energy system. Owners of solar energy systems are encouraged but not required to obtain solar access easements from neighboring landowners to ensure solar access. When an applicant owns two or more adjacent lots, and at least one of those lots is proposed to utilize solar energy collection devices, the applicant is requested to consider establishing a solar access easement or a similar legal mechanism to make sure that structures or vegetation on one lot does not unreasonably obstruct solar access for the solar energy collection devices in the adjacent lot. The municipality does not guarantee and will not protect any individual property rights with respect to solar access. If such action or event should occur, the matter shall be resolved as a civil dispute between the landowners and (Municipality) shall not be held responsible.
 - (12) A clearly visible warning sign concerning voltage must be placed at the base of all pad-mounted transformers and substations.
 - (13) Solar energy panels erected on a roof must be placed in accordance with all applicable codes and practices related to firefighting and be reviewed by the fire marshal having jurisdiction in the municipality.
- C. The following provisions shall specifically apply to **geothermal energy systems**:
- (1) (Municipality) residents depend on groundwater as a water supply source. Because geothermal systems are constructed in the ground or use groundwater, these systems create a potential for water supply and quality degradation. Therefore, the (elected officials) finds that the installation, use, and maintenance of geothermal systems are matters of legitimate concern with respect to public health, safety, and welfare, and that the regulation of installation and maintenance of geothermal systems is warranted.
 - (2) It shall be unlawful to install a new geothermal well or modify an existing geothermal well without a valid permit.
 - (3) Open-loop geothermal systems are prohibited. *(Municipalities may wish to include this*

type.)

- (4) Closed-loop geothermal energy systems shall be permitted by right provided that such systems are located on a lot with a permitted use in accordance with the applicable provisions of this Chapter and Section.
- (5) A site plan, prepared, signed, and sealed by a qualified professional licensed in the Commonwealth of Pennsylvania, shall be submitted, which identifies property lines, lot area, location of existing natural and manmade features, location of the proposed closed-loop geothermal system, bore holes, ownership information for adjoining properties, and setback measurements from property lines, street lines, and occupied buildings.
- (6) The geothermal system must be installed, maintained, and decommissioned in standards conforming to IGSHA Closed-Loop/Geothermal Heat Pump Systems Design and Installation Standards, as same may be amended and updated from time to time and as per the manufacturer's specifications, as well as all zoning, building code, and utility requirements.
- (7) Only a Pennsylvania Department of Environmental Protection licensed well driller, or an IGSHA-accredited geothermal system installer, shall conduct the drilling of a geothermal well. In all cases, the well drilling rig must also be approved by Pennsylvania Department of Environmental Protection.
- (8) Geothermal energy systems may be located on a lot with a permitted use provided that all structural components comply with the building setback requirements and lot coverage requirements of the zoning district on which it is located.
- (9) Minimum isolation (setback) distance. Wells and boreholes regulated by this ordinance shall be located using the minimum isolation (setback) distances to existing or potential sources of pollution listed in Table 1. For closed-loop geothermal wells and boreholes, which due to infeasibility, cannot conform to the requirements of Table 1 (on the following page), an appeal to the pertinent municipal official can be made detailing the infeasibility and the proposed location. Upon review, the municipal official may reduce the required setback distances.
- (10) Closed-Loop Geothermal Boreholes shall be located, drilled, and finished in a manner that will protect the borehole structure from damage from surface activities or other natural occurrences so that the quality of the local groundwater cannot be affected.
- (11) The minimum required backfilling material for boreholes is bentonite. Bentonite grout shall be pure, with at least 20 percent solids by weight when mixed with water. Hydration of the bentonite must be delayed until the bentonite has been placed down the well. It is recommended that the vertical boreholes are grouted from the bottom of the well to the top using an appropriate grout with thermal transfer properties. If the borehole penetrates bedrock, it must be grouted from a depth of 15 feet into the bedrock to the top of the borehole.
- (12) A nonparticipating landowner shall not intentionally block, interfere, or disrupt the functional operation of a geothermal system. If such action or event should occur, the matter shall be resolved as a civil dispute between the landowners and (Municipality) shall not be held responsible.

