IgCC: The Shapeshifting Code

— By Greg Winkler, AIA, LEED AP, Mid-Atlantic Precast Association

Shapeshifting is a common theme in mythology, epic poems, science fiction, Shakespearean comedy, and *Star Trek*. It can be defined as the ability of a being to change its form from one thing to another at will. It is doubtful that the word has ever been used in reference to a building code, but we finally have the code to which it can apply: *The International Green Construction Code* (IgCC).

The IgCC is an overlay code, designed to work in conjunction with the family of International Code Council (ICC) codes, but particularly with the International Building Code and International Energy Conservation Code. It consists of twelve chapters and four appendices, but the heart of the code's requirements resides in six main chapters:

- Site development and land use
- Material resource conservation and efficiency
- Energy conservation, efficiency, and CO_2 emission reduction
- Water resource conservation, quality, and efficiency
- Indoor environmental quality and comfort
- Commissioning, operation, and maintenance

The scope of requirements in the IgCC draws heavily from the template created by the U.S. Green Building Council in their well-known LEED standards. The IgCC addresses, for instance, all the usual suspects created for LEED in defining green buildings, including: alternative transportation, waste management, indoor environmental quality, stormwater management, and material resource conservation. Where it differs substantially from the LEED standards is that the IgCC pushes performance efficiency across all building systems as the primary driver of sustainability. So while the code includes all the requirements popularized by LEED as ways to drive societal sustainability, the overwhelming focus of the IgCC is on specific performance requirements to drive *building* sustainability through greater efficiency.

In *A Midsummer Night's Dream*, Shakespeare created Puck as a mischievous, shapeshifting sprite who both torments and guides the other characters throughout the play; sometimes intentionally and sometimes by accident. The IgCC can be viewed a bit like Puck. It has a number of built-in features that will create higher performing buildings, but the code also has so many customizable options that it will represent a difficult challenge for design professionals who engage with it in a number states. The ability of jurisdictions to partially shape the code to their liking is by design, of course. It responds to the practical and political realities of creating a new code that is both relevant to the particular needs of a region and more likely to gain widespread adoption through particular attention to addressing those needs.

The strategy seems to be working. Though officially launched at the end of March 2012, the IgCC is already in use or has been adopted by nine states, including states in northern, southern, and western regions of the country. What design professionals who engage with the code will find, however, is a fragmented landscape of requirements customized by each state (and in some states, each municipality):

IgCC or ASHRAE? IgCC allows a code jurisdiction to select the *ASHRAE 189.1: Standard for the Design of High Performance Green Buildings* as an alternate path of compliance under the code. This was the price of bringing the U.S. Green Building Council (which developed the standard with ASHRAE) under the IgCC tent, but it results in an awkward transition for jurisdictions in adopting IgCC's administrative provisions and applying them to a separate standard outside the code. Architects will need to become familiar with this standard as well as the IgCC provisions.

ICC 700 for Residential: IgCC allows the jurisdiction to designate *ICC 700: The National Green Building Standard* (a residential standard developed with the National Association of Homebuilders) as the applicable code for one and two family dwellings, and R-2, R-3, and R-4 occupancies. Conversely, the jurisdiction can require compliance with the International Residential Code, ANSI/CABO, or its own residential code.

Jurisdictional Electives: IgCC allows jurisdictions to designate whether 17 specific sections of the code are applicable for buildings in their territory.

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These optional requirements include: site development and land use restrictions, percentage of waste diverted from landfills, enhanced energy performance by occupancy type, indoor air quality testing, and sound transmission/sound level requirements.

Whole Building Life Cycle Assessment (LCA): IgCC does not require LCAs, but it allows the owner/architect team to avoid another significant requirement if they perform one. For instance, providing an LCA allows the team to avoid complying with the building material selection requirements contained in Chapter 5 of the code. The tradeoff? The LCA must demonstrate at least a 20 percent improvement in environmental performance for global warming potential, and a similar improvement over a code compliant reference design in two of five environmental impact areas listed in the code.

Appendix A--Project Electives: Appendix A of the IgCC contains a list of an additional 39 requirements, spanning the full breadth of the code. Jurisdictions can use this section to significantly ramp up requirements beyond the code baseline according to their regional needs. In each of five categories, the jurisdiction will state a minimum number of electives that the project team must comply with—up to a maximum of 29 total electives. The owner/architect team can then select which requirements in each category work best with their project. Once selected, these electives become mandatory code compliance requirements for the project.

Appendix C—The Optional Ordinance: This section offers jurisdictions an avenue to create, in the words of ICC: "*…a fiscal and evidentiary-based adoption structure utilizing performance bonding requirements tied to the compliance verification process*." This optional adoption ordinance requires that bonds be obtained to guarantee building performance promised in the construction and permit documents. Aimed primarily at the contractor, this requirement would nonetheless introduce additional liability into the construction system, and that liability will touch design professionals as well.

Those are the potential variables in the IgCC, but it also contains some significant built-in provisions that will apply no matter what options the code jurisdiction selects. Despite the fact that the IgCC will appear in different forms in different places, its base provisions should deliver higher performance even where it is adopted in minimal form. Some baseline IgCC requirements:

- Buildings designed on a performance basis must comply with code sections that have requirements for modeled performance pathway requirements and plug load controls.
- Buildings designed on a prescriptive basis must comply with requirements addressing building envelope systems, mechanical systems, water heating systems, and electrical power and lighting systems.
- Section 605.1.1 requires that insulation and fenestration exceed the requirements of the International Energy Conservation Code by at least 10 percent.
- Section 611 requires the commissioning and completion of mechanical, lighting, electrical, and building envelope systems.
- 55 percent of constructed materials selected for each project must consist of some combination of used, recycled, recyclable, bio-based, or indigenous products.

Puck's most famous line in *A Midsummer Night's Dream* is: "*Lord, what fools these mortals be!*" The story of building codes is not always what they begin as, but what they grow into. The building code that delivered greater life safety through enhanced sprinkler requirements also delivered larger buildings of lesser construction as a tradeoff. Those paths cannot always be foreseen by the code authors, awash in the minutiae of prescriptive language, consensus votes, and after-the-fact interpretations.

IgCC has good bones. If it is not everything it could have been, it still possesses the strength of wholeness. All the traits that could eventually turn it into a great code--a powerful driver for building sustainability--are there, though sometimes hidden, Puck-like, in the appendix or in the adoption tables. Still, they are there, as building blocks for the future. We are asked to forgive the variability of the code's requirements as the price of widespread adoption, the price necessary to achieve relevance and impact.

Most importantly, the IgCC is transformational. Going forward, we will view green design mostly through the lens of life cycle costs, operating efficiency, and service life. They are where the carbon footprint, emissions, societal impact, and cost all dwell in large part. They are the new measure of sustainability. IgCC has shifted the definition of what defines sustainability, fusing it to high performance. This is no small achievement.