Central City Concern
Building Efficiency Charrette

“embracing building efficiency as a pathway to self-sufficiency”

charrette date: July 30, 2009
report date: November 30, 2009
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Overview and Introduction

Central City Concern (CCC), with the generous support of Enterprise Community Partners, has taken another significant step in transforming itself into a sustainable organization by hosting a Building Efficiency Charrette with the goal of envisioning how to achieve net zero energy, water, and waste\(^1\) across its 22-building portfolio.

On July 30, 2009, a diverse group of building industry professionals, public employees, and staff members\(^2\) assembled at the AIA Center for Architecture in Portland, Oregon to focus on how to systematically implement green building strategies to increase efficiencies of CCC’s buildings with a particular focus on reductions in energy, water and waste. The primary purpose of the charrette was to address two key goals to be accomplished within the next 18 months:

- Achieve 20% utility cost reductions amounting to over $200,000 in annual savings
- Develop a Roadmap that will guide CCC towards net zero energy, water, and waste by 2030.

A smart, ambitious approach to conservation could enhance the capacity of organizations like CCC to provide affordable housing and services for those in need. CCC currently spends over $1 million annually on water and energy and this charrette addressed how significant resources currently directed towards utilities could be redirected towards direct services for its clients.

The workshop helped to clarify visions, principles, and strategies associated with this effort, to galvanize support amongst stakeholders, and to affirm that dramatic improvements in building efficiencies is interconnected with the organization’s mission of “providing pathways to self-sufficiency through active intervention in poverty and homelessness.”

\(^1\) Net zero energy, in the context of the CCC portfolio, would mean that 100% of the portfolio’s energy needs are supplied by on-site renewable energy systems on a net annual basis. Similarly, net zero water would mean that all water needs for the portfolio would be met through on-site water harvesting and treatment of rainwater and wastewater so that no storm water or wastewater leaves the site. Net zero waste would mean that no waste materials left the site destined for a landfill. These definitions are adapted from the Living Building Challenge issued by the Cascadia Region Green Building Council.

\(^2\) The group included representatives from Central City Concern, City of Portland Bureau of Planning and Sustainability, Carleton Hart Architects, Energy Trust of Oregon, Gerding Edlen Development, Green Building Services, Housing Development Center, Interface Engineering, Multnomah County Weatherization Program, Oregon Built Environment & Sustainable Technologies Center, Portland Development Commission, SERA Architects, State of Oregon Housing and Community Services and Walsh Construction Company. A complete list of attendees is included in Appendix B.
Central City Concern provides vital services to more than 15,000 Oregonians each year and oversees more than 1,500 units of affordable housing. CCC residents, who are transitioning out of homelessness, face numerous challenges, and utility costs can pose an economic barrier to successful tenancy. Unlike some affordable housing where utility costs are passed on to residents, CCC pays all building utilities. For housing providers like CCC, utility costs reduce available resources for housing and supportive services. Utility rate increases are expected to outpace both inflation and the organization’s revenue growth. Looking forward, CCC must find ways to reduce utility costs in its buildings if it is going to continue to provide the kinds of wrap-around services that have helped tens of thousands of people over the years overcome homelessness.

The Building Efficiency Charrette is one of many CCC efforts, past, present, and future, that constitute the Building Efficiency Project (BEP). These efforts, described below, promise to transform CCC into an increasingly sustainable organization:

- **Building Audit** – Through the help of a summer intern, CCC assessed current utility costs associated with each of its properties. This effort helped to inform the discussions at the charrette and to understand the relative opportunities for improved building efficiency at each property.

- **Building Efficiency Charrette** – This report documents the proceedings of the charrette as well as highlights visions, principles, strategies, and next steps that emerged from the half day session.

- **Action Plan to Achieve 20% Utility Cost Reductions** – This upcoming step, targeted to be implemented over the next 18 months, and deemed readily achievable by charrette participants, will target high return on investment actions that are consistent with long-term plans for CCC’s properties. This charrette report can help to inform the creation of this action plan.

- **Building Efficiency Roadmap to 2030** – This Roadmap will be developed over the next 18 months and will serve to guide CCC over the next 20 years as it works towards net zero energy, water, and waste.

The following initiatives were identified to focus for the continued efforts of the BEP (discussed in more depth later in the report):

- Prioritize and commit to carrying out the Building Efficiency Project
- Build capacity within CCC to implement the BEP
- Identify funding opportunities and secure funds
- Continue efforts to audit resource use at all facilities
- Create and implement action plan to achieve 20% utility cost reduction by 2010.
- Develop a Building Efficiency Roadmap to 2030 that identifies major efficiency measures, costs, and financing plan
- Provide training and feedback opportunities to support BEP effort
After an initial welcoming and introductions, Central City Concern provided an overview of the organization and the BEP Project (see Appendix A for a complete agenda, Appendix B for a list of participants, and Appendix C for the BEP Project Overview). After the overview, the group began the core activity, a design “SLAM” as described in detail in Appendix D. The purpose of such a visioning exercise is to take people out of their current context of role, space and time; present challenging, seemingly unattainable goals; and develop ideas and strategies as a team. Participants were put into four design teams and were asked to propose a portfolio-wide strategy to achieve the goal of 100% social impact and zero environmental impact by 2030. The teams were asked to meet the following project requirements focused on social equity, financial performance, and environmental benefits:

