

## **Zero Energy Commercial Buildings Consortium Working Groups DRAFT Charter and Tentative Timeline**

### **Objective**

The Consortium Working Groups overarching objective is to support the Consortium in performing its tasks of:

- Identifying Potential Next Generation Technologies;
- Produce an Analysis of Cost and Non-Cost Barriers; and
- Collaborate with Industry Stakeholders.

Activities this might involve include:

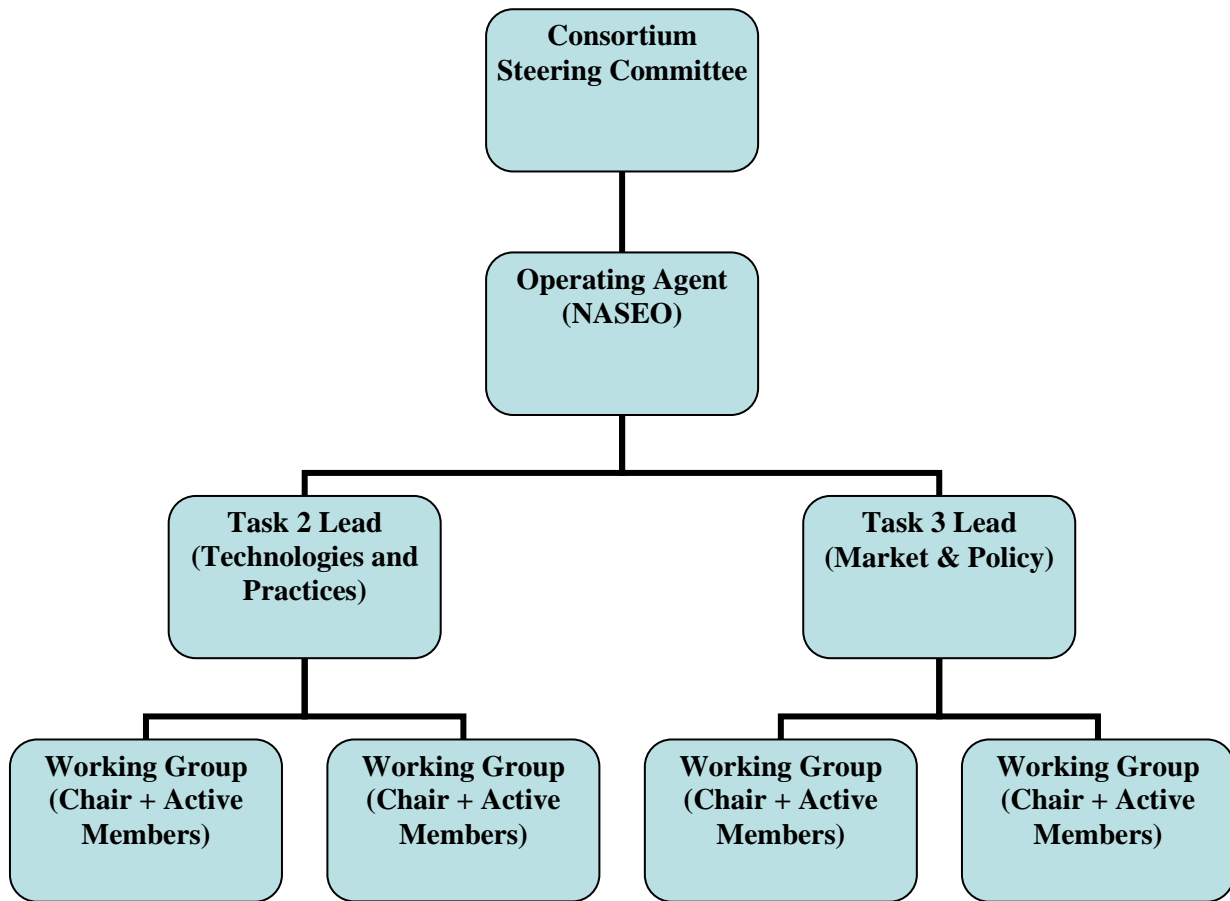
1. Identifying and assessing technologies
2. Identifying best practices and case studies
3. Participating and facilitating industry collaboration and promoting the Consortium
4. Agenda setting for future project years

### **Commercial Interest and Antitrust Guidelines**

These are expectations for members in their interactions with the rest of the consortium.

