# Table of Contents

Preface  ................................................................. ix  
About the International Code Council  ......................... xi  
About ASHRAE  ............................................................ xii  
About the International Green Construction Code ........... xii  
Acknowledgments  ............................................................ xiii  
About the Authors  ............................................................ xiii  

## PART I: CODE ADMINISTRATION AND ENFORCEMENT  
1

Chapter 1: Introduction to Green Codes  ......................... 2  
  Impacts of Buildings  .................................................... 3  
  Defining “Green Building” ................................................ 6  

Chapter 2: Legal Aspects, Permits and Inspections .............. 9  
  Code Adoption  ........................................................... 10  
    Amending the IgCC  .................................................... 10  
    Jurisdictional Options  ................................................. 11  
    Appendices  .............................................................. 13  
    Local and State Laws  .................................................. 14  
  Duties and Powers of the Authority Having Jurisdiction ... 14
<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretations</td>
</tr>
<tr>
<td>Alternative Design, Materials and Methods of Construction</td>
</tr>
<tr>
<td><strong>Construction Documents</strong></td>
</tr>
<tr>
<td>Plans and Specifications</td>
</tr>
<tr>
<td>Permits</td>
</tr>
<tr>
<td>Inspections, Testing and Commissioning</td>
</tr>
<tr>
<td>Required Inspections</td>
</tr>
<tr>
<td>Certificate of Occupancy</td>
</tr>
<tr>
<td><strong>Means of Appeals</strong></td>
</tr>
<tr>
<td>Definitions</td>
</tr>
</tbody>
</table>

### PART II: FOUNDATION OF GREEN CODES 23

#### Chapter 3: Codes and Standards 24

- History of Codes 25
- The Case for Building and Green Codes 26
- **Code Development** 28
- IgCC Development 29
- **Building Codes: Scope and Limitations** 31
  - International Building Code (IBC) 31
  - International Residential Code (IRC) 32
  - International Mechanical Code (IMC) 32
  - International Fuel Gas Code (IFGC) 32
  - International Plumbing Code (IPC) 33
  - International Green Construction Code (IgCC) 33
  - International Energy Conservation Code (IECC) 33
  - International Fire Code (IFC) 33
  - International Property Maintenance Code (IPMC) 34
  - International Existing Building Code (IEBC) 34
  - International Wildland-Urban Interface Code (IWUIC) 34
  - International Private Sewage Disposal Code (IPSDC) 34
  - ICC Performance Code for Buildings and Facilities (ICCPC) 35
  - International Zoning Code (IZC) 35
- **Using the Codes** 35
  - Using the IgCC 37
  - Arrangement and Format of the 2021 IgCC 38
  - Mandatory, Prescriptive and Performance 39

#### Chapter 4: Establishing Green Baselines 40

- Federal Resource Conservation Programs and Standards 41
- **Green Building Certification Programs** 42
  1. LEED for New Construction and Major Renovations 42
  2. Green Globes 44
  3. The Living Building Challenge 46
- **Green Building Codes and Standards** 48
- Integration of Green Building Measures 48
- Evolving Role of Building Code Regulations 50
Chapter 7: Energy Efficiency ........................................... 98
  Interface with ASHRAE 90.1 and
  International Energy Conservation Code (IECC) ................. 100
  Energy Compliance Measures ......................................... 100
  Mandatory Provisions .................................................. 102
    General ........................................................................ 102
    Energy Consumption Management ................................... 103
    Automated Demand Response ......................................... 105
  Prescriptive Option .......................................................... 105
    Building Envelope ......................................................... 107
    Heating, Ventilating and Air Conditioning ............................ 111
    Service Water Heating .................................................... 115
    Lighting ....................................................................... 115
    Energy Cost Budget ....................................................... 118
  Performance Option ........................................................... 119
    Annual Energy Cost ........................................................ 120
    Annual Carbon Dioxide Equivalent (CO₂e) ......................... 121
    Zero Energy Performance Index ....................................... 123
    Simulation Aided Design ................................................. 123
  Summary ......................................................................... 123
  Plan Review Checklist ........................................................ 124

PART V: INDOOR ENVIRONMENT AND
MATERIAL RESOURCES ................................................. 129

Chapter 8: Indoor Environmental Quality (IEQ) ....................... 130
  Interface with ASHRAE 62.1, International Building Code (IBC)
  and the International Mechanical Code (IMC) ..................... 132
  IEQ Compliance Measures ............................................... 133
  Mandatory Provisions ..................................................... 136
    Indoor Air Quality (IAQ) .................................................. 136
    Thermal Environmental Conditions for Human
      Occupancy .................................................................... 141
    Acoustical Control ........................................................ 141
    Soil-gas Control ............................................................ 143
    Lighting Quality ............................................................ 144
    Moisture Control .......................................................... 145
    Glare Control ................................................................ 145
    Glare Control Override .................................................. 146
  Prescriptive Option ........................................................... 146
    Daylighting ................................................................. 146
    Materials ................................................................. 149
    Lighting for Presentations .............................................. 153
  Performance Option .......................................................... 153
    Daylight Simulation ....................................................... 153
    Materials ................................................................. 154
    Lighting for Presentations .............................................. 155
  Summary ......................................................................... 155
  Plan Review Checklist ........................................................ 156
# Table of Contents

