



PUBLIC CODE CHANGE PROPOSAL FORM

FOR PUBLIC PROPOSALS TO PUBLIC VERSION 2.0 OF THE INTERNATIONAL GREEN CONSTRUCTION CODE

CLOSING DATE: All Proposals Must Be Received by January 3, 2011.
 The 2011 IGCC Code Development Hearings are scheduled for May 16 – 22, 2011, Dallas, TX.

1)

Name: Dan Adamson		Date: 1/3/2011	
Jurisdiction/Company: Solar Energy Industries Association			
Submitted on Behalf of:			
Address: 575 7th Street NW, Suite 400			
City: Washington		State: DC	Zip Code: 20004
Phone: Christine Covington: 202-556-2894	Ext.	Fax:	
E-mail address (see item 3 below): Christine Covington: ccovington@seia.org			

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CODE CHANGE PROPOSAL FORM
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Code: GC _____ **– 11** *(to be filled in by ICC)*

Code Sections/Tables/Figures Proposed for Revision: Chapter 2

Proponent: Dan Adamson, representing Solar Energy Industries Association

Email Address: Christine Covington: ccovington@seia.org

Add new text as follows:

BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) SYSTEM. A system that incorporates photovoltaic modules, which convert solar radiation into energy, into the building envelope.

PHOTOVOLTAIC SYSTEM. A complete set of components for converting sunlight into electricity by the photovoltaic process, including the photovoltaic equipment and balance of system and/or tracking components. A photovoltaic system includes either flat-plate photovoltaic equipment or concentrating photovoltaic equipment.

SOLAR WATER HEATING SYSTEM. A system that uses solar radiation to heat water to supply or supplement the building's hot water.

WIND ENERGY SYSTEM. A system installed on the building site or on the building that uses a wind turbine to convert wind energy into electricity.

SOLAR THERMAL SYSTEM. A system that uses solar energy to provide space heating or cooling, hot water heating, swimming pool heating, or process heating.

Reason: Definitions are added to Chapter 2 to clearly distinguish between the different types of renewable energy systems that have entered the marketplace.

Cost Impact: None

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF



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CODE CHANGE PROPOSAL FORM
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Code: GC _____ **– 11** *(to be filled in by ICC)*

Code Sections/Tables/Figures Proposed for Revision: Section 603.1.1.1

Proponent: Dan Adamson, representing Solar Energy Industries Association

Email Address: Christine Covington: ccovington@seia.org

Revise as follows:

603.1.1.1 zEPI determination. *Building zero energy performance index (zEPI) shall be determined in accordance with Section 603.3 and Equation 6-3.*

$$zEPI = 57 \times (PD-RE-WE)/RD \quad \textbf{(Equation 6-3)}$$

Where:

PD = Total annual energy delivered to the *proposed* design and consumed on site, as determined in accordance with Section 603.

RE = Total annual energy savings from renewable energy derived on site and for which renewable energy credit ownership is retained

RD = Total annual energy used by a *standard reference design*, determined in accordance with Section 603

WE = Total annual energy savings from *waste energy recovery*

PD, RE, RD and WE shall all be expressed in consistent units of energy in accordance with Section 603.1.1.

Reason: The additional language requires ownership of the REC created by the onsite renewable energy, in order to prevent double-counting of the REC created by the onsite generation.

Cost Impact: None

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF



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Code: GC _____ **– 11** *(to be filled in by ICC)*

Code Sections/Tables/Figures Proposed for Revision: Section 303

Proponent: Dan Adamson, representing Solar Energy Industries Association

Email Address: Christine Covington: ccovington@seia.org

Revise as follows:

303.2 Additional elective. Where required in accordance with Section 705.1 or Section 611.1 Exception 1, the total number of *project electives* indicated in Table 302.1 shall be increased by one.

Reason: An Additional elective requirement is submitted to require one additional energy project elective from Section 613 for those cases where the minimum 2% renewable energy threshold cannot be met. This requirement will ensure that the energy efficiency of the building will not be degraded because of the unavailability of renewable energy, and will also increase enforceability of this Section of the IGCC.