- Ensure participants are not inhibited or afraid to vigorously argue positions
- Participate and behave in a reasonable manner
- Do not use meetings, informal conversations, or member contact lists to advance private corporate interests, fix prices, or otherwise lessen competition by:
  - Boycotting or excluding competitors
  - Reduce, restrict, or limit in any manner, the kinds, quantities, sizes, or qualities of products
  - Reduce or limit products or innovation
  - Make decisions based on business reasons over scientific evidence

## Working Group Organizational Structure



Each working group will be chaired or co-chaired by a Steering Committee member. Consortium members may be invited to serve in a chair or co-chair capacity as needed.

### ***Role of the Working Group Chair or Co-Chair***

The working group chair or co-chair is responsible for organizing and moderating group calls, virtual correspondence, and in-person meetings. The chair or co-chair is the primary point of contact between the working group members and the Consortium's implementing partner or task lead for the related task. In consultation with the Steering Committee, the chair or co-chair will facilitate between working group members and the task lead to determine the scope and direction of the working group appropriate to completing the task.

The chair or co-chair, in consultation with the Steering Committee and task leads shall also assess working group membership and make suggestions in cases where gaps exist.

For the first project year, the inaugural working group chairs will serve as initial conveners and coordinators. Once the working groups have coalesced, chair

appointments may be revisited to allow all working group members to have input on the leadership. During that time, working group members may choose to hold elections for the chair and co-chair positions.

Chairs and co-chairs will be expected to hold at least 2-4 calls in 2010 and to provide written updates on those calls to the Steering Committee. In-person meetings may be convened when the opportunity exists, and chairs the Consortium project team will support working group chairs to organize as necessary. Chairs may also be expected to participate on additional 2-4 calls with the other groups' chairs, project task leads, and steering committee members.

### ***Role of the Working Group Member***

The working group member is an Active Member of the Consortium and is expected to actively participate in working group activities.

Activities include:

- Regular participation on Working Group calls (2-4 in year 1 and as needed)
- Contributing best practices and case studies (ongoing)
- Attendance at in-person meetings (annually)
- Reviewing Consortium reports (as needed)
- Providing input on direction and agenda setting (as needed)
- Promoting the Consortium at industry events (as needed)

### ***Creating New or Dissolving Existing Working Groups***

The Consortium Steering Committee, in consultation with Chairs and Co-Chairs and with Active Consortium Members, may choose to create new working groups or dissolve or combine existing working groups based on Consortium direction and activity, membership distribution, and other developments. Working Group members may submit recommendations to the Steering Committee for consideration. Proposals for new working groups or organizational changes to existing working groups shall be deemed effective upon receiving a majority vote of support from current Steering Committee members.

## **Working Group Processes**

### ***Calls and Meetings***

Chairs and co-chairs will be expected to hold at least 2-4 calls in 2010. Calls will be moderated and led by working group chairs and co-chairs.

Working Groups will assess Consortium and other existing industry events for in-person meeting opportunities. Working Groups will try to meet in person at least once a year. The Consortium cannot reimburse members for travel expenses.

## Correspondence

Working Group correspondence will primarily be virtual through e-mail list-serves, web-based file-sharing platforms, or other means to be determined. Chairs and co-chairs will monitor and moderate this activity.

## Milestones and Activities Timeline

Deliverables include a draft and final version of each report, due in June and November 2010, respectively. Additionally, working group chairs are expected to participate on 2-4 calls with the steering committee, other working group chairs, and project task leads. Working group chairs are also expected to conduct 2-4 calls with their groups and coordinate input for the reports with the project task leads.



Zero Energy Commercial Buildings Consortium Working Groups	2010											
	1	2	3	4	5	6	7	8	9	10	11	12
Working Group Scoping												
Group calls with all chairs												
Working Group Calls												
Working Group Meetings												
Contributing content and input												
Drafting of Next Generation Technology Report												
Final Draft of Next Generation Technology Report												
Drafting of Analysis of Cost and Non-Cost Barriers Report												
Final Draft of Analysis of Cost and Non-Cost Barriers Report												
Promoting the Consortium												
Providing input on consortium agenda												