- Net zero energy and meeting the 2030 Challenge: Carbon neutral and fossil fuel-free by 2030
- Net zero water use on-site
- Zero waste
- Occupant behavior transformation
- Preservation of affordability for a low-income population

After completing the 30 minute visioning exercise, the charrette participants shared their ideas (see Appendix E) and then collectively summarized key findings from the exercise (see Appendix F). The four groups then focused on developing more detailed timelines and strategies for achieving the 2030 goals. Each group focused on one of the following four areas:

- Building Envelope and Heating, Ventilation, & Air Conditioning (HVAC) systems
- Lighting & Electrical
- Water & Waste
- Financing and Incentives

Each of the four groups then shared their strategies and implementation plans (see Appendix G) and then the entire group distilled the results from all the groups by identifying key strategies and next steps (see Appendix H) for accomplishing the goals of the BEP. Finally, charrette participants had the opportunity to learn more about various energy efficiency resources available to them from the numerous organizations represented in the room (see Appendix I).

In short, the appendices capture the proceedings from the half-day charrette. The next section of this report, “Pathway to Building Efficiency,” articulates a vision, principles, strategies, and next steps that emerged from the workshop. This information will help guide the next phases of the BEP.
Pathway to Building Efficiency

**Intent:** The intent of the charrette was to address the opportunity of dramatically increasing building efficiencies with a particular focus on energy, water, and waste. It became readily apparent that Central City Concern can achieve these reductions while accomplishing its mission by focusing on a triple bottom line approach that addresses, “People, Planet, and Prosperity.” One participant stated:

> “We need to develop a suite of success measures that go beyond energy and water.”

**Vision:**

**PEOPLE**
*a pathway to self sufficiency*
- Residents and the larger community share in goals and successes
- Residents enjoy a high-quality, healthy, and efficient living environment

**PLANET**
*minimize environmental impacts:*
- Net-zero energy
- Net-zero water
- Net-zero waste

**PROSPERITY**
preserve affordable housing & services
- CCC has abundant resources for housing and services
- Efficiency savings provide further investments in efficiencies

Based on the discussions at the workshop, a compelling vision, guiding principles, and key initiatives emerged and are described below.

The interconnectedness of People, Planet, and Prosperity are particularly strong in a mission-driven organization such as CCC. It is apparent that each component of the vision, shown in the Vision diagram, is dependent on the other components. For example, the mission to end homelessness is impacted by the resources that are required for water and energy. The ability to significantly reduce water and energy costs is limited by the availability of capital which in turn is impacted by the financial models of the organization. In short, fulfillment of the mission and accomplishing the goals of the BEP can best be achieved through a comprehensive adoption of sustainability practices throughout the portfolio.
Principles: The Guiding Principles diagram below shows principles that emerged from the discussions that could be used to guide the BEP. Optimizing the positive outcomes of the BEP will require coordination within the organization and with multiple partnerships. It will also require considering the entire portfolio as a whole. For example, there could be significant economies of scale in considering water efficiency measures that would be applied across the organization’s entire portfolio rather than one building at a time. Finally, this transformation is new territory and therefore it will be important to see this as an iterative rather than a linear process.
Based on a review of the charrette discussions, the following key initiatives have been identified as instrumental in achieving the BEP goals of reducing utility costs by 20% and having a Roadmap to 2030 by the end of 2010. They are arranged loosely in chronological order beginning with items that should be addressed soonest.

- **Prioritize Building Efficiency Project** – Confirm an organization-wide commitment to BEP.
- **Build Capacity** – Identify or hire a full-time, dedicated sustainability coordinator with authority and accountability to develop and run this program. Identify champions within the organization. These steps would help to ensure accountability for and capacity to achieve the BEP goals.
- **Seek Funding Opportunities** – Understand the various funding opportunities, timelines, and requirements from organizations such as Energy Trust of Oregon, Oregon Housing and Community Services, Multnomah County Weatherization Program, Enterprise, and others. There are certain funds, such as those available from the American Recovery and Reinvestment Act, that are only available temporarily and need to be prioritized. Explore financial models that will enable significant investment in building efficiency by capitalizing operating cost savings to create additional capital for further efficiency investments.
- **Perform facility audits** – Complete the comprehensive site audit and base-lining effort to provide an accurate and detailed portrayal of performance by site. Performing ASHRAE Level I and Level II audits on all facilities is recommended. Prioritize projects based upon audit results.
- **Create action plan** – An action plan will be required to achieve a 20% utility cost reduction by 2010. The success of this component of the BEP will generate utility savings that can leverage future investments. Although this action plan will have a short-term focus, it is important that the plan is compatible with long-term rehabilitation and other considerations.
- **Develop Building Efficiency Roadmap to 2030** – This plan will guide CCC towards net zero waste, water, and energy over the next 20 years and is targeted to be developed by the end of 2010. The Climate Action Plan developed by City of Portland and Multnomah County could serve as a relevant framework for this effort. One component of this Roadmap would be that there would be a comprehensive set of metrics that not only relates to building efficiency goals but also to other factors important to the mission of the organization such as health and comfort for occupants. Another component would relate to life-cycle cost thinking and analysis.
- **Provide training** - Develop a training and education program for residents, staff, and other stakeholders to ensure project success.

