An Overview of the International Green Construction Code
What is the IGCC?

- Adoptable, useable and enforceable code
- Reduces the negative impacts of the built environment on the natural environment
- Full range of sustainability topics
  - Natural resource preservation
  - Material conservation
  - Energy conservation
  - Water conservation
  - Indoor environmental quality
Scope and Intent

- Applicable to the construction of all new and existing buildings
- Consistent and coordinated with the ICC family of Codes & Standards
- Intended to be enforced primarily by building officials
- Seeks to drive green building into everyday practice
IGCC Development Schedule

IgCC Development began in 2009.

IGCC Code Development Hearing May 16 through 22, 2011, Dallas, Texas.

Final Action Hearings November 2 through 6, 2011, Phoenix, Arizona.

The first edition of the IGCC to be published March 2012.

Already adopted in a handful of states and municipalities.
Development Partners

- The IgCC has been developed by the International Code Council (ICC) in association with cooperating sponsors:
  - ASTM
  - AIA

- The IGCC also references ASHRAE 189.1 as an alternative compliance path, as developed by ASHRAE and partners:
  - IES
  - USGBC
IGCC Approach

• The IGCC is *not* a rating system, nor is it intended to replace them.

• The IGCC is *code* which is intended to be adopted on *mandatory* basis.

• Unlike most rating systems, the IGCC primarily consists of *minimum mandatory requirements*, just as other I-Codes.

• Produces *more predictable results* than rating systems.

• Requires *green practices* whenever reasonable.
How should we compare green and sustainable codes, standards, rating systems and programs?

- Building by building?
- By their ability to be adopted on a mandatory basis in all regions and potential overall reduction of negative environmental impacts?

What should the intent of a green code or program be?

- To make a few buildings very green?
- To have as large a positive impact and as little a negative impact as possible on the total natural environment? Not just local, not just the U.S., but the entire planet.
IGCC Context

Because the IGCC is intended to apply to both private sector and government owned buildings on a mandatory basis it:

- Raises the floor of sustainability for all commercial buildings.

- Positions the IGCC to achieve environmental benefits on a massive scale – a scale not possible with voluntary rating systems.
Simply put, a green building code and a beyond-code green building rating system provide the best-case scenario to reduce the impact of buildings on the environment.
Mandatory vs. Elective Provisions

IGCC

ASHRAE 189.1

ICC 700

LEED - NC
IGCC Technical Highlights

Key difference from other ICC codes:

- Chapters based on sustainability topics, not building systems or trades
- Requires that choices be made by the jurisdiction and the owner/RDP

First two chapters are similar to other I-Codes

- Chapter 1: Administration
- Chapter 2: Definitions
Chapter 3: Jurisdictional Requirements

Allows jurisdictions to make choices for higher levels of stringency.

- Once selected, items in Table 302.1 are enforced just like requirements in other I-Codes, for all projects constructed in the jurisdiction.
- Codified during adoption process.
- Allows the jurisdiction to address their own regional environmental goals, needs or concerns
- Most provisions of the code are not tied to Table 302.1 or Appendix A.
Chapter 4: Site Development and Land Use

Chapter 4 contains requirements for the development and maintenance of buildings and building sites which are intended to promote natural resource conservation and environmentally responsible land use and development.
Chapter 4: Site Development and Land Use

• Preservation of natural resources
  – Site development limitations
  – Natural resources inventory
• Transportation impact
• Stormwater management
• Heat island mitigation
• Site lighting

• Detailed provisions
  – Subsurface graywater irrigation systems,
  – Vegetation and soil protection,
  – Soil use and restoration,
  – Landscape, soil and water quality protection,
  – Vegetative roofs.
Chapter 5: Material Resource Conservation and Efficiency

Chapter 5 contains provisions that require building material conservation, resource efficiency and environmental performance.
Chapter 5: Material Resource Conservation and Efficiency

- Construction material and waste management plan
  - 50% construction waste diversion minimum with options for increases to 65 or 75 percent
- Recycling areas
- Storage of lamps, batteries and electronics
- 55% of total materials used must consist of:
  - Used
  - Recycled
  - Recyclable
  - Bio-based or
  - Indigenous materials
- Mercury limits in fluorescent lamps
- Moisture control
Chapter 6 is applicable to new buildings and additions to existing buildings.

