Green Building
Guidelines, Standards, Codes
background, update, trends

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Presentation Overview

- ACC Plastics Division B&C Team
  - Activities & goals

- B&C markets & the business of chemistry

- Growth of green building

- Green building criteria

- An assessment of green building criteria with respect to foam insulation

- Trends & future direction

- Conclusions
Building/Construction Market Team – Members

Ashland Distribution Company
BASF Corporation
Bayer MaterialScience, LLC
Braskem America
Chevron Phillips
The Dow Chemical Company
DuPont Company
ExxonMobil Chemical Company
LyondellBasell
SABIC Innovative Plastics
Solvay Solexis
Styron Corporation, LLC
Total Petrochemicals USA, Inc.
Vinyl Institute

ACC Plastics Division
ACC B&C Team Goals

1. Leverage national and state *energy-efficiency* goals to increase the use of energy-efficient plastics

2. Promote and defend plastics in *Green Building* initiatives

Communications,
Research,
Advocacy
2012 Review -- Energy Efficiency

• Engaged in code updates for commercial & residential buildings in 20 states; 9 states and DC have updated energy codes in 2012 (AL, IL, IN, LA, MD, NH, SD, SC, WV)

• Defended attempts to dilute, backtrack codes in MN, UT, PA, OH and MI

• IECC 2012 adopted in MD
Green Building is growing rapidly

Why Green Building?
Because Buildings ...

<table>
<thead>
<tr>
<th>PRODUCE:</th>
<th>CONSUME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>36% of CO2</td>
<td>28% of all Water</td>
</tr>
<tr>
<td>35% of all Solid Waste</td>
<td>40% of all Energy</td>
</tr>
<tr>
<td></td>
<td>70% of all Electricity</td>
</tr>
</tbody>
</table>

-100%  -50%  0%  50%  100%
Growth in US Green Building Council

- **USGBC Staff (at DC Headquarters)**: 80 (2006), 200 (2012)
- **Attendees Greenbuild**: 12,000 (2006), 24,000 (2012)
- **Exhibitors Greenbuild**: 500 (2006), 800 (2012)
- **Registered LEED projects**: 3,000 (2006), 33,000 (2012)
Green Building criteria defined

**Codes**
- Minimum requirements to permit
- Mandatory language, compliance
- Legally enforceable

**Performance Standards**
- Technical specification
- Often performance & consensus based
- Referenced in codes
- No enforcement, inspection

**Credit-Based Standards**
- Levels of achievement
- Seek to “push the envelope”
  Check-list approach
- Often not consensus
- May offer certification (labels)

**Guidelines**
- Voluntary
- Aspirational
- Not legally enforceable

Future?
## Leading Green Building criteria

<table>
<thead>
<tr>
<th>Market</th>
<th>Guidelines</th>
<th>Check-list Standards</th>
<th>Performance Standards</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Non-residential</strong></td>
<td><strong>Residential</strong></td>
<td></td>
</tr>
<tr>
<td>Non-residential</td>
<td>USGBC</td>
<td>GBI</td>
<td>NA</td>
<td>ASHRAE</td>
</tr>
<tr>
<td>Residential new</td>
<td>Austin, Boulder, Santa Fe, etc.</td>
<td>LEED-Home</td>
<td>NA</td>
<td>National Green Building Standard™</td>
</tr>
<tr>
<td>Residential remodel</td>
<td>REGREEN</td>
<td>TBD</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td>NA</td>
<td>LEED</td>
<td>Green Globes</td>
<td>189.1 GB Std</td>
</tr>
<tr>
<td>Healthcare</td>
<td>Green Guide for Healthcare</td>
<td>LEED-Health Care</td>
<td>Veterans Adm</td>
<td>SPC 189.2</td>
</tr>
<tr>
<td>Schools</td>
<td>CHPS</td>
<td>LEED-Schools</td>
<td>TBD</td>
<td>NA</td>
</tr>
</tbody>
</table>

USGBC = US Green Building Council  
GBI = Green Building Institute  
NAHB = National Association of Home Builders  
ICC = International Code Council  
ASHRAE = American Society of Heating, Refrigeration, Air-conditioning Engineers
Assessment of current credit-based standards

• **Pros**
  - Raising awareness
  - Provides their definition of green
  - Guides green architects, designers where to focus
  - Easy to understand
  - Sets high goals, encourages by awarding credits
  - Brings together thought leaders

• **Cons**
  - Tend to be check-lists
  - Are marketed brands with self perpetuating agendas
  - Too often not performance nor consensus based
  - When used as policy, enters a gray area
Q: How do GB criteria treat plastics?