Table 1

Setback From	Borehole and Geothermal Supply and Geothermal Return Well (feet)
Delineated wetlands, flood plains, lakes, ponds, or other surface waters	10-25 feet
Storm drains, retention basins, stabilization ponds, or stormwater management facilities	at least 10 feet
Preparation area or storage area of hazardous spray materials, fertilizers, chemicals, or salt piles	300 feet 100-150 feet (if borehole is cased and grouted inside and out)
Gravity sewer lines and drains carrying domestic sewage or industrial waste	5-15 feet or according to easement
Existing water and forced sewer buried utilities and/or utility trenches	at least 15 feet or outside easement
Septic tanks, aerobic tanks, or holding tanks	at least 25 feet
Subsurface sewage disposal systems, elevated sand mounds, or other sewage disposal fields	25-50 feet
Sewage seepage pits and cesspools	at least 25 feet
Farm silos, barnyards, privies, and fuel tanks	at least 25 feet
Spray irrigation sites, sewage sludge, and septage disposal sites	at least 25 feet
Dedicated public right-of-way and property lines	at least 10 feet
Building foundations (except for buildings enclosing water wells and/or water well pumps and any other source of pollution as approved)	at least 10 feet
Identified NPL Site (Superfund) plume area	at least 300 feet
Any other source or potential source of pollution	at least 300 feet

D. The following provisions shall specifically apply to **wood-fired boilers**:

- (1) Wood-fired boilers, as defined under Subsection 2. Definitions., shall be permitted by special exception, as an accessory use, in residential districts with a minimum lot area of 2 acres or more as an alternative or emerging energy facility serving any residential use.
- (2) In no case shall a wood-fired boiler be permitted in the required front, side, or rear yard, nor shall it be located closer than 150 feet to any property line.
- (3) A site plan, prepared, signed, and sealed by a qualified professional licensed in the Commonwealth of Pennsylvania, shall be submitted, which identifies property lines, lot area, location of existing natural and manmade features, location of the proposed wood-fired boiler, ownership information for adjoining properties, and setback measurements from property lines, street lines, and occupied buildings.
- (4) Wood-fired boilers shall be a Phase 2 type, as certified by the United States Environmental Protection Agency (EPA) as meeting a particulate matter emission limit of 0.32 pounds per million British Thermal Units output and is labeled accordingly. Phase 2 outdoor wood-fired boiler models will be identified with a white hang tag.

- (5) Wood-fired boilers shall be premanufactured self-contained systems with a lockable fuel feed chute and ash door.
- (6) Wood-fired boilers shall have a permanently attached smokestack with a minimum stack height of 10 feet above the ground that also extends at least 2 feet above the highest peak of any residence located less than 150 feet from the outdoor wood-fired boiler.
- (7) Fuel for wood-fired boilers shall consist of clean wood, wood pellets made from clean wood, biomass woody fuels, wood chips, home heating oil, natural gas, propane, or that which complies with all applicable sulfur limits and is used as a starter or supplemental fuel for dual-fired outdoor wood-fired boilers.
- (8) The following fuels are prohibited:
 - A. Any material not listed in Subsection 7. above
 - B. Treated or painted wood
 - C. Furniture
 - D. Garbage
 - E. Tires
 - F. Plastic
 - G. Rubber
 - H. Waste petroleum products
 - I. Paint or paint thinner
 - J. Chemicals
 - K. Hazardous waste
 - L. Coal
 - M. Glossy colored paper
 - N. Construction or demolition debris
 - O. Plywood
 - P. Particle board
 - Q. Saltwater driftwood
 - R. Manure
 - S. Animal carcasses
 - T. Asphalt products
- (9) As part of the special exception application, the Zoning Hearing Board may attach reasonable conditions and safeguards.
- E. The following provisions shall specifically apply to **emerging energy systems** other than those as described in Sections 4A, B, C, or D:
 - (1) Emerging energy systems, other than those specifically defined in this Chapter, shall be permitted by special exception as an accessory use provided that such systems are located on a lot with a permitted use in accordance with the applicable provisions of this Chapter.
 - (2) Emerging energy systems may be located on or attached to an occupied building provided that the structural components of the emerging energy systems do not exceed the permitted building height requirements of the zoning district to which it is located.
 - (3) Emerging energy systems may be located on a lot with a permitted use provided that all structural components comply with the building setback requirements and lot coverage requirements of the zoning district on which it is located.