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3 Level I audits look at how energy is used in a building and are used to identify energy efficiency improvement opportunities. They include rough estimates of payback associated with possible energy improvement measures. A Level II audit would provide more refined cost analysis for those energy improvement measures identified in the Level I audit.
Conclusion: There were a number of key outcomes from this Building Efficiency Charrette including:

- A consensus among participants that reducing utility costs by 20% by the end of 2010 is readily achievable.
- Building efficiency significantly impacts CCC’s capacity to carry out its mission.
- A focus on the triple bottom line of People, Planet, and Prosperity provides a framework for achieving the goals of the BEP while also furthering CCC’s mission.
- The vision, guiding principles, and key initiatives that emerged from the charrette can guide the next phases of the BEP.

“This is unknown territory. No one really knows how to do net zero on a wide scale yet, especially for organizations with limited revenue streams.”

This report presents a distilled and refined version of the total proceedings from the charrette and is not a substitute for the depth of ideas that was generated during the event. The appendices attempt to more fully capture the totality of the charrette and contain a wealth of ideas that should be considered as the next steps of the BEP are implemented.

Through this important project, CCC has the opportunity to significantly decrease the resources it directs to energy, water, and other utilities and therefore increase its capacity to serve people coming out of homelessness. The pathway to building efficiency can also be a pathway to self-sufficiency.
AGENDA
Central City Concern | Building Efficiency Project
Thursday, July 30, 2009, 8:30am – 1:30pm

AIA Center for Architecture
403 NW 11th Avenue (at Flanders St), Portland, Oregon 97209

GOAL
To improve the environment and preserve affordability and services for Central City Concern’s residents by developing a roadmap to achieve an immediate 20% reduction in energy and water use and a 100% reduction (net-zero) by 2030 in an affordable housing portfolio.

ANTICIPATED OUTCOMES
☐ Provide an overview of the current status of energy (electricity and gas) and water use in an affordable housing portfolio.
☐ Identify challenges and opportunities associated with energy and water reductions in affordable housing.
☐ Recommend appropriate efficiency measures that will result in significant energy and water savings.

8:00 – 8:30 [30] Arrival, Settling in, Ready to go
8:30 – 9:00 [30] Introductions, Purpose, Agenda & Overview
9:30 – 10:15 [45] CCC SLAM
10:45 – 11:00 [15] Break
11:00 – 11:45 [45] CCC Strategies (capitol improvements + O&M recommendations)
   - hvac + building envelope
   - lighting + electrical (plug loads)
   - water + waste
   - financing + incentives
12:45 – 1:30 [45] Session Summary, Next Steps/Action Plan & Wrap-Up
The following individuals and organizations participated in the Building Efficiency Charrette:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Bill Hart</td>
<td>Carleton Hart Architects</td>
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<tr>
<td>Adrienne Karecki</td>
<td>Central City Concern</td>
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<td>Ben Franceschi</td>
<td>Central City Concern</td>
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<td>Ben Gates</td>
<td>Central City Concern</td>
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<td>David Altman</td>
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<td>Dean Gisvold</td>
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<td>EV Armitage</td>
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<td>Herb Draper</td>
<td>Central City Concern</td>
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<td>Jay McIntire</td>
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<td>Martin Soloway</td>
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<td>Ray Delcambre</td>
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<td>Robert Ridgway</td>
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<td>Ron Haver</td>
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<tr>
<td>Sean Hubert</td>
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<tr>
<td>Traci Manning</td>
<td>Central City Concern</td>
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<tr>
<td>Valerie Garrett</td>
<td>City of Portland Bureau of Planning and Sustainability</td>
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<tr>
<td>Ethan Bradford</td>
<td>Energy Trust of Oregon</td>
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<tr>
<td>Diane Ferrington</td>
<td>Energy Trust of Oregon</td>
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<td>Emily Merchant</td>
<td>Energy Trust of Oregon</td>
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<td>Spencer Moersfelder</td>
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<td>Kevin Tippit</td>
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<tr>
<td>Jill Sherman</td>
<td>Gerding Edlen Development</td>
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<td>Renee Loveland</td>
<td>Gerding Edlen Development</td>
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<tr>
<td>Dennis Wilde</td>
<td>Gerding Edlen Development</td>
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<tr>
<td>Peter Walker-Keleher</td>
<td>Green Building Services</td>
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<td>Ralph DiNola</td>
<td>Green Building Services</td>
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<tr>
<td>Craig Kelley</td>
<td>Housing Development Center</td>
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<tr>
<td>Jon Gray</td>
<td>Interface Engineering</td>
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<td>Omid Nabpoor</td>
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<tr>
<td>Jess Kincaid</td>
<td>Multnomah County Weatherization Program</td>
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<tr>
<td>Joshua Goffin</td>
<td>Multnomah County Weatherization Program</td>
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<tr>
<td>Cindy Bethell</td>
<td>Portland Development Commission</td>
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<tr>
<td>Erin Reome</td>
<td>Portland Development Commission</td>
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<tr>
<td>Clark Brockman</td>
<td>SERA Architects</td>
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<td>John Smith</td>
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<td>Kate Turpin</td>
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<td>John Czarnecki</td>
<td>State of Oregon Housing and Community Services</td>
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<td>Steve Divan</td>
<td>State of Oregon Housing and Community Services</td>
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<td>Tim Zimmer</td>
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<tr>
<td>Bhavna Kumar</td>
<td>Walsh Construction Co</td>
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<td>Ed Sloop</td>
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<td>Mike Steffen</td>
<td>Walsh Construction Co</td>
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Appendix C: Building Efficiency Project Overview