Energy requirements for alterations to existing buildings are found in Ch 10.

The IgCC provides the following energy compliance paths:

- Prescriptive-based (Section 602.2.1)
- Performance-based (Section 602.2.2)
Chapter 6: Energy Conservation, Efficiency & Atmospheric Quality

*Performance-based designs must comply with the following Sections:*

- 602 – Modeled Performance Pathway Requirements
- 603 – Energy Metering
- 604 – Auto Demand Response (If indicated in Table 302.1)
- 608.6 – Plug Load Controls
- 609 – Appliances & Equipment
- 610 – Renewable Energy
- 611 – Commissioning
Chapter 6: Energy Conservation, Efficiency & Atmospheric Quality

Prescriptive-based designs must comply with the following Sections:

- 603 – Energy Metering
- 604 – Auto Demand Response (If indicated in Table 302.1)
- 605 – Envelope
- 606 – Mechanical
- 607 – Service Water Heating
- 608 – Electrical & Lighting Systems
- 609 – Appliances & Equipment
- 610 – Renewable Energy
- 611 – Commissioning
Chapter 6: Energy Conservation, Efficiency & Atmospheric Quality

Designs which use the prescriptive-based compliance path and have a total building area of <25,000 s.f.:

- Are exempt from lower zEPI scores (higher energy performance thresholds) that may be required by some adopting jurisdictions in Table 302.1 (See Section 302.1.1)
zEPI Performance Based Requirements

Zero Energy Performance Index (zEPI) as a metric of efficiency.

- Definition: A scalar representing the ratio of energy performance of the proposed design compared to the average energy performance of buildings in the benchmark year of 2000, with similar occupancy operation schedule and climate.
zEPI Performance Based Requirements

- Used in conjunction with Table 302.1 and Appendix A
- Calculation of zEPI gives credit for and encourages
  - Waste energy recovery (cogeneration) and
  - On-site generation of renewable energy.
- zEPI of 100 = average energy performance of buildings in the benchmark year of 2000, for buildings with similar occupancy, operation schedule and climate
zEPI Performance Based Requirements

\[ zEPI = 57 \times \left( \frac{EUI_p}{EUI} \right) \] (Equation 6-1)

Where

- \( EUI_p \) = the base annual energy use index in source kBtu/sf-y for the proposed design of the building and its site calculated in accordance with Section 602.1.2*

- \( EUI \) = the base annual energy use index in source kBtu/sf-y for a baseline building and its site calculated in accordance with Section 602.1.2*

*Sec. 602.1.2 references Equation 6-2 and modifications to Appendix G of ASHRAE 90.1
zEPI in Perspective

- 2000 Median Energy Use: 100
- 2006 IECC: 73
- 2009 IECC: 62
- 2012 IECC: 51
- IGCC Point of Entry: 51
- IGCC Enhanced Performance: 46

2006 IECC vs. Other Standards:
- IECC: 73
- 2009 IECC: 62
- 2012 IECC: 51
- IGCC Enhanced Performance: 46

Comparison:
- IECC: 73% reduction
- 2009: 62% reduction
- 2012: 51% reduction
- IGCC Enhanced Performance: 46% reduction
Chapter 7: Water Conservation and Efficiency

Chapter 7 requires and encourages the conservation of water used indoors, outdoors and in wastewater conveyance.

• Seeks water efficiency regardless of the source.

• Encourages the use of lower quality water wherever possible and permissible.
Chapter 7: Water Conservation and Efficiency

- Efficiency provisions for indoor and outdoor applications
  - Plumbing fixtures/fittings
  - Appliances
  - Carwashes
  - Cooling towers
- Efficient hot water delivery systems
- Submetering
- Water treatment systems
- Alternate water sources
  - Rainwater harvesting
  - Graywater reuse
  - Reclaimed water
- Nonpotable water applications
Chapter 8: Indoor Environmental Quality and Comfort

Chapter 8 contains requirements regarding the indoor environmental quality and comfort of building occupants.