- (4) A site plan, prepared, signed, and sealed by a qualified professional licensed in the Commonwealth of Pennsylvania, shall be submitted, which identifies property lines, lot area, location of existing natural and manmade features, location of the proposed emerging energy system, ownership information for adjoining properties, and setback measurements from property lines, street lines, and occupied buildings.
- (5) Emerging energy systems may be located on a lot provided that it is located, designed, and installed considering the health, safety, and general welfare of the adjacent property owners. As part of the special exception application, the Zoning Hearing Board may attach reasonable conditions and safeguards.
- (6) A clearly visible warning sign concerning voltage must be placed at the base of all pad-mounted transformers and substations.
- F. The following resource protection provisions shall apply to all alternative or renewable energy systems:
 - (1) The landowner shall provide documentation of the land and airspace on their property, which must remain open to assure adequate solar access, water, and/or wind to the renewable energy system. All such documentation shall be considered as part of the permit application or special exception application.
 - (2) As part of the permit application, the landowner shall notify the Zoning Officer that the alternative or renewable resource system has been installed. The landowner shall also provide the Zoning Officer with any other permits that have been obtained from agencies with jurisdiction to locate the alternative or renewable energy resource system on the property.
- G. The following provisions shall apply to noise, shadow flickering, and/or interference involving alternative and/or emerging energy systems:
 - (1) Audible sound from any alternative and/or emerging energy facility shall not exceed 55 dBA, as measured at the applicant's property line. (Municipality) has the right to inspect, measure, and record sound levels at the applicant's expense.
 - (2) The applicant shall not disrupt radio, telephone, television, or similar communication signals, and shall mitigate any harm caused by the alternative and/or emerging energy system.

5. Provisions for Encouraging Passive Energy Conservation

- A. Building Orientation
 - (1) Streets: Streets shall be designed so that the buildings in the subdivision or land development can be oriented with their long axis within 20 degrees of a true east-west orientation.
 - (2) Lot design: The lot design shall provide for lots of adequate width, depth, and shape for solar energy orientation, to provide open area, to eliminate overcrowding, and to be appropriate for the location of the subdivision or land development and for the type of development contemplated. Lots and building setback lines shall be designed so that the buildings in the subdivision or land development can be oriented with their long axes within 20 degrees of a true east-west orientation. In subdivisions or land developments of more than five buildings, only 80 percent of the proposed buildings need be oriented as required by this paragraph.
- B. Building Placement
 - (1) Buildings shall be placed on an axis within 20 degrees of a true east-west with the longest

wall facing southward to benefit from solar energy, natural shading, natural lighting, and thus reduce energy requirements. In subdivisions or land developments of more than five buildings, only 80 percent of the proposed buildings need be oriented as required by this paragraph. A group of connected townhomes is to be considered one building for the purposes of this rule.

- (2) Buildings shall be placed within the topography such that walkout basements (where used) are positioned so that the exposed or walk out part of the basement is on the southward facing side of the building.
- (3) All lots shall be laid out to permit buildings to employ renewable energy sources such as closed-loop geothermal energy, wind energy, or solar energy in the mechanical heating and cooling of any building.
- (4) No structure, whether Principal Use or Accessory Use; and no coniferous plant materials, whether trees, shrubs, or other; and no permanently fixed equipment, shall be of such a height that it would cast a shadow during daylight between 9:00 AM and 3:00 PM of the winter solstice (the shortest day of the year) on any solar gathering component of an existing or proposed solar energy system.

