What Can Congress Do to Build Better Buildings?

April 29, 2019

Materials will be available at:  www.eesi.org/042919buildings

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What Congress Can Do To Support Better Buildings

Ryan Colker
Vice-President, Innovation
Executive Director, Alliance for National & Community Resilience
What are Model Codes?

- Developed through a consensus-based process on a three year cycle
- All interested parties can make recommended changes
- Basis for state and local building codes and criteria for federal agencies (GSA, DOD, HUD, OBO, etc.).
The Family of Model Codes

- International Building Code (IBC)
- International Fire Code (IFC)
- International Mechanical Code (IMC)
- International Plumbing Code (IPC)
- International Residential Code (IRC)
- International Energy Conservation Code (IECC)
- International Existing Building Code (IEBC)
- International Fuel Gas Code (IFGC)
- International Property Maintenance Code (IPMC)
- International Private Sewage Disposal Code (IPSDC)
- International Zoning Code (IZC)
- International Wildland-Urban Interface Code (IWUIC)
- ICC Performance Code (ICCPC)
- International Green Construction Code (IgCC)
- International Swimming Pool and Spa Code (ISPSC)
Requires installation of CO detection in residential structures

Retroactive installation of CO detection for existing residential structures
Modern building codes require storm shelters for schools in tornado prone regions. Yet of the 21 states that regularly face tornado risk, just 7 have requirements in their codes for tornado shelters in schools.
Additional Items Captured in Recent Codes

2015 International Building Code
- Storm Shelters
- Solar Panels
- Seismic Resistance

2018 International Building Code
- Structural Improvements
- Wind/Earthquake Loads
Energy Code Contributions to Resilience

**Durability**
Durability ensures home is livable for decades

**Moisture Management**
Rot, mold, mildew

**Extreme Weather Protection**
Better envelopes Habitability – more lives saved

**Energy Efficiency**
Grid Stability Microgrids Energy Storage

**Fire Safety**

*Works in Tandem with Other Model Codes*
Modern Codes Mitigate Damage

- $500M in annualized losses avoided across 8 SE states per FEMA
- Reduced windstorm losses by 72% since Florida’s statewide code
- Reduced hail damage 12-28% in Missouri
U.S. Hazard Risk
Counties in the BCEGS Database that Have Adopted Hazard-Resistant Building Codes and Participate in the NFIP
December 31, 2018
Building Codes are Highly Cost Effective Mitigation Measures

<table>
<thead>
<tr>
<th>Natural Hazard</th>
<th>Benefit-Cost Ratio</th>
<th>Meet Common Code Requirements</th>
<th>Federally Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riverine Flood</td>
<td>5:1</td>
<td>6:1</td>
<td>7:1</td>
</tr>
<tr>
<td>Hurricane Surge</td>
<td>7:1</td>
<td>Not applicable</td>
<td>Too few grants</td>
</tr>
<tr>
<td>Wind</td>
<td>5:1</td>
<td>10:1</td>
<td>5:1</td>
</tr>
<tr>
<td>Earthquake</td>
<td>4:1</td>
<td>12:1</td>
<td>3:1</td>
</tr>
<tr>
<td>Wildland-Urban Interface Fire</td>
<td>4:1</td>
<td>Not applicable</td>
<td>3:1</td>
</tr>
</tbody>
</table>
Total Costs and Benefits of Meeting the 2018 IBC and IRC

**Benefit: $13 billion**
- 46% – Property: $7
- 23% – Additional living expenses and direct business interruption: $3
- 12% – Casualties and PTSD: $1
- 12% – Indirect business interruption: $1
- 6% – Insurance: $1
- 1% – Urban search and rescue: $0.02

Billions 2018 USD

**Cost: $1.2 billion**
Code Adoption Considerations

- Codes adopted
  - Statewide, variants, home rule
  - Amendments
  - Editions
- Legislative vs. regulatory updates
- Enforcement
Federal Validation

• Existing Regulatory Validation
  – FEMA’s strategic plan/minimum standards
  – HUD CDBG-DR
  – GSA/DOD code requirements
  – CPSC grants

• Congressional Validation
  – Bipartisan Budget Act cost-share
  – DRRA pre- and post-disaster assistance for administration and enforcement
  – Pre-disaster grant funding criteria
The federal government will spend billions (if not trillions) of dollars on infrastructure including schools, public housing, transit stations, bus terminals, airports, medical facilities, and community centers. In many instances, these structures will be built to the codes in place at the local level.