The following project introduction was given by Benjamin Franceschi, Central City Concern’s Building Efficiency Coordinator, who audited CCC’s portfolio, and coordinated building efficiency initiatives over the summer of 2009.

Central City Concern has embarked on a Building Efficiency Project. Thank you to Enterprise, the project sponsor, and to all who are participating in the charrette today.

The project’s goal is to improve the environment and preserve affordability and services for Central City Concern’s residents by developing a roadmap to achieve an immediate 20% reduction in energy & water use and a 100% reduction (net-zero) by 2030 in an affordable housing portfolio.

The project seeks to meet the triple bottom line of people, planet, and profit (or prosperity). However, as a mission-driven organization, CCC places a particular emphasis on and fulfilling it mission (principles). This could be called the quadruple bottom line.
Appendix C: Building Efficiency Project Overview (continued)

The project has proposed an immediate 20% energy and water reduction over the next 18 months, and a 100% energy and water reduction by 2030. The 20% reduction would implement the ‘low-hanging fruit’ or simple conservation measures that can be implemented now. The 100% reduction would implement strategic capital improvements that would aim to meet regular reduction targets of 20% every 5 years.

Central City Concern has completed a preliminary energy and water audit of the 22 residential buildings in their portfolio. The audit consists of 3-5 years of utility data, entered into Energy Star’s Portfolio Manager and a building inventory of physical components that affect energy and water use. The spreadsheet shown here includes a side-by-side comparison of several buildings with a useful metric of energy use per occupant.

A useful energy use metric has been ‘energy cost per occupant’. This allows one to see which buildings are the best and worst performers. Perhaps strategies from the best performers can be applied to the worst performers. Perhaps there is lots of ‘low hanging fruit’ among the worst performers.
CCC has a mixed portfolio of high-density and low-density buildings, buildings for individuals, and buildings for families.

Among the low density buildings (many serving families), the Rose Wood Apartments is the worst performer, costing $948 per occupant per year. The best performer is difficult to quantify as tenants pay their own electricity bills in many of CCC’s low-density buildings.

Among the high density buildings (mostly serving individuals), the Butte Building is the worst performer, costing $850 per occupant per year. The best performer is the Estate Hotel, recently renovated in 2008.
CCC pays over $1 million in electricity, gas, and water expenses. A 20% reduction would net approximately $200,000 in savings annually.

Several opportunity areas have been identified to achieve savings: 1) lighting; 2) plug loads; 3) heating ventilation & cooling; 4) building envelope; 5) water; 6) waste; and 7) financing & incentives.

A project approach and timeline has been proposed.
Today we are convening the charrette.

Following this project introduction, Green Building Services facilitated the core Charrette activities.
Appendix D: Charrette SLAM - Clinton Climate Concerns RFP

**Goal:** Green Building Services employed a fictitious Request for Proposals (RFP) from “Clinton Climate Concerns (CCC)” to challenge the charrette participants to develop strategies to achieve a net-zero portfolio by 2030. Following is a presentation of CCC RFP that set the stage for the fast paced ‘Slam.’

**CCC Background:** Clinton Climate Concerns (CCC) has assembled four of the best multidisciplinary consulting A&E and development teams to support the expansion of their affordable housing Real Estate Investment Trust (REIT). This new REIT, focused on the triple-bottom-line (People, Planet and Profit), is working to add poorly performing properties in communities and neighborhoods lacking affordable housing to their portfolio and then rehabilitate them. This non-profit, Socially Responsible Investment (SRI) fund currently has over 1,700 properties and recently added 22 properties with 1,500 housing units.