**Chapter 9: Materials and Resources**  
- Interface with the International Building Code (IBC) and Local Recycling Laws, Statutes and Ordinances  
- Material Resources Compliance Measures  
- Mandatory Provisions  
  - Construction and Demolition Waste Management  
  - Extracting, Harvesting and/or Manufacturing  
  - Areas for Storage and Collection of Recyclables and Discarded Goods  
- Prescriptive Option  
- Reduced Impact Materials  
- Performance Option  
  - Life-cycle Assessment (LCA)  
- Summary  
- Plan Review Checklist

**PART VI: PUTTING IT ALL TOGETHER**  

**Chapter 10: Construction and Plans for Operation**  
- Interface with the Building, Fire, Plumbing, Mechanical, Electrical and Energy Codes  
- Construction and Operations Compliance Measures  
- Mandatory Provisions  
  - Construction  
  - Plans for High-performance Building Operation  
- Summary  
- Plan Review Checklist

**PART VII: THE FUTURE**

**Chapter 11: Future of Green Codes and Standards**

- Glossary
- Index
Construction practices, materials and building design have evolved over time from simple structures to resource-intensive building systems. Historically, humans lived near accessible resources, first as hunters and gatherers and later as agriculturists. Shelters were constructed to provide safe and protective environments. Over time, structures progressed from bio-based portable shelters to stone, earthen and wood structures to the air-conditioned and electrically powered glass, steel and concrete commercial buildings we know today. Until the industrial era, buildings were a product of local climates and regionally available resources. Today, most buildings have become ubiquitous and less responsive to local and regional environmental conditions.

Fire safety became a concern as buildings became larger and more combustible, particularly in densely populated cities. Immediately following the Great Fire of London in 1666, which had rapidly spread through the densely built timber housing of the city, the Rebuilding of London Act was passed to regulate construction materials and proximity to open space. In the United States when loss of life and massive property damage became intolerable following events such as the great Chicago Fire in October 1871, the need to regulate construction was satisfied by building codes.

Insurance companies and the public health movement laid the foundation for modern fire, building, health and sanitation codes as people know them today. As building codes evolved, mechanically supplied ventilation, maintenance and property protection found its way as vital components, next followed by energy efficiency, water conservation and green construction.

The **International Green Construction Code®** (IgCC®) was first introduced in 2010 as the IgCC Public Version 1. The code went through a full development cycle and joined the International Codes®
Green Construction Code Essentials captures the provisions that regulate high-performance commercial green buildings and references ICC/ASHRAE 700 for low- and mid-rise residential buildings. Green Construction Code Essentials is written as an overview of the IgCC, providing the intent of many provisions and the interface with other I-Codes. Understanding green code provisions is essential to the application of the IgCC to any building design; thus, the text is illustrated to further simplify and communicate essential concepts. The text is presented and organized in a user-friendly style with an emphasis on clear, understandable language. This book is directed to readers familiar with basic construction and building system principles with a limited knowledge of the International Energy Conservation Code® (IECC®) and ANSI/ASHRAE/IES 90.1. Anyone involved in the design, construction or regulation of building construction can learn from this book. Building owners, design professionals and contractors in nearly any building trade will gain a basic understanding of the principles, provisions and applications of the technical content of the IgCC. The reader will be able to use this book to more fully explore the most common IgCC measures.

This book is not intended to explain all of the provisions of the IgCC or all of the acceptable materials and methods of construction. It focuses on the most common and used provisions applicable to many conditions in commercial construction. This is not to say that the information not covered is any less important or less valuable to the reader. This book should be used with the 2021 IgCC, which should be referenced for more detail.

Reasonable application of the code provisions is supported by a basic understanding of the scope and intent of both the IgCC and the other I-Codes. This book also references other codes and standards to help understand interrelated concepts and provisions.

Green Construction Code Essentials contains full-color photos, definition of terms and illustrations to help the reader visualize and better understand the application of the code requirements. Practical
examples, simplified tables and highlights of particularly useful information help clarify the most essential requirements of the code, thereby helping the reader determine compliance. References to the applicable sections of the 2021 IgCC are included to easily locate the code section for more detail and exact code language. As the second edition of this publication, the author welcomes comments and feedback to improve future editions.

ABOUT THE INTERNATIONAL CODE COUNCIL

The International Code Council is the leading global source of model codes and standards and building safety solutions that include product evaluation, accreditation, technology, codification, training and certification. The Code Council’s codes, standards and solutions are used to ensure safe, affordable and sustainable communities and buildings worldwide. The International Code Council family of solutions includes the ICC Evaluation Service, the International Accreditation Service, General Code, S. K. Ghosh Associates, NTA Inc., Progressive Engineering Inc., ICC Community Development Solutions and the Alliance for National & Community Resilience. The Code Council is the largest international association of building safety professionals and is the trusted source of model codes and standards, establishing the baseline for building safety globally and creating a level playing field for designers, builders and manufacturers.

