

**Add the following Appendix to read as follows:**

APPENDIX AE – ALTERNATIVE ENERGY SYSTEMS

AE101.1 Scope. Applications for the installation, additions or remodel of alternative energy system, including but not limited to photovoltaic and wind generation systems, shall be subject to this appendix when conditioned by the fire code official.

AE101.2 Conflicting Sections. Where provisions in this appendix conflict with other sections of this code or other appendices, the provisions of this appendix shall prevail unless otherwise directed by the fire code official.

AE102 **SIGNING AND MARKING**: All photovoltaic systems shall be permanently marked as specified in this section.

AE102.1 Main Service Disconnect

a. Main Panel Exterior Marking. A placard is required to be permanently affixed to the main service disconnect panel. The placard shall be red in color with white capital letters at least 3/4” in height and in a non-serif font, to read “SOLAR DISCONNECT INSIDE PANEL.” The placard shall be constructed of weather-resistant, durable plastic with engraved letters, or other approved material.

b. Circuit Disconnecting Means Marking. A permanent label is to be affixed adjacent to the circuit breaker controlling the inverter or other photovoltaic system electrical controller. The label shall have contrasting color capital letters at least 3/8” in height and in a non–serif font, to read “SOLAR DISCONNECT.” The label shall be constructed of durable adhesive material or other approved material.

AE102.2 Direct Current (DC) Conduits, Raceways, Enclosures, Cable Assemblies, and Junction Boxes.

a. Marking is required on all interior and exterior direct current (DC) conduits, raceways, enclosures, cable assemblies, and junction boxes.

b. Marking Locations. Marking shall be placed on all DC conduits, raceways, enclosures, and cable assemblies every ten feet (10’), at turns and above and below penetrations. Marking shall also be placed on all DC combiner and junction boxes.

c. Marking Content and Format. Marking for DC conduits, raceways, enclosures, cable assemblies and junction boxes shall be red with white lettering with minimum 3/8” capital letters in a non-serif font, to read “WARNING: SOLAR

CIRCUIT". Marking shall be reflective, weather resistant, and suitable for the environment. Materials used should be in compliance with UL Standard 969.

AE102.3. Secondary Power Sources. Where photovoltaic systems are interconnected to battery systems, generator backup systems, or other secondary power systems, additional signage acceptable to the fire code official shall be required indicating the location of the secondary power source shutoff switch.

AE102.4. Installer Information. Signage acceptable to the fire code official indicating the name and emergency telephone number of the installing contractor shall be required to be installed adjacent to the main disconnect.

AE102.5 Inverters. No markings are required for inverters.

AE102.6 AC Photovoltaic Systems. AC Photovoltaic Systems shall be marked as specified in this section.

a. Main Panel Exterior Marking. A placard is required to be permanently affixed to the main service disconnect panel. The placard shall be red in color with white capital letters at least 3/4" in height and in a non-serif font, to read "SOLAR DISCONNECT INSIDE PANEL." The placard shall be constructed of weather resistant, durable plastic with engraved letters, or other approved material.

b. Circuit Disconnecting Means Marking. A permanent label is to be affixed adjacent to the circuit breaker controlling the inverter or other photovoltaic system electrical controller. The label shall have contrasting color capital letters at least 3/8" in height and in a non-serif font, to read "SOLAR DISCONNECT." The label shall be constructed of durable adhesive material or other approved material.

## **AE103 BUILDING MOUNTED PHOTOVOLTAIC SYSTEMS.**

AE103.1. All building- or roof-mounted photovoltaic systems shall be installed as specified in this section.

a. Access, Pathways, and Smoke Ventilation. Access and spacing requirements shall be observed to ensure emergency access to the roof, provide

pathways for specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

b. Exceptions. Exceptions to the requirements in this section shall be permitted to be granted by the fire code official where access, pathway or ventilation requirements are reduced due to any of the following circumstances:

- (1). Proximity and type of adjacent exposures.
- (2). Alternative access opportunities, as from adjoining roofs.
- (3). Ground level access to the roof.
- (4). Adequate ventilation opportunities below solar arrays.
- (5). Adequate ventilation opportunities afforded by module set back from other rooftop equipment.
- (6). Automatic ventilation devices.
- (7). New technologies, methods, or other innovations that ensure adequate fire department access, pathways, and ventilation opportunities.

c. Designation of ridge, hip, and valley does not apply to roofs with 2-in-12 or less pitch.

d. Measurement Conventions. All roof dimensions shall be measured to centerlines.

e. Roof Access Points. Roof access points shall be defined as areas where ladders are not placed over openings (windows or doors) and are located at strong points of building construction and in locations where they will not conflict with overhead obstructions (tree limbs, wires, or signs).