**CCC RFP Summary:** CCC has brought together these competing teams to launch a new pilot program: Zero Environmental Impact, 100% Social Impact. Each team will be given the opportunity to compete to win the opportunity to fully develop and implement their program. Once the pilot has been implemented, the team will have the opportunity to roll out the program to the entire portfolio. The program requires that the teams devise a solution for these properties that includes the following outcomes:

- Zero-net energy and meeting the 2030 Challenge: Carbon neutral and fossil fuel-free by 2030
- Zero-net water use on-site
- Zero waste
- Occupant behavior transformation
- Preservation of affordability for a low-income population
- Note: CCC pays all utility bills (as passing this on to this population would impose a barrier to tenancy)
Appendix D: Charrette Slam - RFP from Clinton Climate Concerns (continued)

CCC RFP Deadline: The project teams will have 40 minutes to prepare a presentation. On ONE flip chart page, includes the following information:

1. The name of your team
2. The name of your program
3. The program solution for 2030
4. 3-5 key principles that will guide your program and implementation teams
5. Major capital improvement requirements for these existing facilities (what are the BIG moves)
6. Key technologies and strategies that would be implemented (radical shifts from current strategies)
7. Major O&M changes proposed
8. Key players in this transformation of the properties

Request for Clarification: Timeline & Strategies: As a follow-up activity, the CCC would like to understand how to cost-effectively roll this program out to the entire portfolio in alignment with the 2030 challenge. Project teams are required to complete the 2010-2030 timeline to help articulate their approach and back-cast their recommended approach in 5 year increments.

Deliverables:
- Completed timeline
- Key strategies, measures, and technologies that will be (in given categories) implemented in each 5 year period between 2010 and 2030 that outline how incremental goals will be achieved
- Key strategies, measures, and technologies (in given categories) that could be implemented immediately in the next 18 months to arrive at an immediate 20% reduction in energy and water usage. These shall be considered “low-hanging fruit” for CCC in the rehabilitation of their 22 buildings.
Appendix E: Charrette Slam - Report Out

**Slam Goal:** Teams had 40 minutes to generate plans to achieve 0% Environmental Impact and 100% Social Impact by 2030 as described in the RFP in Appendix D. They then reported out their plans to the larger group as captured below.

**TEAM YES (Yellow Environmental Superstars)**

Team Members:
Adrienne Karecki, Martin Soloway, Ron Haver, Kate Turpin, David Kenney, Ethan Bradford, Kevin Tippit, Joshua Goffin, Tim Zimmer, Ed Sloop

Highlights:
- Make occupant health a priority
- Educate stakeholders including residents & staff
- Facilitate a culture shift
- Emphasize passive systems and simple solutions
- Focus on envelope
- Create low-maintenance solutions & minimize impact to residents
- Consider residents’ perspective
- Maintain excellent records
- Implement short-term improvements that are consistent with long-term strategy
- Maximize opportunities to use building envelope for multiple purposes including vegetated roof and solar collector
- Standardize equipment, including lights, fixtures, appliances, etc, across all buildings to simplify maintenance and reduce costs.
- Maximize daylighting & insulation
- Maximize serviceability & access
- Do more with less
- Base decisions on life cycle costs, not just initial cost
- Recognize that building proximity allows for economies of scale
- Maximize operations for high density building
- Use systems thinking
- Time improvements to maximize return on investment
Appendix E: Charrette Slam - Report Out (continued)

**Slam Goal:** Teams had 40 minutes to generate plans to achieve 0% Environmental Impact and 100% Social Impact by 2030 as described in the RFP in Appendix D. They then reported out their plans to the larger group as captured below.

**TEAM KILL BILLZ**

Team Members: Ben Gates, Robert Ridgway, Erin Reome, Diane Ferrington, Emily Merchant, Craig Kelley, Bhava Kumar, Ray Delcambre, Jay McIntire, John Smith, Jon Gray

Key Principles:
- Passive housing: build like a thermos with good ventilation and following:
  - Super-insulation, air sealing, triple-glaze windows
  - Heat recovery ventilation
- Water: provide potable water production & supply/sewage treatment including:
  - Harvesting & treatment system
  - Efficient water fixtures
- Renewable energy: Sun and human power including:
  - Solar photovoltaics and hot water
- Resident participation & feedback: provide incentives for resident behavioral adaptation

Major Capital Improvement Requirements:
- Structural improvements

Key, Radically Different, Technologies and Strategies:
- Net metering with water

Major O&M Changes Proposed:
- Implement robust monitoring of real-time energy consumption and reporting
- Provide training for staff & residents

Key Players:
- Code officials
- Residents
- Staff
- Board
- Funders
- Elected Officials
- Design and construction professionals
- Lenders
- Foundations
- Developers
- Utilities
Appendix E: Charrette Slam - Report Out (continued)

**Slam Goal:** Teams had 40 minutes to generate plans to achieve 0% Environmental Impact and 100% Social Impact by 2030 as described in the RFP in Appendix D. They then reported out their plans to the larger group as captured below.