## Upcoming Events and Meeting Opportunities

Date	Event	Organizer	Location	Relevant WG
February 1-5, 2010	State Energy Policy and Technology Outlook Conference	NASEO	Washington, DC	
February 23, 2010	Renewable Energy Supplier Summit	Renewable Energy World	Austin, TX	Grid, Micro-Grid
May 11, 2010	Lighting Supplier Summit	IES	Las Vegas, NV	Lighting/Daylighting and Controls
June 2010	Building Envelope Supplier Summit	AIA	Miami, FL	Building Envelope

## Working Groups Scopes

The following are draft statements on the scope of each topical working group. These will be reviewed and amended by each Working Group as a first order of business. Changes and adjustments to a Working Group's Scope and Activities shall be made by member consensus, in consultation with the Consortium Steering Committee.

Working Groups shall coordinate efforts with other initiatives and committees which fall under DOE's Commercial Buildings Initiative, such as the Commercial Buildings Energy Alliances (CBEAs).

- This process is meant to be visionary, looking forward 30-40 years ahead of time. This can complement work by the CBEAs who are more focused on the near term
  - In addition to perspectives of big building owners and operators, what else is out there that we can add in the near term, but more importantly what's even farther ahead.
  - What's the end point look like, and some major milestones by category in between. Smallest emphasis on the next 5 years which may be well covered by the CBEAs.
  - Dave H.: What are the biggest chunks of energy savings in the next 5 years and next 10 years. And what comes farther down the road?
- Need to coordinate with DOE and PNNL's activities (which covers what's within 2 years of commercialization)
- Defining net-zero energy--Let's establish one working definition across working groups for now and evaluate exceptions on a case-by-case basis

## ***Technologies and Practices***

These six Working Groups primarily support Task 2: Identifying Potential Next-Generation Technologies.

- All groups should consider technology barriers and solutions in the context of new and existing buildings

### **1. Building Envelope**

The Building Envelope Working Group includes external building materials, insulation, windows, and roofs. Connections between building envelope and other building systems, such as lighting/daylighting, HVAC, green roofs, rooftop gray water collection, or rooftop distributed generation will be explored and coordinated with other working groups.

- How does one conceptually think through competing demands for roof surface area?
  - Analysis of trade-offs and need to connect with design process
  - What external constraints or desired functionalities should shape that analysis?
- Design decisions that affect building envelope solutions—orientation, building shape, etc. (and not just confined to building envelope materials)
- Dynamic envelopes
  - Dynamic insulation? (e.g. solar walls)
  - Openable windows
  - Phase-change materials
- Building in flexibility—does the envelope have the ability to adapt over time and replace elements as technology improves or current installations degrade?
- Context of existing buildings—different set of challenges and problems
- Exterior insulation and re-cladding –more prevalent in Europe. Is this a good idea for the U.S.?

### **2. Mechanical Systems, Plumbing and Controls**

The Mechanical Systems, Plumbing and Controls Working Group includes HVAC systems, plumbing, and water pumping and cooling systems.

- Role of evaporative cooling in new construction?
- Ground coupling
- Multi-variant refrigeration systems
- Phase-change materials/Load balancing
- Shift from larger systems to multiple smaller systems with more refined controls systems

- Can controls systems deal with multiple system types and integrate them effectively
- Separate comfort conditioning, ventilation, humidity control, and thermal control systems from each other—may be opportunities to improve operational efficiencies by separating these out
- What are the feedback mechanisms from the controls systems to owners and occupants
- Heat cascading between and within buildings
  - Supermarkets are doing it a little now but there's room for improvement
- Commercial technology problem of equipment interfaces and integration
  - Current trends in control strategies and systems and where does it need to go from here
  - IP issues, industry standards issues
  - “translators” to help systems work together—need for troubleshooting and commissioning. We're a long way from plug and play.
  - Keep in mind long-term building operation and maintenance needs as systems are put in
- What are the limits of unitary systems when net-zero is the goal?
  - One package with separate subsystems?
  - Scrap this model and come up with a new one?
  - How to characterize and optimize these systems as they evolve and change across climate zones and with different system functionalities.
  - How can we reconfigure/retrofit existing buildings which already have unitary systems?
- Can you or how can you do mechanical refrigeration in a net-zero building?
- Hydronic vs. air vs. electrical thermal distribution

### 3. Lighting/Daylighting and Controls

The Lighting/Daylighting and Controls Working Group includes interior and exterior lighting technologies, systems, and controls.