#### AE103.2 Household Systems (One- and Two-Family Dwellings)

a. Access and Pathways.

(1). Hip Roof Layouts. Modules shall be located in a manner that provides one (1) three foot (3') wide clear access pathway from the eave to the ridge of each roof slope where the modules are located. The access pathway shall be located at a structurally sound location on the building, such as a bearing wall.

EXCEPTION: Where adjoining roof planes provide a three foot (3') wide clear access pathway.

(2). Single Ridge Layouts. Modules shall be located in a manner that provides two (2) three-foot (3') wide access pathways from the eave to the ridge on each roof slope where the modules are located.

(3). Hip and Valley Layouts. Modules shall be located no closer than one and one-half feet (1-1/2') to a hip or valley if modules are to be placed on both sides of a hip or valley. Where modules are located on only one side of a hip or valley that is of equal length, the modules shall be permitted to be placed directly adjacent to the hip or valley.

b. Ridge Setback. The modules shall be located no higher than one and one-half feet (1-1/2') below the ridge.

### AE103.3. Commercial Systems.

a. Definition. Commercial Systems shall be defined as all photovoltaic systems installed in any occupancy other than a one and two family dwelling.

b. Alternative Requirements. Where the fire code official determines that the roof configuration is similar to residential (i.e., townhouses, condominiums, or single-family attached buildings) the fire code official shall be permitted to make a determination to apply the requirements under Section AE103.2, above.

c. Access. There shall be a minimum six-foot (6') wide clear perimeter around the edges of the roof. EXCEPTION: If either access to the building is 250' or less, there shall be a minimum four foot (4') wide clear perimeter around the edges of the roof.

d. Pathways. Pathways shall be established as follows:

(1). Pathways shall be over structural members.

(2). Centerline axis pathways shall be provided in both axes of the roof.

(3). Centerline axis pathways shall run on structural members or Over the next closest structural member nearest to the center lines of the roof.

(4). Pathways shall be straight line not less than four feet (4') clear to skylights, ventilation hatches, and/or roof standpipes.

(5). Pathways shall provide not less than four feet (4') clear around roof access hatches with at least one not less than four foot (4') clear pathway to the parapet or roof edge.

e. Smoke Ventilation.

(1). Solar arrays shall be no greater than 150 feet by 150 feet in distance in either axis.

(2). Ventilator options between array sections shall be (a) a pathway eight feet (8') or greater in width; (b) a pathway four feet (4') or greater in width and bordering on existing roof skylights or ventilation hatches; or (c) a pathway four

feet (4') or greater in width and bordering four foot by eight foot (4' X 8) "venting cutouts" every twenty feet (20') on alternating sides of the pathway.

#### AE104. Location of Direct Current (DC) Conductors.

a. Exterior mounted Direct Current conduits, wiring systems and raceways for photovoltaic circuits shall be located as close as possible to the ridge, hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities.

b. Conduit runs between sub-arrays and to DC combiner boxes shall use design guidelines that minimize the total amount of conduit by taking the shortest path from the array to the DC combiner box.

c. DC combiner boxes shall be located so that conduit runs are minimized in the pathways between arrays.

d. DC wiring shall be run in metallic conduit or raceways when located within enclosed spaces in a building and shall be run as follows:

(1). When run perpendicular or parallel to load bearing members, a minimum ten-inch (10") space below roof decking or sheathing shall be maintained.

(2). Where flexible metal conduit (FMC) or metal clad cable (MC) containing PV power circuit conductors is installed across ceilings or floor joists, the raceway or cable shall be protected by guard strips.

#### **AE105 GROUND MOUNTED PHOTOVOLTAIC SYSTEMS**

AE105.1 Marking shall be in accordance with Section AE102, above.

AE105.2 Setbacks. Special setback requirements do not apply to ground-mounted, freestanding photovoltaic arrays. NOTE: The zoning regulations of the jurisdiction regulate setbacks between buildings, accessory structures (possibly including ground-mounted photovoltaic arrays) and property lines.

AE105.3 Clearances. A clear area of ten feet (10') around ground-mounted

photovoltaic installations shall be provided.

AE105.4 Non-Combustible Base. A gravel base or other non-combustible base acceptable to the fire code official shall be installed and maintained under and around the installation.

AE105.5 Protection. Fencing, skirting, or other suitable security barrier shall be installed when required by the fire code official. NOTE: Security barriers are intended to protect individuals and animals from contact with energized conductors or other components.

AE105.6 Fire Sprinkler Protection. Fire sprinkler protection is not required for ground-mounted photovoltaic installations.