### TEAM NET-ZERO CHAMPIONS

Team Members:
Herb Draper, EV Armitage, Bill Hart, Ben Franceschi, Steve Divan, Valerie Garrett, Omid Nabpoor, Cindy Bethell, Mike Steffen

Program solution for 2030:
- Radical interconnected change throughout portfolio emphasizing communication

Key Principles:
- Carbon-neutral/fossil-fuel free
  - Disconnect gas services
  - Assess solar/water access portfolio-wide
- Water
  - Create rules for separation and use of grey & blackwater
  - Storing in system/aquifer responsibilities
- Waste
  - Create policies related to intake/output
  - Take advantage of all materials
- Behavior
  - Reward tenants for energy savings
  - Encourage efficiencies through competitions
  - Support no-smoking policies
- Other
  - Plant trees throughout sites – passive heating & cooling
  - Provide education for residents
  - Carefully assess the issue of smoking and its effects on ventilation, comfort
  - Recognize that achieving net-zero energy is more challenging for buildings with high Floor to Area Ratios – important to use a portfolio-wide approach
Major Capital Improvement Requirements:
- Replace windows
- Upgrade thermal performance of envelope
- Provide dashboard monitoring
- Disconnect gas completely to allow renewable energy to eventually replace fossil fuels
- Integrate natural systems

Key, Radically Different, Technologies and Strategies:
- Practice Biomimicry
- Incorporate Living Machines
- Create energy from methane gas from waste
- Achieve net-zero waste (trash & human waste)
- Establish individual water & energy budgets for residents
- Radical metering (regional)

Major O&M Changes Proposed:
- Install complex metering systems allowing real-time data extraction with rewards

Key Players:
- Planners
- Utilities
- Green tech industry
- Researchers
- Universities
- City
- Construction industry
- Property managers
- Foundations
- Residents
- Laws: SHPO- State Historical Preservation Office - historical preservation regulations need changing
Appendix E: Charrette Slam - Report Out (continued)

Slam Goal: Teams had 40 minutes to generate plans to achieve 0% Environmental Impact and 100% Social Impact by 2030 as described in the RFP in Appendix D. They then reported out their plans to the larger group as captured below.

TEAM PRESENT FUTURE

Team Members
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Program solution for 2030:
• Higher focus now, less in future
  - Policy change
  - Energy efficiency & conservation
  - Behavior change
• Lower focus now, more in future
  - Financing
  - Job creation
  - Renewables

Key Principles:
• Reduce consumption by 70%
• CCC, partners, and client group to serve as major ambassadors for program nationally & internationally
• Identify synergies
• Map complementary systems
• Identify partnering buildings and agencies
• Create a robust REIT that is funding CCC and other organizations
• Provide education on sustainability
• Convert pee to tea, poop to power, waste to resource
• Construct intelligent buildings that are not complicated
• Create climate responsive facades
• Work towards a situation where triple bottom line will be viewed as the new normal
• Elevate the importance of the urban environment to that of the overall environment
• Implement climate responsive design
• Recognize that these buildings are home and community for the tenants
• Train residents to perform energy retrofits
• Localize resource flows – jobs, products, systems
• Cross-connect resources; e.g., water collection to energy
• Construct a demonstration waste-to-power plant
• Engage population with feedback loops
• Reward residents through financial approaches
• View the “problem” on a portfolio-basis
• Map complementary and proximate buildings and resources
• Analyze what policies need to be changed; e.g., urban wind
Appendix F: Charrette Slam - Summary

After each group presented, the entire group worked together to identify the common strategies, principles, themes, etc. that emerged from the group presentations. These ideas have been categorized as People, Planet, or Prosperity. Of course, many ideas ideally address all three categories but have been placed in the category most closely associated with the idea.

People:
- Engage residents & building community as part of solution
- Change social paradigm: normalize certain behaviors by rewarding good behavior
- Promote social equity by training residents in green collar jobs and promoting living wage jobs in partnership with unions
- Establish partnerships at all levels, from residents to international
- Maintain a balance between energy efficiency & personal comfort; for example, resident could go out on balcony to smoke or have ability to open windows
- Be sensitive to the issues of smoking
- Collect input from residents on their needs & feedback
- Recognize that CCC cannot achieve sustainability without ending homelessness and that housing is a right that is available to everyone who needs it
- Find ways to share successes and communicate progress
- Be ready to address needed policy and code changes (local, state, national)
- Encourage all involved in the transformation to “walk the talk” and address their own lifestyle changes - it will not work to only ask this of the CCC residents