C. Shading

- (1) No structure, whether Principal Use or Accessory Use; and no coniferous plant materials, whether trees, shrubs or other; and no permanently fixed equipment shall be of such a height that it would cast a shadow during daylight between 9:00 AM and 3:00 PM of the winter solstice (the shortest day of the year) on the southward face of another building at the wall and/or at roof line or the buildable area of a parcel if no building exists.
- (2) Buildings shall be built incorporating an overhang, awning, deciduous trees, or other methodology that casts a shadow on all fenestration on the southward exposure of the building during daylight between 9:00 AM and 5:00 PM (daylight savings time) of the summer solstice (the longest day of the year).

D. Landscaping

- (1) All required landscaping, street trees, and buffers shall be provided in accordance with the regulations for the zoning district in which the project is located and in accordance with the subdivision and land development ordinance as applicable.
- (2) Prevailing winds are to be identified and landscaping shall be positioned to provide a windbreak for any occupied building.
- (3) Street trees shall be placed considering solar access and shading.
- (4) Coniferous trees shall be placed on the north side of a structure to provide a windbreak in the winter and deciduous trees shall be placed on the south side of structures to provide shading in the summer and solar energy access in the winter.
- (5) All landscape berms shall be on the north side of any occupied building upon a lot.

E. Cool/Green Roofs

- (1) The use of green roofs and cool roofs on nonresidential, flat, or slightly sloped, (0 – 30 degree pitch) roofed buildings, and structures, is encouraged to supplement measures to reduce energy consumption, reduce heat island effects, and provide other environmental benefits such as a reduction in stormwater runoff.
- (2) Cool roofs shall have a Solar Reflectance Index of 50 or greater in accordance with the Cool Roof Rating Council and ANSI/CRRC S100 (2016), Standard Test Methods for Determining Radiative Properties of Materials.
- (3) Green roofs shall include vegetation on at least 50 percent of the roof area of all buildings in the project and shall use only drought-tolerant landscaping. Green roofs shall be installed

in accordance with ANSI standards for fire, wind uplift, and root repellency (ANSI/SPRI VF-1, ANSI/SPRI RP-14 and ANSI/SPRI VR-1.) See Section 6. for available bonus provisions.

F. Green Walls/Living Walls

- (1) The use of green walls, interior or exterior, is encouraged to supplement measures to reduce energy consumption, heat island effects and provide other environmental benefits such as improved air quality.
- (2) Green walls may be modular or soilless types.

G. Thermal Mass Walls

- (1) The use of thermal mass walls is encouraged to supplement measures to reduce energy consumption in combination with renewable energy sources and other passive energy reduction strategies as outlined in this Chapter.
- (2) In accordance with the 2018 Pennsylvania Alternative Residential Energy Provisions, as published by the Pennsylvania Housing Research Center, and the Pennsylvania Energy Code, thermal mass walls must have an R value of 8 or an R value of 13, when more than half the insulation is on the interior.

6. Bonus Provisions

Editorial note: *This section is provided as a suggestion. Municipalities are encouraged to consider incentives and or bonuses for including sustainable and renewable energy that fit their individual sustainability goals. Preference should be given to renewable energy systems that are placed on brownfields, contaminated lands, and the built environment. Tax incentives may also be considered to help promote the inclusion of solar and other sustainable and renewable energy systems.*

- A. To encourage the use of alternative and/or emerging energy green technologies and sustainable design features, for all new construction the following bonuses may be used for a reduction in (Municipality) permit and escrow fees, increases in the base density, and increases in building coverage permitted in accordance with the following table. Increases are cumulative and may be combined for a maximum of 75 percent reduction in permit and escrow fees, 30 percent increase in building coverage, and/or a maximum density increase of two and one-half dwelling units per acre of residential land (2.5 DU/AC). All other requirements of the zoning code and subdivision and land development ordinance must be met.
- B. Any increase in dwelling units or building coverage shall be accounted for in all stormwater management facilities and calculations in accordance with applicable (Municipality) regulations and ordinances using structural and or non-structural BMPs. Applicants will be required to submit proof of compliance with this regulation as part of the stormwater management report and calculations submitted with any land development or building permit application and shall be subject to review by the (Municipality).