- Integration of controls and systems (see previous)
- Solid state lighting (LEDs, OLEDs, ) technologies and applications
- New lighting system configurations adapted to LEDs and OLEDs
- Active daylighting strategies—both mechanical and optical
  - Holographic films that can project light in deliberate pattern into interior spaces
  - Solar light collection
- Task ambient lighting
  - Associated institutional issues—how can we lower overall ambient lighting and light for tasks and people rather than space
  - Safety and security lighting
- Visual performance vs. light output

- What's the latest? Is this resolved or still needs to be resolved?

#### **4. Process, IT, and Miscellaneous Equipment**

The Process, IT, and Miscellaneous Equipment Working Group includes facility management, IT technologies and software, and miscellaneous equipment. Analysis of equipment for restaurants, hotels and the hospitality industry, hospitals, and office equipment will be conducted.

- Coordinate with CBEAs 2 groups (restaurant equipment and hospital/medical equipment)
- Controls can get some initial savings
- Strategies to reduce idling and phantom loads when equipment is not in use
- Non-electrical equipment
- Growing IT loads and data centers—don't just move the IT closet across the street or outside the building footprint
- Potential challenges are in energy-wasting communications and display (face-recognition technology and automated powering-down)
- What are categories that are not being addressed?
- What are some cross-cutting technologies that need attention?
- Electric vehicle and load management

#### **5. Combined Heat and Power (CHP), Multi-Building Systems, and Grid Integration**

The CHP, Multi-Building Systems, and Grid Integration Working Group includes CHP technologies, on-site generation, possible off-site generation, and the systems needed to support integration of those and other technologies for large campuses and multi-building systems. It also includes smart grid and ICT, grid connectivity for integrated renewable technologies, and net metering. Members may include utilities, building owners and operators, information and communications technology groups, and renewable energy groups.

- Wind and solar
- On-site vs. off-site generation—*be very careful about eroding the definition of net-zero energy.*
- Defining the footprint of the building
- Tradeoff between density and off-site generation
- Electric vehicles—future buildings should not preclude and should even allow for on-site charging

### ***Market and Policy***

These seven Working Groups primarily support Task 3: Analysis of Cost and Non-Cost Barriers

## 6. Codes and Standards

The Codes and Standards Working Group focuses on how codes and standards can push the adoption of high-performance commercial building technologies, systems, and practices and also ensure that new buildings are built to allow for future improvements.

- Are codes going to continue to be prescriptive options? Or are we moving towards whole-building performance?
  - Prescriptive paths will get increasingly harder
  - What infrastructure and capacity is needed to make this shift nationally (such as California has done)?
  - What are implications for code enforcement and compliance with such a shift? – EM&V and institutional challenges
  - Will such a shift be flexible enough to allow component renovations and replacements in existing buildings in cases when it's not a whole-building retrofit?
    - Be conscious of not discouraging renovations, replacements, or underinvestment
  - How can we demonstrate the feasibility and cost-effectiveness of component replacements?
- How can you make codes to allow for innovation without decreasing quality assurance?
- Need to shift from benchmarking improvements against previous codes and towards benchmarking against net-zero absolutely
- What are we measuring? As-designed or actual performance?
- How are we enforcing? As-designed or actual performance?
- Align code policy with benchmarking policy and utility pricing policies. Zoom out and explore other ways to align code policy with other policy avenues.
- Changes in price signals at 2 stages: utility pricing to moderate operational energy consumption and initial connection costs to limit energy use in initial design and construction
- Pricing as a tool for code compliance and enforcement
- Incentives to push towards more efficient and stretch codes

## 7. Integrated Design and Building Delivery

The Integrated Design and Building Delivery Working Group explores solutions that will align the design and delivery process among multiple stakeholders such as architects, engineers, facility managers, maintenance and repair staff, and others to ensure buildings which are well-integrated wholes rather than a series of components. Solutions include standardized Building Information Models (BIM), early-stage stakeholder meetings, commissioning and others.