Planet:
- Reroute waste flows to energy and resource flows (concept of waste as a resource)
- Create a culture change related to tracking energy use of individuals
- Emphasize the importance of building envelopes
- Reduce energy demand
- Recognize that energy conservation is integral to sustainability (both social & environmental aspects)
- Address the huge amount of waste associated with resident furniture & belongings
- Meter energy use to level needed to impact change
- Recognize value of flora & fauna in CCC buildings
- Address issues of bedbugs, cockroaches with regard to environmental health for the sake of occupants and surround eco-systems
- Emphasize durability & maintainability of building environment to reduce waste
- Engage the State Historic Preservation Office in discussions around energy efficiency retrofits – current historic preservation restrictions make such projects difficult
Appendix F: Charrette Slam - Summary (continued)

Prosperity
- Increase building efficiencies through a “campus” approach by balancing energy use across portfolio and capitalizing on synergies with proximate properties
- Make decisions based on life cycle cost analysis to maximize value over time as opposed to lowest first cost
- Create intelligent buildings that are not complicated and are not dependent on occupant behavior
- Reward “good” behavior as opposed to penalizing “bad” behavior
- Create accountability within CCC for who is responsible for monitoring energy usage
- Benefit from economies of scale by establishing partnerships with product & equipment manufacturers for high-quality products (energy efficient, durable, minimal maintenance requirements, etc.) that are cost-effective
- Self-finance; use utility savings to invest & leverage further investments
- Create income generating opportunities that promote income equity
After the initial Slam and report-out, groups then focused on creating an implementation plan with a particular area of focus: Lighting & Electrical, Water & Waste, HVAC & Building Envelope, and Financing & Incentives. Each group was asked to identify specific actions and strategies and to determine when they would happen. The time periods were the next 18 months, 2012-2015, 2015-2020, 2020-2025, and 2025-2030.

**Lighting & Electrical: Strategies:**

- Start with lighting audits
- Think bigger picture than just seeing lighting as low hanging fruit: relatively low cost/big ROI
- 6-12 month plan: turn down lights, upgrade HVAC controls, replace wasteful appliances
- Establish university research partners
- Work with Energy Trust – they can do quick lighting improvements on unit basis (i.e. switching to CFLs) and have a refrigerator recycling program
- Switch to bulk, standardized purchasing of lighting
- Perform 6 months of planning followed by 12 months of implementation
- Work with multiple possible funding partners
- Address tenant behavior through education (i.e. when to turn off lights, how to operate automatic controls, when to turn off or unplug appliances, etc.)
- Consider a bulk purchasing plan for energy demanding appliances. For example, CCC could buy high-efficiency televisions that are then resold to tenants.
- Group questioned how much to rely on occupants to make changes vs. master controls/automatic sensors/intelligent building
- Consider installing energy dashboards as a strategy for changing resident behavior
- Submeter units and give residents 25% of monthly savings – model of rewards vs. punishment (Atlanta unit gave smiley faces to reward good energy usage & this had impact on energy use)
- Consider emerging technologies like LEDs once stable and tested
- Install occupancy sensors in corridors, stairways, elevators
- Implement mechanical ventilation and heat recovery
- Establish new construction & retrofit standards for electricity going forward as new technology is developed
- Target low-efficiency water heaters for replacement with high-efficiency ones
- Meet health and comfort needs of occupants through adequate & well balanced lighting
- Choose interior colors (paints, carpeting, etc.) that are reflective and optimize interior lighting
- Maximize natural lighting potential
- Submeter to distinguish lighting and plugloads
Appendix G: CCC Strategies - Report Out (continued)

**Water & Waste:**

- Strategies - Next 18 months:
  - Replace high-use fixtures with low-flow ones (requires big investment and provides big return)
  - Target turnover as a time for replacement

- Strategies - Longer term:
  - Implement new water systems during major building rehabs
  - Overall focus on portfolio while installing new systems one building at a time
  - Install bioreactors/Living Machines

**Waste:**

- Perform a waste audit on garbage/recycling
- Administer a tenant survey building by building
- During building rehab, provide smaller multiple chutes for waste & recycling instead of 1 big trash chute
- Establish channels for tenant furnishings to be donated to other nonprofits (i.e. Goodwill) instead of to landfill
- Address challenge of bedbugs to allow furnishings to be reused

**Overall approach:**

- Target changes during Turnover, Building Rehab, and Tenant Improvements
Appendix G: CCC Strategies - Report Out (continued)

HVAC & Building Envelope

- Build upon the recent audit and perform comprehensive needs assessment of all buildings in the portfolio – next 18 months
- Perform retro-commissioning of existing buildings – next 18 months
- Consider that 20% efficiency savings might come later than 18 months because of time needed for audit, financing, retro-commissioning
- Perform thermal imaging scan of portfolio envelope – next 18 months
- Perform window replacement - complete by 2015
- Upgrade envelope insulation – complete by 2020
- Replace gas-based energy systems – must switch from fossil fuels in order to achieve net-zero – don’t have individual controls – complete by 2020
- Eliminate need for massive boilers & distribution systems with better insulation and individual controls – complete by 2020
- Switch to renewable energy, including solar hot water, after achieving approximately a 60-70% energy reduction – complete by 2030
- Provide education & training – Next 18 months
- Provide measuring & feedback systems, occupant control & training– begin by 2015 and continue indefinitely
Appendix G: CCC Strategies - Report Out (continued)

