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## **Understanding the International Green Construction Code (IgCC), the California Green Building Standards Code (CGBSC) & Implications for Building Projects**



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## INTRODUCTION

Green building and energy conservation are now more commonplace in the United States with State and Local Authorities Having Jurisdiction (AHJs) adopting some version of the International Code Council's (ICC) suite of building codes. Some jurisdictions are now adopting the ICC's Green Construction Code (IgCC). The State of California has taken the International Green Construction Code a step further and implemented it across the state for all new building projects. Some existing buildings can be included in these requirements; however, they are exempt from compliance with the code when the cost of the work is below a threshold of \$200,000. This can be a major concern due to the recent wildfires in the past four years, and all total constructive loss structures will need to comply. California is the only state to have implemented the IgCC in this way, all other adoptions can be found in a list below.

The intent of the IgCC is to establish and promote provisions consistent with green construction, and the International Energy Conservation Code (IECC) is the baseline standard for the IgCC to build from. This article will discuss the history of these codes, what they cover, and where they apply, with some additional emphasis on California standards.

## HISTORY OF THE IgCC AND ICC

The IgCC was first developed by committee process by the International Code Council (ICC) in 2009 (Public Version 1.0). Currently the industry is on the fifth edition of the 2021 IgCC, the prior editions having been issued in 2012, 2015, and 2018. The 2018 version was co-developed by the ICC and American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE). The ICC is responsible for Chapter 1 (Scope and Administration), and the remainder of the technical content is based on the provisions/standards developed by ASHRAE in ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1 *Standard for the Design of High-Performance Green Buildings Except Low Rise Residential Buildings*. This document follows the ICC formatting as utilized in other ICC codes with Standard 189.1 formatting in parentheses.

## WHAT DOES THE CURRENT IgCC COVER?

The current adoption of the IgCC addresses the following topics:

- General Scope/Compliance – Jurisdictional Requirements and Project Electives (Chapter 1)
- Site/Land Development (Chapter 5)
- Water Conservation (Chapter 6)
- Energy Conservation (Chapter 7)
- Indoor-Air and Environmental Quality (Chapter 8)
- Materials and Resources Conservation (Chapter 9)
- Construction and Plans for Operation (Chapter 10)

It is important to note that the **2018 IgCC does not apply to the following structures or building uses** as identified in the wording of the code in sub-section 101.3.2(2.2):

- Single-family dwellings
- Multi-family dwelling of three stories or fewer above grade
- Manufactured houses (mobile homes)
- Manufactured houses (modular)
- Building projects that use none of the following:
  - Electricity
  - Fossil fuels
  - Water

Please note, the National Association of Home Builders (NAHB) has developed with the ICC a similar non-mandatory document **ICC 700-2008 National Green Building Standard** (NGBS) to address and encourage green building practices for use on residential building projects. This document provides builders, renovators, developers and contractors different options to obtain (points) towards a certified NGBS building project. This system can apply to new construction and renovation / rehab work, the 2020 standard includes an option for both commercial and residential multi-family development to be certified as well. The standard has mandatory minimum points as well as elective points in six-categories (lot development, resource efficiency, energy efficiency, water efficiency, indoor environmental quality and homeowner education) for a rating of Bronze, Silver, gold or Emerald.

The **2018 IgCC does apply to the following building projects** as identified in the scoping of the code in sub-section 101.3.2(2.1):

- New buildings and their systems
- New portions of buildings and their systems
- New systems and equipment in existing buildings, and relocated existing buildings and temporary structures as specified by the code

The intent of the IgCC is to establish green construction minimum regulations for all new construction other than single-family residential that addresses buildings, systems and their sites while utilizing prescriptive and performance-based options for compliance.

## WHERE DOES THE IgCC CURRENTLY APPLY?

As of the publication date of this paper, the IgCC is currently adopted in the following states/territories:<sup>1,2</sup>

- Arizona
  - City of Scottsdale – 2015 Version
  - City of Phoenix has adopted its own standard based off the National Green Building Standard for residential construction
  - Kayenta Township (Tribal Community) – Voluntary – 2010 IgCC public Version 2.0
- Colorado
  - Town of Carbondale – 2012 Version.
  - City of Fort Collins – Commercial Building Code Green Building Amendments (based on IgCC)
- District of Columbia – 2012 version
- Florida
  - Boynton Beach (Sustainable Development Standards) – Based on 2018 version (increase in existing building size by 5,000 SF or development of new site)<sup>3</sup>
- Idaho
  - City of Boise – 2012 Version
- Maryland - 2012 version
  - City of Baltimore – (Mandatory - All buildings)
  - City of Rockville - (Mandatory – All commercial and multi-family buildings)
- North Carolina - 2015 version

- North Carolina Building Code Council adopted Rainwater Collection and Distribution Systems section of the 2009 IgCC public version 1.0
- New Hampshire
  - City of Keene – (All projects awarded urban development zone incentives)
- Rhode Island – 2012 Version
  - Statewide adoption for the design and construction of all major public facilities
- Oregon – 2009 version
- Texas
  - City of Dallas – 2012 Version
    - Mandatory for all new structures, excludes all existing buildings
- Washington
  - City of Richland - IgCC public version 1.0 is optional reference document for the construction of commercial buildings

Please note the ICC lists the states of Arkansas, Illinois, Minnesota, Missouri, and Tennessee as having a jurisdiction that has adopted the IgCC in some form or another. Check with the local AHJ to see what codes and standards apply to any building construction or repair.