C. Table of Bonuses

Bonus Feature	Bonus Feature Standard	Bonus
Residential Buildings		
Energy efficient buildings and construction.	Building designs, materials, system, and construction techniques that produce an Energy Star score of at least 75 percent for at least 50 percent of the total buildings on the tract. The applicant shall provide a monitoring plan to track compliance.	5 percent reduction in permit and escrow fees or an additional 0.25 DU/AC
Building design, materials, system, and construction techniques that produce an energy score of at least 75 percent and provide solar and/or geothermal ready infrastructure.	The inclusion of electrical and plumbing infrastructure to enable the conversion to, or addition of, solar panels and/or geothermal systems to all newly constructed residential units.	10 percent reduction in permit and escrow fees, or an additional 0.5 DU/AC
Provide 25 percent of estimated energy demand via solar or other renewable energy means for all residential units.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	15 percent reduction in permit and escrow fees, or an additional 0.5 DU/AC
Provide 50 percent of estimated energy demand via solar or other renewable energy means for all residential units.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	25 percent reduction in permit and escrow fees, or an additional 0.75 DU/AC
Provide 75 percent of estimated energy demand via solar or other renewable energy means for all residential units.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	50 percent reduction in permit and escrow fees, or an additional 1.0 DU/AC
Provide 100 percent of estimated energy demand via solar or other renewable energy means for all residential units.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	75 percent reduction in permit and escrow fees, or an additional 2.5 DU/AC

Bonus Feature	Bonus Feature Standard	Bonus
Non-Residential Buildings		
Energy efficient buildings and construction.	Building designs, materials, system, and construction techniques that produce an Energy Star score of at least 75 percent for each building. The applicant shall provide a monitoring plan to track compliance.	5 percent reduction in permit and escrow fees or an additional 5 percent building coverage
Building design, materials, system, and construction techniques that produce an energy score of at least 75 percent and provide solar and/or geothermal ready infrastructure.	The inclusion of electrical and plumbing infrastructure to enable the conversion to, or addition of, solar panels and/or geothermal systems to all newly constructed non-residential buildings	10 percent reduction in permit and escrow fees, or an additional 10 percent building coverage
Provide 25 percent of estimated energy demand via solar or other renewable energy means for each building.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	15 percent reduction in permit and escrow fees, or an additional 15 percent building coverage
Provide 50 percent of estimated energy demand via solar or other renewable energy means for each building.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	25 percent reduction in permit and escrow fees, or an additional 20 percent building coverage
Provide 75 percent of estimated energy demand via solar or other renewable energy means for each building.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	50 percent reduction in permit and escrow fees, or an additional 25 percent building coverage
Provide 100 percent of estimated energy demand via solar or other renewable energy means for each building.	The inclusion of on-lot/structure and/or a community-based renewable energy system.	75 percent reduction in permit and escrow fees, or an additional 30 percent building coverage
Install a cool roof.	Use of a roofing material with a solar reflective index greater than 50 for 100 percent of the exposed roof area.	5 percent reduction in permit and escrow fees or an additional 5 percent building coverage
Install a green roof – 50 percent.	Building design includes a green roof for 50 percent of the total roof area.	25 percent reduction in permit and escrow fees, or an additional 20 percent building coverage or a reduction in stormwater system capacity equal to the volume offset by the green roof (subject to analysis/verification)
Install a green roof – 100 percent.	Building design includes a green roof for 100 percent of the total roof area	50 percent reduction in permit and escrow fees, or an additional 25 percent building coverage or a reduction in stormwater system capacity equal to the volume offset by the green roof (subject to analysis/verification)

- D. Upon submission to (Municipality) for land development, the applicant shall provide a narrative clearly outlining the applicable bonuses which are being sought, in addition to any supporting documentation as applicable, or which may be requested by (Municipality) to determine the applicability of the specific bonus or combination thereof.