Requirements include issues of Indoor Air Quality (IAQ) Management Plan for the following:

- Building construction, features, operations and maintenance facilitation, HVAC Systems, specific IAQ & pollutant control measures and restrictions on prohibited materials.
Chapter 8: Indoor Environmental Quality and Comfort

Indoor Air Quality (IAQ) Management Plan must address:

- HVAC & Air-handling systems
  - Access
  - Durability & cleanability
  - Filters
  - Performance
- IAQ during construction
- Indoor pollutant control measures (fireplaces, biomass appliances, radon, tobacco smoke, copy rooms, garages etc.)
- Material emissions and pollutant control
- Acoustics/Sound transmission (interior & exterior)
- Daylighting
Chapter 9: Commissioning, Operations & Maintenance

Modeled after
– Special inspections criteria in Chapter 17 of the IBC
– Commissioning criteria found in the IECC

• Sections 903.1.1 and 903.1.2 require pre- and post-occupancy reports be provided to the building owner.

• The building official is charged only with verifying that the reports have been provided to the owner, not with their review and approval.
Chapter 9: Commissioning, Operations & Maintenance

- Pre-occupancy inspection and testing
- Operating and maintenance manuals
- Building maintenance schedules

- Commissioning Plan
  - List of items for which commissioning is required or encouraged
  - Distinguishes between pre-occupancy and post-occupancy commissioning

- Post-occupancy periodic reporting as a jurisdictional choice tied to Table 302.1.
Chapter 10: Existing Buildings

Chapter 10 contains provisions for existing buildings in the IgCC are loosely based on the provisions for existing buildings in Chapter 34 of the IBC.

In essence whatever is changed, altered or added must be constructed in accordance with the requirements of the current code, as applicable to that component, assembly or system.
Chapter 10: Existing Buildings

- Alterations/renovations: whatever is changed must meet current IGCC requirements and:
  - Prescriptive reqs. for HVAC, water, metering, lighting, refrigeration, pools
  - Energy audits
  - Limited to 10% of the total cost of alterations

- Unaltered components can remain as they are (but with repairs as needed)
- Additions are treated much like new construction
- Historical building provisions
Chapter 11: Existing Site Development

Chapter 11 covers much of the same information covered as Chapter 10, except that it contains material related to existing building sites, as opposed to existing buildings.

Addresses existing building landscaping, site hardscape and surface vehicle parking, as well as other items related to Chapter 4, Site Development and Land Use.
Chapter 12: Referenced Standards

Chapter 12 contains a list of:

- Standards that are referenced in various sections of the IGCC
- The agency which promulgated it
- The standard’s identification, effective date, full title and the sections or sections of the IgCC which reference it.
- Latest editions of all standards will be referenced, consistent with referenced standards in other I-Codes.
Appendices

• Appendices are enforceable only where specifically adopted by the jurisdiction.

• The jurisdiction can accomplish this by selecting the “Yes” boxes in Table 302.1 in the rows related to Appendices A, B, C and D.
Appendix A - Project Electives

- Encourage higher performance buildings (buildings which exceed the minimum requirements of the IGCC)

- Encourage and drive the construction of higher performance buildings which exceed the already stringent minimum requirements contained in the body of the code.

- Encourage the implementation of practices that the jurisdiction has not chosen to enforce in Table 302.1
Appendix A - Project Electives

- Encourage implementation of green practices which are difficult or impossible to mandate. (eg., brownfield remediation)
- Adds a degree of flexibility for owners and designers.
Appendices B, C & D

Appendix B: Radon Mitigation
- Similar to the radon provisions in the IRC, but modified for commercial building applications

Appendix C: Optional Ordinance
- Uses performance bonding requirements tied to compliance verification

Appendix D: Enforcement Procedures
- Designed to ensure the continued compliance of buildings, structures and building sites constructed under the IgCC
For more information and updates check the ICC website

www.iccnesafe.org/igcc
Questions?

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