Washington, DC Headquarters:
500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001

Regional Offices:
Eastern Regional Office (BIR)
Central Regional Office (CH)
Western Regional Office (LA)
Distribution Center (Lenexa, KS)
888-ICC-SAFE (888-422-7233)
www.iccsafe.org

Family of Solutions:
ABOUT ASHRAE

With more than 50,000 members from over 132 nations, ASHRAE is a diverse organization dedicated to advancing the arts and sciences of heating, ventilation, air conditioning, and refrigeration to serve humanity and promote a sustainable world. The Society and its members focus on building systems, energy efficiency, indoor air quality, and sustainability within the industry. Through research, standards writing, publishing, and continuing education, ASHRAE shapes tomorrow’s built environment today.

ASHRAE Headquarters
180 Technology Parkway NW
Peachtree Corners, GA 30092
404-636-8400
www.ashrae.org

ASHRAE Washington, DC Office
1255 23rd Street NW, Suite #825
Washington, DC 20037
(202) 833-1830
GovAffairs@ASHRAE.org

ABOUT THE INTERNATIONAL GREEN CONSTRUCTION CODE

The 2021 IgCC is a comprehensive model code that provides the design and construction industry with the single, most effective way to deliver low-impact, resilient and high-performance buildings. The provisions are applicable to new buildings as well as additions and alterations to existing buildings.

The IgCC is one of the I-Codes published by the International Code Council. All of these codes and the administration provisions of the IgCC are maintained and updated through an open code development governmental consensus process and are available internationally for adoption by the governing authority to provide consistent and enforceable regulations for the built environment. In an agreement with the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), the IgCC technical provisions are maintained through the American National Standard Institute (ANSI) approved ASHRAE consensus process utilizing ANSI/ASHRAE/ICC/
USGBC/IES 189.1—2020. The International Code Council is responsible for the administrative provisions of the IgCC.

By collaborating on developing the 2021 IgCC, the strategic developing organizations supporting it envision a new era of building design and construction that includes environmental health and safety as code minimums. The IgCC provides fundamental criteria for energy efficiency, resource conservation, water efficiency, land use, site development, indoor environmental quality and building performance that can be adopted broadly.

ACKNOWLEDGMENTS

The authors would like to thank: Dave Walls, Vice President of Business Support Initiative, International Code Council for his peer review and support in developing the contents of this publication.

Appreciations related to the development of the 2018 edition: for jurisdictional peer review: Stephen Kanipe, Sustainability and Energy Specialist, City of Aspen. Thank you to Rick Belanger, President and Chief Expectations Manager for Dianous, LLC and Russell Feery, CxA, Engineering Economics, Inc., for their input on the building systems commissioning process.

ABOUT THE AUTHORS

Hope Medina, CBO, CSP
Plans Examiner, Inspector, Instructor and Consultant
specializing in Energy & Sustainability
Shums Coda Associates

Hope Medina is an ICC Certified Sustainability Professional. During her tenure as a code professional, she has held many positions, including permit technician, inspector and plans examiner, and she utilizes these experiences to educate fellow code professionals about energy and sustainability. Ms. Medina has served on several cycles as a consensus committee member for the National Green Building Standard, and is currently sitting on the 2024 International Energy Conservation Code commercial consensus committee. She currently chairs the Colorado Chapter of ICC’s energy and green Code Change Code Development committee.
She has been a longtime member of ICC’s Sustainability Membership Council where she has served as a governing member and the Vice-chair.

She has a strong commitment for advocacy of energy efficiency and sustainability, and was responsible for creating the Sustainability Membership Council’s annual Building Safety Month video series. Hope Medina updated the 2018 edition of this publication to the current 2021 edition.

**Anthony Floyd, FAIA, CSP, NOMA, LEED AP**
**Green Building Program Manager and Energy Code Specialist**
**Scottsdale, Arizona**

Anthony Floyd is a licensed architect, ICC Certified Sustainability Professional and Fellow of the American Institute of Architects. He's a former City of Scottsdale building official, and since 1997 has served as the city’s green building program manager and energy code specialist. He helped to establish Arizona’s first Green Building Program, and is responsible for education, outreach, project qualification and maintaining Scottsdale’s regionally based green and energy efficiency criteria. He was instrumental in Scottsdale’s adoption of the IECC, IgCC and LEED Gold city facility policy. He currently serves on the project committee for ASHRAE 189.1, *Standard for the Design of High-Performance Green Buildings*; the ICC Sustainability, Energy and High-Performance Code Action Committee (SEHPCAC); and the AIA Building Performance Knowledge Community. Anthony Floyd authored the the first edition of this publication, the 2018 edition.