- Coordinate with technical working groups

- What are the ingredients of success for the small sampling of cases out there?
- Definition? --Requiring results rather than defining the design process may be a better way to define
- What are consequences if performance differs from design?
- Moving fundamental decisions and communicating their long-term impacts earlier in the process and with broader stakeholder engagement
- Strategies for vigilance and being cautious about erosion of design decisions
- Internalize and standardize economics so different stakeholders can come to the same conclusions
- Better tools: Simulate building performance continually throughout the design process

## 8. Benchmarking and Performance Assurance

The Benchmarking and Performance Assurance Working Group includes performance metrics; evaluation, monitoring & verification (EM&V); building labeling and disclosure; commissioning and retro-commissioning, energy modeling systems, and performance feedback.

- Fundamental metrics of performance—what is the amount of energy to do “something” (currently defined as floor space intensity, but neglects occupancy)—though this does not credit building less
  - How can we value delivery services to number of occupants over time with minimal space
  - Does the market sufficiently self-correct this because building less costs less?
- Where do we need to go with benchmarking? Do we need to shift from whole building to the systems level? Or do both concurrently?
- Challenge of increasing IT use
- Need to understand loads better
- Underexamined questions of what is the purpose of measurement and disclosure, who and what are we trying to influence with this information, and how do we communicate that information to those audiences
- Parsing out different audiences: building owners, building operators and occupants, building designers
- Linkage between snapshot ratings/benchmarking and continuous performance over time—display and disclosure
- Regulations and mandates for disclosure
  - Privacy and security issues
- Methods—benchmarkers get information from utilities, or inverse it with utilities taking the lead. What are state-level policy drivers?
- Commissioning
  - Define terms

- Locus of activity/burden of responsibility (3<sup>rd</sup> party? Or other?)
- What are the information and operation flows that will help optimize
- Explore ways to tie benchmarking to financing and appraisal. For example, requiring benchmarking at 1-year occupancy

## 9. Voluntary Programs, Financing and Appraisal

The Voluntary Programs, Incentives and Green Building Initiatives Working Group includes utility, state, and local programs and incentives such as rebates, loan guarantees, tax credits, subsidies, etc. This also includes green building initiatives and linkages to other sustainability areas such as indoor air quality, transit-oriented development, and green supply chains and procurement.

Relevant corporate social responsibility initiatives may also be included.

- Voluntary programs can push early-adoption and be drivers of advanced technologies and advanced practices
- Categorize project, process and participant characteristics of success stories and best practices
- Relationship of voluntary programs with mandates and regulatory policy
  - Get over voluntary program resistance to raising the bar (moving their best practices into minimum practices)
  - Ex: Massachusetts uses a 2-tiered “stretch” code
  - Linkage with codes and standards
- CSR: market positioning, attractiveness and image, stockholder beliefs as drivers beyond traditional cost-effectiveness
  - Can ripple up to supply chain
- Can help the market break through rate-limiting cost-effectiveness paradigm
- Voluntary programs can be drivers for market transformation through technology diffusion, learning curve, capacity building, market demand

The Financing and Appraisal Working Group explores innovative financing solutions for financing investments in building new commercial buildings and retrofitting existing commercial buildings. This includes risk assessment, life-cycle cost analysis tools, performance contracts, loan guarantees, mortgage-based securities, and others.

- Appraisal practices should recognize the EE of a building, but challenge is in moving the market to value those investments (market value does not equal price tag)
- Present value of future savings energy cost savings is an asset value, how close we are to do this. High performance building capture this, would be greater than two percent.
- Parse out energy values in labeling programs like LEED and calculate what the positive ROI is.
- Methods to capitalize market value of energy savings

## 10. Owner/Tenant Issues

The Owner/Tenant Issues Working Group addresses split incentives by exploring alternative leasing provisions and streamlining development and permitting provisions. Developing the business case and stakeholder outreach and education, may be included.

- EE in green leases and green construction
- What is the necessary approach to help structure this group's activities?
- Is this a one-time near-term set of solutions? Are there fundamental differences between 20% savings and 80% savings?
- Leases with flexibility and more tolerance for more complex systems and varying building conditions—more active engagement of tenants as contributors to building performance
- Communications, education, and engagement of tenants and occupants

## 11. Workforce Development

The Workforce Development Working Group focuses on how to ramp-up certification, training, and education programs to meet the increased need for qualified personnel.

- Design
  - Academic community and formal education
  - Certification and continuing education
- Construction
- Operation
- Cultivating young professionals or retraining existing workforce?
  - For young professionals—need to be aware of booms and busts of market cycles and demands
- States' activities are ramping up on this, so they would be good partners on this