Cost Impact: None

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF



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CODE CHANGE PROPOSAL FORM

(See instructions on page 2)

Code: GC _____ **– 11** (to be filled in by ICC)

Code Sections/Tables/Figures Proposed for Revision: Section 611 Building Renewable Energy Systems

Proponent: Dan Adamson, representing Solar Energy Industries Association

Email Address: Christine Covington: ccovington@seia.org

Delete and substitute as follows:

~~**611.1 Renewable energy systems requirements.** Buildings that consume energy shall comply with this section. Each building or surrounding lot or building site where there are multiple buildings on the building site shall be equipped with one or more renewable energy systems in accordance with this section.~~

~~Renewable energy systems shall meet the requirements of Section 611.2 for solar photovoltaic systems, Section 611.3 for wind systems, or Section 611.4 for solar water heating systems, and Section 611.5 for performance monitoring and metering of these systems as approved by the code official. These systems shall be commissioned according to the requirements of Section 612.~~

Exceptions:

- ~~1. Buildings or building sites where there are multiple buildings on the building site providing at least two percent of the total estimated annual energy use of the building, or collective buildings on the site, with on-site renewable energy using a combination of renewable energy generation systems meeting the requirements of Section 611.2, 611.3, or 611.4.~~
- ~~2. Where not less than four percent of the total annual building energy consumption from renewable generation takes the form of a ten-year commitment to renewable energy credit ownership, confirmed by the code official.~~
- ~~3. Where the combined application of on-site generated renewable energy and a commitment to renewable energy credit ownership as confirmed by the code official, totals not less than four percent of the total annual building energy consumption from renewable generation.~~

~~**611.1.1 Building performance-based compliance.** Buildings and surrounding property or building sites when there are multiple buildings on the building site, that seek compliance with this code in accordance with Section 602.3.2, performance-based compliance, shall be equipped with one or more renewable energy systems that have the capacity to provide not less than two percent of the total calculated annual energy use of the building, or collective buildings on the site, with on-site renewable energy in accordance with Section 603.~~

~~**611.1.2 Building prescriptive compliance.** Buildings and surrounding property or building sites where there are multiple buildings on the building site, that seek compliance with this code in accordance with Section 602.3.1, Prescriptive compliance, shall be equipped with one or more renewable energy systems that have the capacity to provide not less than two percent of the total estimated annual energy use of the building, or collective buildings on the building site, with on-site renewable energy by calculation demonstrating that on-site renewable energy production has a rating of not less than 1.75 Btu/hr or not less than 0.50 watts per square foot of conditioned floor area, and using any single or combination of renewable energy generation systems meeting the requirements of Sections 611.2, 611.3, or 611.4.~~

~~**611.2 Solar photovoltaic systems.** Solar photovoltaic systems shall be designed, constructed and sized to provide not less than two percent of the total estimated annual electric energy consumption of the building, or collective buildings on the building site in accordance with Section 611.1.1 or 611.1.2.~~

Exception: Solar photovoltaic systems are not permitted to be used to comply with section 611.1 where building sites with total global insolation levels lower than 2.00 kWh/m²/day as calculated in accordance with NREL SERI TR 642-761.

611.2.1 Requirements. The installation, inspection, maintenance, repair and replacement of *solar photovoltaic systems* and all system components shall comply with the manufacturer's instructions, Sections 611.2.1.1 through 611.2.1.4, and NFPA 70.

611.2.1.1 Roof-mounted solar photovoltaic systems. Where *solar photovoltaic systems* are installed on roofs, the roof shall be constructed to support the loads imposed by such modules. Solar photovoltaic systems and supporting structure shall be constructed of noncombustible materials or fire retardant treated wood equivalent to that required for the roof construction. Not less than four feet of clearance shall be provided between any portion of a roof-mounted *solar photovoltaic* array and roof-mounted equipment, *skylights*, access hatches and similar *building* components that could hinder access to the *solar photovoltaic* array.

611.2.2 Performance verification. *Solar photovoltaic* systems shall be tested upon installation to verify that the installed performance meets the design specifications. A report of the tested performance shall be provided to the *building owner*.