→ All projects receiving federal funds should be built to the latest edition of the model codes

• 15 states do not require jurisdictions adopt codes. In some of these states upwards of 25% of the residents live in communities with codes 9 years or older
• 8 states have no statewide energy conservation code and 11 have codes over 9 years old. Modern codes are ~25% more efficient than those in 2010.
FEMA found that requiring building codes as part of the National Flood Insurance Program would reduce losses, increase property values, reduce insurance rates, make NFIP more actuarially sound.

→ Include minimum code requirements in NFIP reauthorization

Federal agencies make significant contributions to code development and adoptions in the form of R&D, technical assistance and grants.

→ Provide appropriate funding for DOE BTO ($268 million) and NIST ($652.7 million for Scientific and Technical Research Services and $150 for construction)
May is Building Safety Month

- Annual public awareness campaign in its 39th year
- Proclamations from all levels of government
- Shared amplification
- Reception 5/22 5-730pm @LiUNA
What Congress Can Do To Support Better Buildings

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The role of lighting in the built environment

Randy Burkett, FIALD, FIES

29 April, 2019
Lighting design

Quality of light affects people
- Increase satisfaction & productivity
- Heighten user performance
- Enhance mood & desirability of space
- Contribute to sense of well-being
- Provide psychological reinforcement

Contributing issues
- Architectural integration and revelation
- Daylighting
- Energy and sustainability
- Operations and maintenance
- Codes and standards
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Lighting design - Outdoors

Quality of light affects people
• Provide functional lighting
• Use surfaces as light sources
• Heighten awareness of safety & security
• Enhance wayfinding & orientation
• Establish mood & desirability
• Create a sense of place
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Leading our nation’s efforts to drive innovative solid-state lighting R&D

The DOE Solid-State Lighting Program leads our nation’s efforts to drive research and development of innovative LED and OLED technologies. Find out how DOE and partners are sparking a lighting revolution and positioning American companies for global success.
DOE SSL PROGRAM

The DOE SSL program supports research and development of promising SSL technologies through annual competitive solicitations that cover three areas:

- Core Technology Research, focusing on applied research for technology development, with particular emphasis on meeting efficiency, performance, and cost targets. This research fills technology gaps to overcome technical barriers.
- Product Development, using the knowledge gained from basic or applied research to develop or improve commercially viable materials, devices, or systems.
- Manufacturing Support, aimed at accelerating SSL technology adoption and encouraging a role for U.S.-based production through manufacturing improvements that reduce costs and enhance product quality.

The DOE Solid-State Lighting Program leads our nation’s efforts to drive research and development of innovative LED and OLED technologies. Find out how DOE and partners are sparking a lighting revolution and positioning American companies for global success.
Energy Department Announces $42 Million in Project Selections for Innovative Buildings Research

JANUARY 29, 2019

Title: Improved Light Extraction By Engineering Molecular Properties of Square Planar Phosphorescent Emissive Materials

Title: Environmentally Robust Quantum Dot Downconverters for Highly Efficient Solid-State Lighting

Title: Additively Manufactured Solid-State Luminaire

Title: High Efficiency OLED Light Engine

Title: High-Luminance LED Platform for Improved Efficacy in Directional Lighting

Title: Corrugated OLEDs for High Efficiency White OLEDs

Title: High Efficiency InGaN LEDs Emitting in Green, Amber and Beyond

Title: From Deposition to Encapsulation: Roll-to-Roll Manufacturing of Organic Light Emitting Devices for Lighting
DOE funded lighting applications research - Gateway Program

- Circadian and Sleep Health in Shift Work Applications
- Evaluating Tunable Lighting in Classrooms (September 2018)
- LED Area Lighting Retrofit: Yuma Border Patrol (April 2018)
- Tuning the Light in Classrooms: (September 2017)
- Tuning Hospital Lighting: Evaluating Tunable LED Lighting at the Swedish Hospital Behavioral Health Unit in Seattle (August 2017)
Interior lighting design
Lighting influences

- Glare impacts
- Circadian influences
- Visual comfort
- Visual performance
- Daylighting and occupant satisfaction
- Hospital recovery time
- Lighting’s role in senior living settings
Exterior lighting design
Lighting influences

• Glare impacts
• Intuitive wayfinding
• Safety and security
• Enhancement of social settings
• Urban revitalization
• Environmental aspects
Thank you
What Can Congress Do to Build Better Buildings?

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www.eesi.org/survey

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