



**SUSTAINABLE ENERGY STANDARD**  
**For The International Energy Conservation Code, 2006 Edition (as locally amended) Regionally-Specific for the Pima County Area**

**This Standard does not constitute a general code requirement as it is adopted as reference material for select Pima County energy programs.**

The following modifications to the International Energy Conservation Code, 2006 Edition are deemed to be a sustainable energy standard:

**Section 101.1 Title.** Insert:[name of jurisdiction] as “Pima County”.

**Section 101.2 Scope.** REVISE section by ADDING a paragraph to read:

The calculated target annual energy consumption of the building lighting, mechanical system, and domestic hot water heating shall be less than 50% of the energy required by the ANSI/ASHRAE/IESNA Standard 90.1-1989 without amendments for the purpose of calculating the minimum base case, otherwise buildings must also meet the adopted International Energy Code of this jurisdiction. In addition, the minimum displacement goal of energy by solar devices is prescribed as a function of residential bedrooms at 550kWh/br/yr. Displacement for other structures is prescribed in tables relating displacement goals as a function of the buildings’ use and occupancy. Buildings that show proof of LEED registration at the silver level with a LEED Accredited Professional as part of the design team shall be deemed compliant with this standard. New buildings must achieve a minimum of 7 points from LEED credits EA1 (Optimize Energy Performance) and EA2 (Renewable Energy). Existing buildings must achieve 9 points from LEED credits EA1 and EA2. Commercial buildings shall demonstrate that 5% of the total annual building lighting, mechanical system and domestic hot water heating energy consumption is offset by the use of solar energy for all methods of compliance.

**Exception:** For each 5% of building lighting, mechanical system and domestic hot water heating energy budget that is offset with co-generation the solar requirement may be decreased by 1% to a minimum of 1% solar energy utilization.

ADD new section 102.4 titled:

**Section 102.4 Equipment.**

ADD new section 102.4.1 to read:

**102.4.1 Residential.** Residential buildings constructed under the provisions of this standard (for below 4000 feet) shall be permitted to use refrigerated air conditioning systems selected under the guidelines of the Air Conditioning Contractors of America (ACCA) Manual J Procedures, Specifically Sections 7-27, 7-28 and 7-29 at outside conditions of 105 degrees F and inside conditions of 75 degrees F. Other provisions of this standard notwithstanding, air conditioning equipment shall have a minimum SEER of 14 and gas-fired heating appliances shall have a minimum of 90% efficiency.

ADD new section 102.4.2 to read:

**102.4.2 Evaporative cooling.** Evaporative cooling may be used for cooling or to reduce air conditioning requirements but may not be used as the method of compliance to this standard except for commercial buildings that use evaporative cooling as an economizer cycle on a refrigeration or air conditioning application. Duct leakage through the evaporative device shall be minimized during air conditioning and heating modes of operation.

ADD new section 102.4.3 to read:

**102.4.3 Water Heating.** The following service water heating systems are the only methods acceptable:

- a. Solar water heaters.
- b. Instant gas or electric water heaters.
- c. Heat pump electric water heaters.
- d. Heat recovery water heaters from air conditioning or other sources.
- e. Gas water heaters exceeding 80% efficiency.
- f. Passive Solar with in-collector storage (ICS), thermal siphon and alike shall be installed with no more than a total of 20 linear feet of piping between the solar system and the storage tank.

**Exception:** Other methods acceptable to the authority having jurisdiction showing 50% reduction of water heating energy consumption.

Water heating systems that serve only hand sinks and/or a single mop sink may use a water heater with up to 20 gallons of storage.

**Section 104.1 General:** REVISE section by ADDING a sentence at the end of the paragraph to read:

Plans and specifications shall show the method of utilizing "beneficial use of solar energy".

ADD new section 108 titled: **Section 108 Wood-burning gas fireplaces and wood stoves.**

ADD new section 108.1 to read:

**108.1 Wood-burning stoves.** Wood-burning stoves shall be labeled to show compliance with the U. S. Environmental Protection Agency (EPA) Phase II standards for particulate emissions during operation. Catalytic stoves shall have an accessible, modular, replaceable catalyst element.

ADD new section 108.2 to read:

**108.2 Fireplaces.** Wood-burning fireplaces and gas fireplaces shall produce useful heat and be provided with a means of supplying 100% of the combustion air for operation from the outside, and shall limit particulate emissions to less than 7.5 grams per hour. All fireplaces shall be provided with a tight fitting glass door and a positive means of circulating the heated air in the occupied space.

ADD new section 108.3 to read:

**108.3 Solar Backup.** A wood-burning stove or fireplace shall be considered as providing the required space heating energy only when installed as backup energy for a solar-thermal collection system.