7. Permit and Special Exception Application Requirements.

- A. No alternative or emerging energy facility shall be located, modified, or constructed within (Municipality) unless a permit has been issued to the landowner in accordance with the provisions of this Section.
- B. The permit application and special exception application shall be accompanied with a fee in the amount specified by (Municipality).
- C. The permit application and special exception application shall demonstrate that the alternative or emerging energy facility will comply with the provisions contained under this Section. The following specific items shall be provided by the applicant:
 - (1) A complete narrative describing the proposed alternative or emerging energy facility, which shall include: a project overview; the project location; the number of the alternative or emerging energy systems; the area and height of the alternative or emerging energy systems; the initial and potential generating capacities; the facility dimensions; and the manufacturer's specifications.
 - (2) An affidavit or similar evidence of agreement between the landowner and the facility owner/operator demonstrating that the facility owner/operator has the capabilities and permission of the landowner to apply for necessary permits for construction and operation of the alternative or emerging energy facility.
 - (3) The addresses of all properties within 500 feet on which the proposed alternative or emerging energy facility will be located.
 - (4) A site plan, prepared, signed, and sealed by a qualified professional licensed in the Commonwealth of Pennsylvania showing the boundary lines of the property occupied by the alternative or emerging energy facility and the properties within 500 feet on which the proposed alternative or emerging energy facility will be located. The site plan shall also include: topographical and natural features; the planned location of the alternative or emerging energy systems; the building setback lines; the access road and turnout locations; building and structures; and all public utilities.
 - (5) The existing and projected annual energy needs of the permitted use that will benefit from the alternative or emerging energy system, including the amount of surplus energy that will be exchanged, transferred and/or sold to a public or private utility company.
 - (6) Documents related to the potential abandonment and/or decommissioning of the alternative or emerging energy systems.
 - (7) Other relevant studies, reports, certifications and approvals, and other Municipal Ordinances as may be reasonably requested by (Municipality) to ensure compliance with this Chapter.
- D. As part of the permit or special exception application, (Municipality) may attach reasonable conditions and safeguards in order to consider the health, safety, and general welfare of the applicant and the adjacent property owners.
- E. The following provisions shall apply to emergency service requirements for an alternative or emerging energy facility:
 - (1) The applicant shall provide a copy of the permit application to the local emergency response

providers (police, fire, and ambulance) of (Municipality).

- (2) If required by the Zoning Officer, the applicant, in conjunction with the emergency service providers, shall establish an emergency response plan for the alternative or emerging energy facility.
- F. Pursuant to the time limitations specified for a permit application, (Municipality) will determine whether the application is administratively complete and advise the applicant accordingly.
- G. Pursuant to the time limitations specified by the Pennsylvania Municipalities Planning Code, 53 P.S. §10101 *et seq.*, and the State-wide Building Code [Chapter 5, Part 1], (Municipality) shall consider the permit or special exception application. The applicant may be afforded an opportunity to present the project to the designated municipal officials, as well as answer questions about the project.
- H. Throughout the permit process, the applicant shall promptly notify (Municipality) of any changes to the information contained in the permit or special exception application.