**Financing and Incentives:**

**Strategies:**
- Establish portfolio-wide financing
- Establish a REIT – real estate investment trust
- Start equity fund then leveraged-debt fund
- Create structure where CCC can issue bonds (must get to a certain size in order to do this)
- Improve communication among funders & agencies around financing
- Prepare to take big leaps in increased efficiencies over time rather than linear improvements
- Establish best timeframes for capital improvements
- Create green jobs program
Appendix H: CCC Strategies - Summary & Next Steps

**Strategies:** After each group presented the strategies from their particular area of focus, the entire group generated the following summary list of strategies:

- Prepare to devote considerable money up front
- Understand life cycle costing and think long-term
- Consider how to best involve residents in costs associated with their energy use
- Further develop the triangle model for what to emphasize when
- Use actual savings to reinvest in further improvements
- Focus on lower cost investments at beginning to generate funding for next stages
- Involve residents in education & buy-in up front with initial simple changes
- Create a self-sustaining endowment as a long-term financial strategy
- Establish integrated phasing plan
- Determine how to best integrate four focus areas into a comprehensive strategy/road map
- Recognize that this will be an iterative process - “Lather, rinse & repeat” strategy
- Establish standard training protocol/approach for every new resident upon move-in
- Consider how these buildings will be impacted as Portland evolves overall net zero energy strategy including district energy

**Next Steps:**

- Coordinate with potential funding partners (State, County, Energy Trust, etc)
- Assess retrofit costs and building needs
- Estimate costs for energy efficiency upgrades so they can be capital needs assessments, which is currently underway
- Re-evaluate focus of road map and adjust if appropriate
- Make sure the CCC timeline for Building Efficiency Project is realistic
- Prioritize use of ARRA funds as this money has a very short timeline
- Include applying for incentives as part of Road Map (understand funder program requirements and timelines to plan the best timeframes for particular funders)
- Develop master plan for bulk purchasing
- Include opportunities as well as needs in capital needs assessment
- Refine energy audit to make sure assessment is accurate and meaningful
- Identify pilot projects for particularly innovative approaches
- Have long-term perspective
- Hire energy captains comparable to the JC Penney model
- Develop suite of success measures that go beyond energy & water
- Establish baselines for targeted metrics
- Add sustainability criteria to contractor and vendor selection practices
- Map out near-term, mid-term, long-term partners
- Identify district opportunities by drawing radius around each building to identify potential relationships that could be developed including potential funding sources
Appendix I: Presentations on Energy Efficiency Resources

Representatives from state and county weatherization and efficiency programs presented available and projected funding opportunities for affordable housing.

Oregon Housing and Community Services (OHCS), John Czarnecki
- He is an architect who works with affordable housing developers around the state
- His current role is to help facilitate the appropriate use & need for funding, especially federal stimulus ARRA (American Reinvestment & Recovery Act) funding
- State distributes funds to organizations including Multnomah County
- $60 million total for weatherization efforts is available – some is renewable funding, some is through 2012 and might be renewable
  - Department of Energy - $17 million per year
  - Dept of Energy $37 million to spend by March 2012
  - Eco funds - public purpose funds - $8 million from PGE & Pacificorp
  - LEET weatherization $3-4 million
  - $1.3 million from consumer owned utilities
  - Two other smaller funds
- Goal: work with stakeholders to encourage weatherization measures
- OHCS funds projects through competitive applications to Consolidated Funding Cycle – will combine spring and fall funding rounds (including weatherization, state trust funds, other federal funding like HOME and HELP, special needs funding) so project sponsors can come in with projects to receive this funding
- Affordable housing is integral part of larger aspects of community; workforce housing, giving residents tools to achieve self-determination
- Last year – total $26 million for weatherization, this year $60 million including $38 million over 3 years with stimulus funding, ramping up over time
- Encouraging all agencies statewide to build relationships to complete projects to achieve funding spending goals

Multnomah County, Jess Kincaid
- With state funding, fully funds weatherization upgrades with affordability requirement for 10 years in order to receive County services at no cost: free
- County will work with agencies, inspect the building, contractors, etc to complete project
- Projects can work with County, State and Energy Trust but must plan carefully to avoid double dipping of funds
- Wants Oregon to fully spend down federal stimulus funding or it could potentially be reallocated to other states
- Energy Trust pays for weatherization measures: free lighting audit, replace bulbs with CFLs, install aerators in showers

Energy Trust, Diane Ferrington and Kevin Tippit

These funders will come up with a plan to coordinate the multiple streams of funding, especially stimulus funding, within the next few months.