Answer: It Depends

• **Energy Consumption** is definitely positive

• **Materials Selection** varies:
  – Standards & Codes are more material neutral, performance based
  – Guidelines and Checklist Standards can be more material prescriptive

• **Indoor Environment** focus: low VOCs
2012 Review -- Green Building

• USGBC revision of LEED 2009 -→ called draft LEED v4
  – Energy Chapter continues to reward energy efficiency performance
  – Materials & Resources draft contains negative approaches to chemicals, plastics

• ACC Actions
  – Contacted USGBC first to make them aware that draft materials credits encourage avoidance of products that provide energy efficiency
  – Draft credits will not promote healthier buildings because the criteria ignore exposure consideration

• New Coalition Actions – AHPBC
  **Mission:** Support and promote green building codes, standards, rating systems and credits that are developed in consensus processes, are data-driven, supported by science, and performance-based
“Optimization” Nothing More than Avoidance

“Use products that document their material ingredient optimization using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project.”

• USGBC-approved program. Products that comply with building product optimization criteria approved by USGBC.

• GreenScreen v1.2 Benchmark. Products that have fully inventoried chemical ingredients that meet the following:
  
  - No ingredients have Benchmark 1 hazards as defined by the Green Screen List Translator (3000-5000 chemicals including Proposition 65 list)
  
  - Examples: diisocyanates (MDI, TDI), flame retardants
  
  - All ingredients pass the full Green Screen Benchmark 2: Use – But search for Safer Substitutions or greater:

• Cradle to Cradle v2 Certified. (No Halogens allowed)
2013 Green Building Scenario

• Latest draft continues to contain credits that will lead to chemical avoidance based on hazard-only

• ACC meetings with USGBC -- positive and cooperative
  – working on risk-based approaches
  – hazard + exposure = risk

• Result of direct dialogue with USGBC still uncertain
Future Trends

• Increasing interest in materials
  – Where they come from, What they are made of, What’s their impact?

• Life cycle aspects growing in importance

• LEED is the leader, the “brainstormer”, now raising the bar as codes adopt low hanging fruit
  – USGBC is driving to differentiate from competition
  – Energy efficiency criteria are similar across systems so look elsewhere …
  – Materials criteria are trending toward using life cycle assessment but…
  – Enviros consider LCA a threat; “weak” in health affects and bio-diversity

• Calls for product disclosure
  – Current approaches all hazard-only based
  – Many subscribe to the Precautionary Principle
Life cycle assessment is fuller picture

• Single attributes popular but fall short of the mark
• When every material claims to meet the single attribute, then what differentiates their environmental impact?
• Green architects, designers, builders want/need broader and credible third party verified environmental impact info
A problem with check-lists and single attributes

Which has a lighter environmental impact?

<table>
<thead>
<tr>
<th>Recycled Content</th>
<th>100%</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport to Site</td>
<td>499 miles</td>
<td>501 miles</td>
</tr>
<tr>
<td>Credits</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

**Bottom Line Score**

Check-list = 2      Environment = 0
Environmental Product Declaration (EPD) ?

• A report about a product’s environmental impact and profile

• Manufacturers create EPDs for their products to inform decision makers, consumers

• A life cycle assessment (LCA) is an essential part

• Additional info is also provided about a product’s performance and sustainability

• NOT a claim of environmental superiority

• Like a nutrition label

• A readable, informative brochure

• Needs to be validated by an independent third party
Insulation industry decides to be out in front!
Some takeaways for foam insulation

• Perform life cycle assessments

• Learn more about EPDs/PCRs for insulation

• Follow and participate in the evolution of the green building movement

• What is your company’s sustainability program?
  • Consider end of life solutions
Conclusions

• Green Building movement not over – growing fast

• Market gaining a more sophisticated understanding of multiple attributes, rejecting overbroad “green claims”

• Check-list standards are evolving from benchmark status to “raising the bar”

• Life cycle aspects growing in importance

• Attention to green building activities
  • Your neck of the woods (including energy efficiency)
  • Generally