## THE CALIFORNIA GREEN BUILDING STANDARDS CODE (CGBSC)

The State of California has taken the IgCC as the model for its own California Green Building Standards Code (CGBSC) and modified it to be applicable to ALL building projects throughout the state. This code is mandatory as it was created, approved and adopted at the state level, the current California adoption addresses the topics listed below:

- Administration (Chapter 1)
- Green Building [Scope] (Chapter 3) – Voluntary measures are discussed in section 306
- Residential Mandatory Measures (Chapter 4)
  - Planning & Design
  - Energy Efficiency
  - Water Efficiency
  - Material Conservation and Resources
  - Environmental Quality

- Non-Residential Mandatory Measures (Chapter 5)
  - Planning & Design
  - Energy Efficiency
  - Water Efficiency
  - Material Conservation and Resources
  - Environmental Quality
- Referenced Originations and Standards (Chapter 6)
- Installer & Inspector Qualifications (Chapter 7)
- Forms, Worksheets and Reference Materials (Chapter 8)

As aforementioned, some existing buildings can be included in these requirements; however, any construction project is exempt from compliance with the CGBSC when the cost of the work is below a threshold of \$200,000. It is important to note that while the ICC IgCC does not include single family homes, **the California standards does include them as required buildings which must comply with this code.**

Major items to take note of include the following:

- All new residential construction with attached private garages shall have the following for electric vehicle (EV) charging stations:
  - Install a minimum 1-inch conduit capable of supplying a 208/240V branch circuit to a suitable box location for EV charging. The other end shall terminate to the main service and/or subpanel.
  - The main panel and/or subpanel shall be of sufficient size to install a 40-ampere dedicated branch circuit. The dedicated overcurrent protection space shall be labeled “EV CAPABLE”.
- Site grading and/or drainage systems must manage all surface water flows to keep water from entering buildings.
- Automatic irrigation system shall comply with Appendix D – Prescriptive Compliance Option, Section (5) of the CGBSC, including the requirement to utilize evapotranspiration or soil moisture sensor and rain sensor data.
- A construction waste management plan that identifies materials diverted from disposal by recycling or salvage, materials sorted on site, diversion facility, construction methods employed to reduce waste.
- For projects which disturb less than one acre of soil and are not part of a larger common plan of development, which in total disturbs one acre or more, shall manage storm water drainage during construction.
- All architectural paints and coatings shall comply with VOC limits set forth in the applicable tables.
- Where multiple shower heads serving a single shower shall have a combined flow rate of 1.8 GPM or the shower shall be designed to allow only one shower outlet to be in operation at a time.
- The project shall meet minimum pollutant control requirements for adhesives, sealants, caulks, paints, carpet, resilient flooring systems, etc.

Additionally, items from The California Energy Conservation Code that one should also be aware of are as follows:

## Energy

- Recessed downlight luminaires in ceilings must be LED or GU-24 sockets, devices are to be controlled by occupancy / vacancy sensors switches.
- Components of the exterior thermal building envelope (walls, roofs, foundation slab, windows and doors, etc.) must meet the insulating criteria set forth in 2019 CEC Table 150.1-A – California has a specifically adopted climate zone map.
- Water heating, heating and cooling equipment have minimum efficiencies and control standards based on specific parameters.
- In order to balance indoor air quality and exhaust, a whole house ventilation is required to meet the requirements of the energy code.
- Verification on the plans how the building will meet the minimum ventilation and acceptable indoor air quality requirements per ASHRAE Standard 62.2.
- All Pool and Spa equipment to be evaluated against CEC section 110.4 for energy.

- Were a single-family residence is located in a development of ten (10) or more, any new structure is to be equipped with Photovoltaic (PV) or solar panels meeting the minimum requirements of JA11 where the system meets the annual electrical demand determined by Equation 150.1-C, compliance options do exist.

## APPLICATIONS IN OTHER LOCATIONS

Another item of importance: in New York City, with the passage of Local Law 94 under the Cool Roofs requirement, where a building's roof is replaced and the replaced area is greater than 50% of the roof surface or over 500 SF, the new roof will need to meet the reflectivity requirements of a minimum reflectance of 0.7 per ASTM C 1549 or E 1918 and a minimum emittance of 0.75 per ASTM C1371 or E408; or, it must have a minimum SRI of [78] 82 per ASTM E 1980 where the roof slope is equal to or less than 2:12 slope. Additionally, under Sustainable Roofs requirement, if the entire roof assembly or deck is replaced and the roof slope is equal to or less than 2:12 slope then a contiguous 200 SF or a 4kW photovoltaic array must be installed and comply with the requirements of the New York City Building and Fire Code.<sup>4</sup>

## CONCLUSION

With the awareness created by the Green Building and Leadership in Energy and Environmental Design (LEED) movement stated in the early 2000's the ICC and NHBA responded with the development of model green construction codes and standards. Various jurisdictions have adopted different versions of this code and or further developed and implemented their own green construction code for use statewide as in the case of California's CGBSC. The intent of the IgCC and CGBSC is to create a built environment that uses less resources, creates less waste and uses less energy, while providing better indoor air quality for the inhabitants and minimizing stormwater runoff during and after construction. The NGBS standards developed by the ICC and NHBA offers stakeholders various options for certification and compliance while educating all on the importance and benefits of green construction practices.

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