**Section 202 General definitions.** Add the following new definitions:

**Civano:** A Tucson Solar Village, a model sustainable community; a vision of the future where resource consumption is reduced through more efficient technologies, use of solar energy and lifestyles which promote greater harmony and balance with the natural environment; a community in the spirit of the "Civano" period, a golden era of the Hohokam culture which balanced natural resources and human needs; incorporates and demonstrates strategies for achieving more sustainable development.

**Sustainable Development:** "Development that meets the needs of the present without compromising the ability of future generations to meet their needs." (UN World Commission on the Environment and Development)

**Beneficial Use of Solar Energy:** The following devices/methods may be used to demonstrate compliance:

- Solar space heating systems.
- Trombe wall or clear view collectors for space heating.
- Solar Photovoltaic systems.
- Solar thermal/electric power generating systems, including stand-alone and grid connected parabolic trough and dish Stirling.
- Solar day lighting system using controls to turn off or dim electric lights.
- Solar day lighting systems specifically designed to capture and redirect visible solar energy while controlling infrared energy (conventional skylights are specifically excluded) for at least one half of the non-bedroom space.
- Passive building heating for the winter through the use of optimum window shade structures and orientation.
- Solar water systems for domestic water heating or space heating.
- Solar pool or spa water heating - see also 504.5.

**Power Density:** The total connected power load of all components of a building system, including all auxiliary components and circuitry, without regard to the timing, scheduling, or control of their operation, in w/ft<sup>2</sup> or Btu-h/ft<sup>2</sup>.

**Site Energy:** Energy, other than recovered energy, utilized for any purpose on the site.

Source energy consumption shall be determined by multiplying the site energy usage in kBtu-h per square foot by the following factors:

Site Energy	Factor
Electric	3.10
Gas	1.11
Wood	1.00
Solar (amount of displaced electric or gas)	0.00

**Bedrooms:** A room including clothes closets that may be used for sleeping purposes.

ADD new section 403.7 to read:

**403.7 All recreational swimming** pools and spas shall utilize solar energy as the only water heating source. Medical and rehabilitation pools smaller than 3,000 gallons water capacity shall use solar energy as the primary water heating source, with a new energy source permitted as backup.

ADD new section 403.8 to read:

**403.8 Lighting fixture efficacy.** All general purpose lighting fixtures in kitchen, laundry room, utility room, equipment room, and garage, and those that are required by other Codes at entries on the exterior of buildings shall be so constructed as to accept only lamps with efficacy greater than 40 lumens/watt.

**Exception:** Those fixtures designed for spot or flood type lamps and those fixtures controlled by a permanently installed dimmer.

ADD new section 403.9 to read:

**403.9 Exterior lighting fixture controls.** Exterior lighting fixtures shall be controlled by a time switch with astronomic adjustment or a photo sensor. A standard time switch may be incorporated with the photo sensor to turn the lights off at a desired time before dawn. All time switches shall incorporate a minimum 2 hour carry through of the program.

**Section 404.3 Documentation.** REVISE first sentence to read: ...proposed residence (proposed design) be shown to have an annual energy cost that is less than 50% of the annual energy cost of the standard reference design....

**Section 404.3 Documentation.** REVISE section by ADDING a second exception to read:

**Exception 2:** Compliance with this chapter may utilize an analysis of the annual source energy usage, as required in section 404.3, hereinafter called an annual energy analysis or shall not exceed the source energy usage shown in Table 404.3.

Table 404.3

<i>Sq. Ft. Range</i>	<i>kBtu/Sq.Ft./yr. (source consumption)</i>		
	<i>Heating</i>	<i>Cooling</i>	<i>Total</i>
<i>&lt;1000</i>	<i>5</i>	<i>22</i>	<i>27</i>
<i>1000 - 1399</i>	<i>4</i>	<i>18</i>	<i>22</i>
<i>1400 - 1799</i>	<i>4</i>	<i>16</i>	<i>20</i>
<i>1800 - 2199</i>	<i>4</i>	<i>15</i>	<i>19</i>
<i>&gt;2200</i>	<i>4</i>	<i>14</i>	<i>18</i>

ADD new section 404.5.3 to read:

**404.5.3 Occupied mode.** The occupied mode shall be not less than 10 hours in a 24-hour period.

ADD new section 502.1.2 to read:

**Section 502.1.2 Energy Consumption.** In multifamily dwellings, provisions shall be made to determine the energy consumed by each tenant by separately metering individual dwelling units or tenant spaces.

**Section 503.2.7.1.1 Duct construction.** REVISE section by ADDING the following to the end of the sentence:

All low pressure ducts shall be leak tested in accordance with this standard. The tested rate of air leakage is not to exceed 3% of conditioned floor area in CFM at 25 Pascals (0.1 inches WC) prior to drywall and air handling equipment installation. A representative of the developer and/or builder will perform a field inspection and leakage test of the ductwork before drywall installation. The field representative will certify successful completion of this test.

**Section 504.6 Hot water system controls.** REVISE section by DELETING "conveniently", PLACING a period after "automatically" and DELETING the rest of the sentence.