611.3 Wind energy systems. Wind energy systems shall be designed, constructed and sized to provide not less than two percent of the total estimated annual electric energy consumption of the *building*, or collective *buildings* on the *building site* in accordance with Section 611.1.1 or 611.1.2.

611.3.1 Installation, location and structural requirements. Wind energy systems shall be located on the *building*, adjacent to the *building*, or on the *building site*.

611.3.1.1 Roof top set back. Roof top wind turbine installations shall be set back from the edge of the *building* a distance not less than two times tip height where tip height is defined as the height from the base of the tower to the top of one blade in the 12 o'clock position.

611.3.1.2 Roof and wall penetrations. Roof and wall penetrations shall be flashed and sealed to prevent entry of water, rodents and insects.

611.3.1.3 Solar photovoltaic modules. Solar photovoltaic modules shall be listed and labeled in accordance with UL 1703.

611.3.1.4 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.



611.4 Solar water heating equipment. Not less than ten percent of the *building's* annual estimated hot water energy usage shall be met by on-site solar water heating equipment.



611.5 Renewable energy system performance monitoring and metering. Renewable energy systems shall be *metered* and monitored in accordance with Sections 611.5.1 and 611.5.2.

611.5.1 Metering. Renewable energy systems shall be metered separately from the *building's* electrical and fossil fuel meters. Renewable energy systems shall be *metered* to measure the amount of renewable electric or thermal energy generated on the *building site* in accordance with Section 604.

611.5.2 Monitoring. Renewable energy systems shall be monitored to measure the peak electric or thermal energy generated by the renewable energy systems during the *building's* anticipated peak electric or fossil fuel consumption period in accordance with Section 604.

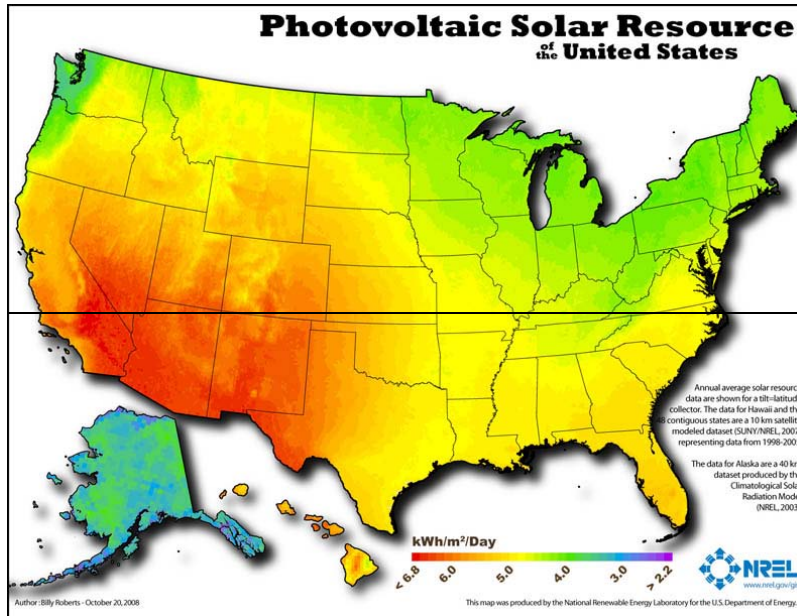


FIGURE 611.4 PHOTOVOLTAIC RESOURCE MAP (kWh/m²/day)

SECTION 611 BUILDING RENEWABLE ENERGY SYSTEMS

611.1 Renewable energy systems requirements. Each building or building site shall be equipped with one or more renewable energy systems in accordance with Section 611.2 that have the combined capacity to provide at least two percent of the annual energy use of the building or building site. These systems shall be metered in accordance with Section 604.4.7.

611.1.1 Building performance-based compliance. Performance-based compliance shall be based on building annual energy use calculations in accordance with Section 603.

611.1.2 Building prescriptive compliance. Prescriptive compliance shall be based on building annual energy use calculations in accordance with Section 603 or demonstrate that the renewable energy system provides not less than 1.75 Btu/hr or not less than 0.50 watts per square foot of conditioned floor area.

