The High Performance Building Design Charrette

What is a charrette?

A charrette is a workshop that forms the keystone of an integrated design process (Refer to "Integrated Design Process-Resource"). It generally occurs in the pre-design phase. It is important to introduce key aspects of the user or occupant program specification into the charrette to ensure that use and high performance goals are aligned. To be effective, a charrette requires solid preparation, as well as a plan for follow through with the charrette results.

Charrette workshops can be half-day or full day workshops, sometimes running over the course of two days, depending on resources available.

A charrette focuses on sustainable development goals, strategies, and integrated design solutions. A high performance building design charrette will, in particular, seek ways to use the site to leverage energy saving opportunities, as well as to design and equip the building structure for energy efficiency.

A charrette should include:

- Participants that represent all those who can impact the design, operation, and use of the building.
- Information and information tools participants can use to identify and discuss strategies, as well as discern priorities.
- Facilitator(s) to provide focus, momentum, and synthesis of ideas.
- Venue(s) that comfortably supports group interaction and, ideally, an example of sustainable/high performance building.

Who should participate?

To achieve greatest success, it should involve anyone who might build, approve, use, or even attempt to block the project. When vested individuals and groups are involved from the outset, they are more likely to feel ownership, and work for the success of the project. More specifically, the list should include, but is not limited to the following:

- Design team, including building architect, MEP engineers, civil engineer, lighting and interior designers, and landscape architect.
- Owner's (and/or developer) staff, including facilities staff. This should include a "champion" on the owner's side to support high performance goals.
- Occupant representative (if other than owner or developer)
- Representatives from organizations providing incentives, grants, or technical assistance related to high performance issues, including utilities, universities, or government agencies.

- Specialists, if on board, such as Commissioning agent, energy modeler.
- Facilitator. This may be someone from the design firm, the owner or developer, or an outside consultant.

What information and informational tools should be provided?

Information and information tools will make the most of the charrette experience. Some materials should be provided prior to the charrette to enhance preparation and some should be provided during the charrette.

Prior to the charrette, participants should be provided:

- Agenda;
- Assignments (e.g. presentations by design team, owner);
- Project Summary; and
- Site plan (if available).

During the charrette, participants should be provided:

- Presentation of preliminary project considerations;
- If possible, an opportunity to visit the site and/or site analysis data, such as orientation, microclimate issues;
- Checklist of sustainable strategies (LEED or other system); and
- Presentation of high performance building case studies, including applications of sustainable strategies and cost benefits resulting.

In addition, real-time (preliminary) energy modeling can be integrated into the charrette experience. Possible tools include e-Quest, Ecotect, Green Building Studio.

How should a design charrette be facilitated?

A facilitator can keep the charrette process on track, and can be responsible for memorializing the results of the process in a charrette report. Ideally the facilitator is not involved with the design per se, to provide distance from the design itself.

Sustainable building consultants, such as those certified in the National Sustainable Building Advisory Program (NaSBAP), or trained in Integrated Design Process (IDP) Facilitation are available. Having a sustainability consultant act as the facilitator is especially important if the design firm is not deeply steeped in the frameworks used to rate high performance buildings.

The agenda should provide a mix of education, brainstorming (visual and verbal), and prioritization exercises. It should provide an opportunity for the facilitator and others to synthesize results as the charrette proceeds.

Where should the charrette be conducted?

The charrette work space should provide ample table space for hand drawing, and breakout discussions. Clear wall space for pinups and projection is a must. In addition, easels and flip charts for each breakout should be provided.

Ideally the venue is an example of a sustainable design, although there may be some benefit in the case of a major modernization project to holding the charrette in the space that will be updated.

I the charrette ca be held at the actual site, then a segment of the charrette should include a site walk to get a good sense of site opportunities and constraints.

What are the desired outcomes?

The goal is to collectively establish meaningful sustainable development goals, establish measurable objectives (such as achieving 25% better than the established energy code), and outline the process for achieving them. The charrette enables a group of individuals with a vast array of native and/or specialized knowledge to discover solutions through consensus to produce a high-performing sustainable building.

The goal is not to prepare a final design but to explore and understand all the design issues. The design issues and possible solutions are identified and well documented. Follow-up assignments are made to analyze in detail specific integrated solutions chosen by the team as potential strategies for the project that will meet the sustainable goals set forth by the owner. A report is developed following the charrette. Typically, the facilitator compiles this report with the engagement of the owner and project architect.

How can the charrette help achieve high energy performance?

Energy should be given careful and deep consideration in the charrette, as early integration of energy opportunities into the design process is key to achieving high performance buildings cost effectively. This can be done as a substantial segment of a longer charrette process that includes other topics, or a special charrette focused on energy itself. What follows is a sample agenda for such a design charrette focused on energy.

Sample Energy Design Charrette Agenda

Introductory Program (prior evening)

- Review of workshop goals, objectives, agenda
- Energy perspectives for sustainability:
  - Integrated design
  - LEED or other sustainability protocol
  - Case Studies

Full Day Workshop

THE SUSTAINABILITY "BIG PICTURE"

Discuss sustainability goals as they relate to budget requirements and core mission e.g. student achievement, staff retention, environmental and community leadership.

METRICS SESSION

Discuss methods to measure whether goals are achieved and discuss potential project features using the energy strategies listed in LEED or other rating system, in particular credits related to energy performance, indoor air quality and commissioning.

ENERGY PROGRAMMING

- Overview of energy programming concepts
- Review of climate data and issues & integrated energy design
- Work Groups: Characterize the predominant spaces according to key load, comfort, and operations criteria; review energy strategy implications.

BUILDING SHELL WORK SESSION (LOADS):

Work Groups:

- Fenestration/Exterior shading;
- Floors/Walls/Roof (construction & insulation);
- Thermal Mass (exterior & interior);
- Floor Plate/Orientation

INTERIORS WORK SESSION (LOADS/SYSTEMS):

Work Groups:

- Architectural daylighting performance, Interior design issues, lighting integration
- Electric lighting performance
- Controls (temperature, lighting, ventilation)
- Furniture systems, furnishings, and plug/misc. loads
- Special systems (autoclaves, kitchen, hydrotherapy pools, server rooms, etc.)

MECHANICAL SYSTEMS WORK SESSION (SYSTEMS):

Work Groups:

- Advanced Secondary Systems – Variable volume vs. Constant volume
- Ventilation - Natural vs. Mechanical, Night-Flush Cooling, Dual Path Systems
- Advanced Central Plants – Boilers, Chillers, Heat rejection, Steam systems, Potable water heating
- Alternate Mechanical Concepts – Ground-coupled heat pumps, Evaporative cooling, etc.
- Energy Distribution Systems – Pumps, Fans, Pipe sizing, Ductwork, Heat recovery

WRAP-UP / NEXT STEPS / ASSIGNMENTS:

Group conclusions – revisit “top” issues from participants relating to sustainability for this project