Code and Regulatory Barriers to the Living Building Challenge

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Our current (and even our best) practices continue to due harm.
Business as usual is no longer an option.
What are the OBSTACLES to true innovation?
101.3 Intent. The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.
Risk - Through the Microscope of Codes...

- Fire Safety
- Structural Integrity
- Means of Egress
- Light
- Ventilation
- Heat
- Water & Wastewater
- Electrical & Gas
- Energy Efficiency

Risk - The Bigger Picture...

- Risks to Future Generations
  - Climate Impact
  - Embodied Energy
  - Pollution
  - Toxicity of Materials
  - Nutrification of Water
  - Heat Island Effect
  - Externalized Costs to Society

- Resource Depletion
  - Dependence on Non-Renewable Energy
  - Loss of Habitat
  - Loss of Biodiversity
  - Loss of Agricultural Land
  - Increased Transportation

Diagram courtesy of the Development Center for Appropriate Technology – Copyright DCAT, 2000
Living Building Projects not only meet minimum standards imposed by regulations, but internalize larger risks of climate change impacts and resource use.
Addressing Code + Regulatory Barriers

Shifting from minimum requirements to regenerative practices

- Shifting risks from project level to balancing risks at all scales
- Seeking solutions, not just preventing problems
“Once the full risk profile of projects is included in regulatory considerations, it will become more difficult and expensive to gain approval for the most damaging projects than for the most beneficial ones. Governments in general, and the regulatory realm in particular, need to act decisively to reverse this preference as human and environmental health depend on it.”
Vancouver Code Study
Vancouver Code Study

**Goal**

Evaluate code and regulatory barriers to LBC for affordable housing projects within both City of Vancouver & Clark County
Why?
A Living Building

- Typical "Code" Buildings
- Better Building Practices
- High Performance Green Buildings
- Pursuing Sustainability
- Restorative Buildings

- Current Behavior, Technology and Policy
- The Living Building Challenge
- Net Zero
- New Behavior, Technology and Policy

Code Barriers to Sustainable, Affordable, Residential Development

CASCADEIA SERA
Vancouver Code Study

Participants

• Vancouver, WA
• Clark County
• Cascadia, Mithun, SERA
• Affordable Housing Partners
• Funded by CTED
Report #1: Findings

Report #2: Recommendations

Report #3: Cost/Benefit Analysis

www.ilbi.org/resources/research
Process: Selection of Case Study Projects

- 2-unit urban townhome
- 54-unit urban stacked flat apartments
- 11-unit single family cottage development
- 34-unit multifamily co-housing project
- 175-unit master planned community
- 10-unit single family rural strawbale construction
Process: Applying LBC design strategies
## Process: Land Use, Development + Building Code Analysis

<table>
<thead>
<tr>
<th>Code</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Zoning</td>
<td>VMC Title 20, CCC Title 40</td>
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<td>Land Divisions</td>
<td>VMC 20.320, CCC 40.540</td>
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<td>Planned Unit Development</td>
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<td>On-site Sewage Systems</td>
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<td>Group A Public Drinking Water Systems</td>
<td>WAC 246-290</td>
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<td>Group B Public Drinking Water Systems</td>
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<td>Large On-Site Sewage Systems</td>
<td>WAC 246-272B</td>
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<td>Wastewater Treatment Facilities</td>
<td>WAC 173-240</td>
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<td>Evidence of Adequate Drinking Water Supply</td>
<td>RCW 19.27.097</td>
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</table>
Report #1 Key Findings:

Land Use + Development Code Barriers
Key Findings:

**Minimum Parking Requirements**

In urban locations with access to alternative transportation options, reduced parking requirements can provide additional area for onsite systems such as greywater subsurface drip systems.
Key Findings:

Connection to Public Water

Connection to public water system is required where service is available and a waiver to this requirement would be needed from the City or County in order for Public Health to approve. Code changes to this requirement would need to be coordinated with water purveyors.
Key Findings:

Connection to Public Sewer

Connection required within UGA as a condition to building permit issuance. A septic permit cannot be issued by Public Health unless a sewer waiver is granted. Any variances would need to be coordinated with sanitary sewer service purveyors.
Key Findings:

Setbacks for Cisterns

For small urban lots, above ground rainwater harvesting cisterns must meet setback requirements limiting area available for water collection systems.
Key Findings:

Stormwater BMPs

Outdated stormwater codes in effect. Future adoption of 2005 DOE manual will allow low Impact development BMPs.
Key Findings:

**Driveway & Fire Access Road Width Requirements**

Increased impervious surfaces pose barriers to sustainable water discharge. Possible opportunities to reduce width requirements and promote pervious pavement options without compromising intent of code.
Key Findings:

Common Areas

Assessing if common areas can be allowed to double as onsite area for greywater and stormwater mitigation systems on constrained sites.
Key Findings:

Treatment of Group A Water Systems

Chlorination is mandatory for surface water systems. LBC requires treatment without chemicals.
Key Findings:

Rural Cluster Development

In the County, rural cluster developments only allowed where environmental critical areas exist.
Report #1 Key Findings: Building Code Barriers
Key Findings:

Toxic Materials

Where red listed materials are specifically called out in the codes (preservative and fire treated lumber, vapor retardants, PVC), costly to source alternatives and burden of proof for alternatives is on project teams.
Key Findings:

**Energy Efficiency**

Restrictions that present barriers to maximizing energy efficiency:

- Design temperature ranges for heating and cooling
- Insulation clearances in wall and roof cavities
- Passive crawl space ventilation requirements
- Advanced framing definition
Key Findings:

**Water Supply & Discharge**

**UPC hurdles:**

- Connection to sewer and storm utility required
- Antiquated fixture performance
- Potable water required for plumbing fixtures
Institutional Barriers

• Alternative Materials + Methods
• Linear Approval Process
• Lack of Information + Training
• Limitations to Changing Code
2009 Stakeholder Meetings

- Jan. 21st
  Presented code obstacles and solicited feedback

- Feb. 11th
  Brainstormed on strategies to remove the obstacles + met with targeted state/local officials on water barriers

- March 4th
  Prioritized the strategies
Report #2 Recommendations

Table 1: External Stakeholder Priorities

<table>
<thead>
<tr>
<th>Priority</th>
<th># responses</th>
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<tbody>
<tr>
<td>Institutional/Process Barriers</td>
<td>24</td>
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<tr>
<td>Barriers to Energy Efficiency</td>
<td>15</td>
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<tr>
<td>Non-Conventional Structures</td>
<td>12</td>
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<tr>
<td>Driveway &amp; Fire Access Road Widths</td>
<td>10</td>
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<tr>
<td>Minimum Parking Requirements</td>
<td>7</td>
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<tr>
<td>Setbacks for Rainwater Cisterns</td>
<td>6</td>
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<tr>
<td>Cluster Development</td>
<td>5</td>
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<tr>
<td>Toxic (redlist) Materials</td>
<td>4</td>
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<tr>
<td>Connection to Public Water</td>
<td>2</td>
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<tr>
<td>Connection to Public Sewer</td>
<td>1</td>
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<td>Onsite Fuel Storage</td>
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</table>

The table and chart show the priorities ranked from highest to lowest in terms of the number of responses.
Report #2 Recommendations

Institutional/Process Barriers

Short Term
Expedited/Priority Permit Processing
Mandatory Internal Trainings

Long Term
Mandatory Green Pre-application Meetings
Technical Assistance Program
Report #2 Recommendations

Barriers to Energy Efficiency

**Short Term**
- Permit Guidance on Renewables + Passive Strategies
- Density Bonuses for Efficiency Measures

**Long Term**
- Mandatory Reporting + Mitigation of GHG
- Performance Testing
- District Energy Demonstration Ordinance
Report #2 Recommendations

Barriers for Non-Conventional Building Structures

**Short Term**
Flexibility for “Incubator” Projects
Code Guidance for Strawbale

**Long Term**
Code Advisory Committee for Alternative Technologies
Report #2 Recommendations

Driveway + Fire Access Road Widths

Short Term
LID Code Guidance

Long Term
Update Standards to Require Narrower Pavements
Stormwater Utility Fee Fee Reductions
Report #2 Recommendations

Minimum Parking Requirements

Short Term
Include New Parking Requirements in City/County Comprehensive Plan Update
Report #2 Recommendations

Above Ground Cisterns

**Short Term**
Code Guidance on Designing, Permitting, Installing + Maintaining Cisterns
Amend Code
Report #2 Recommendations

Cottage Housing

Long Term
Develop New City/County Codes to Allow Cottages and Cluster Developments
Report #2 Recommendations

Water Related Barriers

**Short Term**
Code Guidance on Designing, Permitting, Installing + Maintaining Cisterns

**Long Term**
Neighborhood Scale Net Zero Water Demonstration Project
Report #3 Cost-Benefit Analysis

Benefits
• Environmental
• Societal
• Financial

Costs
• Staff
• Training
• Outreach
• Infrastructure
# Cost-Benefit Analysis

**TABLE 3: PRIVATE SECTOR COSTS / PAYBACK**

This table summarizes the anticipated first cost increase and payback for the single family residence and multi-family residence when prerequisites of the Living Building Challenge are met.

<table>
<thead>
<tr>
<th>Project Size</th>
<th>Anticipated First Cost Increase</th>
<th>Payback</th>
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<tbody>
<tr>
<td>SINGLE FAMILY RESIDENCE</td>
<td>27-32% increase</td>
<td>30 years</td>
</tr>
<tr>
<td>MULTI-FAMILY RESIDENCE</td>
<td>31-36% increase</td>
<td>22 years</td>
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Next Steps

Clark County Sustainable Communities

Project Purpose: Engage key stakeholders to craft a regional strategy for fostering sustainable development across the County with a goal of 50% participation.
Thank you!
Cascadia Region Green Building Council
www.cascadiagbc.org