8. Supplemental Design, Installation and Maintenance Requirements.

- A. The design of the alternative or emerging energy facility shall conform to applicable industry standards, including those of the American National Standards Institute, National Underwriters Laboratories, ASTM, National Electric Code, or other pertinent certifying organization, in addition to the Uniform Construction Code [Chapter 5, Part 1], and/or other pertinent codes adopted by (Municipality). The manufacturer specifications shall be submitted as part of the permit application.
- B. Maintenance: The landowner is responsible for maintaining the system in a safe and operable condition for the life of the system. The landowner shall consult with a qualified inspector every 12 months to determine if the alternative and emerging energy facility is operating in accordance with the specifications of the manufacturer. A copy of the report shall be submitted to (Municipality) and (Municipality) shall have the right to inspect. Any noted deficiencies are to be corrected to maintain the system in operable condition unless the intent is to decommission the system in accordance with Section 10 of this Chapter.
- C. Above-ground alternative and emerging energy systems shall be clear-coated, transparent, and/or be designed with a non-obtrusive color such as white, off-white, gray, or black. All such systems shall not be artificially lighted, except to the extent required by the Federal Aviation Administration or other applicable authority that regulates air safety.
- D. Above-ground alternative and emerging systems shall not display advertising, except for reasonable identification of the manufacturer.
- E. On-site transmission, distribution, and power lines between an alternative and an emerging energy facility and the structure utilizing the energy shall be placed underground.
- F. Above-ground alternative and emerging energy systems shall not be combined with other support towers or accessory structural components that are devoted to, or utilized by, public or private utilities.

9. Liability and Insurance Requirements.

- A. Unless otherwise required by (Municipality), the landowner shall maintain a general liability policy covering bodily injury and property damage with a minimal limit of at least \$1 million per occurrence and a minimum of \$1 million in the aggregate for any above ground, aerial mounted, or wind energy system alternative or emerging energy facility. Certificates shall be made available to (Municipality) upon request.

10. Decommissioning.

- A. The landowner or energy facility operator shall, at its expense, complete decommissioning of the alternative or emerging energy facility within 12 months after the end of the useful life of the alternative and emerging system. Extensions of this decommissioning period may be granted upon request when safety concerns prohibit the complete decommissioning of the renewable or emerging energy system within 12 months' time. The alternative or emerging energy system will presume to be at the end of its useful life if no energy is generated for a continuous period of 12 months.
- B. The removal of the above-ground alternative or emerging energy facility components shall be completed within 12 months of decommissioning of the alternative or emerging energy system. All disturbed earth shall be restored, graded, and reseeded; and all recyclable materials of a decommissioned renewable energy system or facility shall be properly recycled..
- C. Unless otherwise required by (Municipality), the landowner shall be responsible for the following financial and inspection provisions as part of the decommissioning efforts:
 - (1) The landowner or facility operator shall post and maintain decommissioning funds in an amount equal to net decommissioning costs; provided that at no point shall decommissioning funds be less than 25 percent of decommissioning costs. The decommissioning funds shall be posted and maintained with a bonding company or a lending institution approved by (Municipality).
 - (2) An independent and certified professional engineer may be retained by (Municipality) to inspect the decommissioning of the alternative and emerging systems. All such inspection fees shall be paid by the applicant or landowner.
 - (3) Decommissioning funds may be in the form of a performance bond, surety bond, letter of credit, corporate guarantee or other form of financial assurance as may be acceptable by (Municipality).
 - (4) (Municipality) may release the decommissioning funds when the landowner or facility operator has satisfactorily demonstrated compliance with the decommissioning plan.
- D. If the landowner or facility operator fails to complete decommissioning during the prescribed period of 12 months, (Municipality) may take such measures as necessary to complete decommissioning in accordance with the laws of (Municipality) and the Commonwealth of Pennsylvania.

11. Public Inquiries, Inspections, Violations and Remedies.

- A. The landowner and the facility operator shall provide (Municipality) with a telephone number and identify a responsible person for the public to contact with inquiries and complaints throughout the life of the alternative or emerging energy facility.
- B. (Municipality) reserves the right to inspect an alternative or emerging energy system, at any time, if the system appears inoperable, or constitutes a danger to life or property. Twenty-four hours' advance notice shall be provided to the landowner except in the case of an emergency. (Municipality) further reserves the right to invoice the landowner for expenses incurred as part of the inspection.
- C. It shall be unlawful for any landowner, person, firm, or corporation, to violate, or fail to comply with, or take any action which is contrary to the terms of this Chapter. If (Municipality) determines that a violation has occurred, a notice of violation shall be issued to the landowner and/or facility operator in accordance with the laws specified by (Municipality) and Commonwealth of Pennsylvania.

End of Chapter