Exceptions:

1. Where it is determined that two percent of the building's annual energy consumption cannot be provided by a renewable energy system or combination of renewable energy systems, the building shall comply with one additional project elective from Section 613. This shall be in addition to the requirements of Table 302.1.

2. Where not less than four percent of the total annual building energy consumption from renewable generation takes the form of a ten-year commitment to a certified or verified renewable energy credit ownership, confirmed by the code official.

3. Where the combined application of on-site generated renewable energy and a ten-year commitment to a certified or verified renewable energy credit ownership as confirmed by the code official, totals not less than four percent of the total annual building energy consumption from renewable generation.

611.2 Renewable energy systems. Renewable energy systems shall meet the requirements of Section 611.2.1 roof-mounted solar photovoltaic systems, Section 611.2.2 site-located photovoltaic system, Section 611.2.3 building-integrated solar photovoltaic systems, Section 611.2.4 wind energy systems, or Section 611.2.5 solar thermal systems.

611.2.1 Roof-mounted photovoltaic systems. Roof-mounted photovoltaic systems shall be designed, constructed, and installed in accordance with Section 1509.6 of the International Building Code and NFPA 70.

611.2.2 Site-located photovoltaic systems. Site-located photovoltaic systems shall be designed, constructed, and installed in accordance with manufacturer's instructions.

611.2.3 Building-integrated photovoltaic systems. Building-integrated solar photovoltaic systems shall be designed, constructed and installed in accordance with Section 1507.17 of the International Building Code and NFPA 70.

611.2.4 Wind energy systems. Wind energy systems shall be designed, constructed and installed in accordance with manufacturer's instructions.

611.2.5 Solar thermal systems. Solar thermal systems shall be designed, constructed, and installed in accordance with the International Mechanical Code Chapter 14.

Reason:

Renewable Energy Systems are crucial to our goal for net zero energy buildings. This proposal rewrites Section 611 Building Renewable Energy Systems of the IGCC Public Version 2.0 in order to bring clarity and enforceability to the use of renewable energy on buildings and building sites. Companion changes to this Section 611 rewrite requires additions for Chapter 2 Definitions and Section 303.2, which are submitted as part of this proposal.

The following is a breakdown of the reasons for the reorganization of Section 611.

Section 611.1

1. The charging paragraph clearly states that there is a minimum of 2% of the buildings energy use to be provided by renewable energy systems, along with a requirement for metering of these systems.
2. Instructions for demonstrating compliance with Section 611.1 is given for both performance and compliance paths.
3. Exceptions:

The first exception recognizes that there are circumstances where the 2% renewable energy minimum cannot be reached. In this case, an additional project elective shown in Section 613 must be selected. This will ensure that the energy efficiency of the building is not degraded by the unavailability of renewable energy for that project.

The second and third exceptions recognize the use of Renewable Energy Credits as a means to comply with this section

Section 611.2

This section describes the various types of renewable energy systems that may be used individually or in combination to satisfy the 2% minimum set forth in Section 611.1. Solar systems and wind energy systems are the two major types of renewable energy systems included in the IGCC.

Photovoltaic systems are further broken down into three types, each with "pointers" to applicable installation requirements in the International Building Code. Definitions for each type of Photovoltaic System are proposed for Chapter 2. As the purpose of the IGCC is to serve as an overlay code, detailed installation requirements are not required.

The insolation requirement is removed to encourage the use of solar photovoltaic technology in all geographic areas. The performance verification requirements have been removed, as duplicative of the metering requirements. Additionally, methods of verification are inconsistent and difficult to enforce.

Building-integrated photovoltaic systems (BIPV) are PV modules incorporated into the building envelope such that, in the case of roof BIPV, the system not only generates electricity but also forms the roof covering. Because these products provide dual function, BIPV installation must also meet roof covering requirements found in Section 1507.17 of the IBC.

Wind energy systems are recognized as another renewable energy source and must be placed in accordance with the manufacturer's installation instructions.

Solar thermal systems are recognized as a source of space heating or cooling, and for hot water heating. Solar thermal systems must be installed in accordance with the applicable codes, incorporated by reference.

Cost Impact: None

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF



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