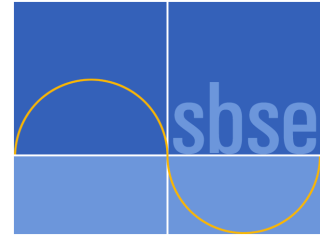


The SBSE Wingspread Conference on the Carbon Neutral Design Studio



Executive Summary

Carbon-neutral design standards represent the future of the building industry, as highlighted by the International Protocol on Climate Change (IPCC), which identifies integrated building design as a “key mitigation technology” that needs to be commercialized before 2030 if we are to avert catastrophic global climate change. In response to this imperative, architectural design and hence architectural design education demands to be reformed to make climate responsive, ‘zero-emissions’ architecture a baseline of creative practice.

As an initial scoping effort of the **SBSE Carbon Neutral Design Education Project**, we are proposing a year-long project to survey current design studio pedagogy for teaching carbon-neutral design, culminating in a (proposed) Wingspread Conference and the development of a workbook on teaching carbon-neutral design.

This effort involves establishing a network of architectural studio faculty across North America who currently teach design studios with carbon neutrality as a theme, organizing resource-sharing and discussion networks, bringing the year’s work together as the topic of a Wingspread conference, and producing, as an outcome of that conference, a series of web tools and a draft workbook on teaching carbon-neutral design.

This project is already well underway. The educators’ network has been established and includes 29 participating studio faculty at 26 North American schools of Architecture and 20 additional discussion group participants from around the globe. This work has been undertaken as a volunteer networking activity of the SBSE and as a means of gathering background information required for grant writing.

The proposed budget for the Wingspread conference and resulting deliverables is \$155,250. This represents the cost of hosting a 40 person event (the preferred capacity of the Wingspread venue) and covers coordination and development of the deliverables. Of those 40 participants, 20 - 25 will be participating design studio faculty and 15- 20 will be invited experts in carbon-neutral design, including both academics and practicing professionals.

Background

Carbon-neutral design standards represent the future of the building industry, as highlighted by the International Protocol on Climate Change (IPCC), which identifies integrated building design as a “key mitigation technology” that needs to be commercialized before 2030 if we are to avert catastrophic global climate change. To this end, legislative standards for carbon-neutral buildings are already under development in California and other states, as well as at the Federal level.

The simple definition of a carbon-neutral or ‘zero-emissions’ building, neighborhood, or other environment is one that emits no net carbon into the atmosphere through its operation; that, in essence, relies strictly on renewable energy sources such as biofuels, solar, and wind power. To design carbon-neutral buildings means to design buildings that use 50% to 80% less energy than current practice, and

only then to incorporate enough renewable energy generation capacity into the fabric of the architecture to cover the remaining demand. This is fundamentally a design problem; one that must be solved by intelligent and informed design decisions at every phase of a project. For architectural education, then, the global imperative of addressing climate change demands a comprehensive response that shifts the ground of design education. Design intuition itself must be reshaped from the ground up to reflect this imperative; that buildings free themselves from fossil fuels and create hospitable human environments fundamentally through their refined relationship with the natural environment and its rhythmic forces.

This proposal for a Wingspread Conference on the Carbon Neutral Design Studio is a component - of the Society of Building Science Educators (SBSE) Carbon Neutral Design Education Project, an evolving proposal to develop teaching resources and tools, pilot those tools, and deliver 'train the trainer' workshops on carbon-neutral design education to design academics and professionals throughout North America.

As a means of jump-starting the larger project, P.I. Wasley has asked SBSE faculty who are currently teaching studios focused on issues of carbon-neutral design to participate in a discussion group and grant-seeking project. The result, in less than two months, is a network of 50 participants from around the globe and a list of twenty-eight 2007-2008 academic year design studio projects that are here considered the 'carbon neutral studio' list. (see **Appendix A**)

Characterization of the Participating Design Studios

Of the 29 studios enlisted in the project:

- Fourteen are currently underway in the fall of 2007 and all will be completed by the summer of 2008.
- Only one is a part of the beginning design curriculum. (Even as this proves the point that beginning design education requires a separate effort, this studio is being included in the project as a spur to further discussion on this topic)
- Ten are undergraduate, graduate, or mixed-level elective studios; at least four are designed to satisfy the NAAB 'comprehensive design' requirement; and four are either capstone or thesis studios.
- Six are based on projects with real clients, sites, and objectives beyond the studio. Two of these are design-build projects (UWM's Solar Decathlon entry and UVA's EcoMOD project).
- Six are 'competitions' studios, working with such competitions as Integrating Habitats, The Leading Edge, and Solar Decathlon.
- At least four explicitly explore multiple program types or multiple climates as a comparative exercise.
- At least three explicitly pair extensive neighborhood design work with building insertion in the resulting fabric.
- At least two involve multidisciplinary teams of students, with participants drawn from disciplines ranging from architectural history to ecology.
- The range of problem statements includes several affordable/green housing programs, schools of various types, nature centers and other public programs, a study of high-volume retail environments, an office park/ data center and other commercial programs, and several higher education projects including a 20–30 story mixed-use dormitory.

As a representative sample, this is a very diverse group. As illustrated in **Figure 1**, the participating institutions are geographically well dispersed (with notable strengths and gaps reflective of the SBSE membership list's skew towards public institutions). The range of degree programs (BSAS, B.ARCH, M.ARCH) is quite marked, as are the curricular variations within the degree programs. There is a large diversity of pedagogical approaches as captured by initial statements of the various faculty.

As noted, the one segment of architectural education not well represented is the beginning design curriculum. This segment will be the topic of a separate Carbon Neutral Design Studio Project, with SBSE partnering with other groups, such as the ACSA Conference on Beginning Design, to solicit participants.

Participating Studio Projects by climate and type

As illustrated in **Figure 2**, the 28 registered studio projects exhibit a wide range of building types and climates. Predictably, small buildings are favored for the in-depth investigation required by the goal of carbon-neutral design. Also predictably, temperate climate locations predominate. These biases will be scrutinized during the evaluation and tool distillation process to insure that tools appropriate for each scale and climate type are developed. Preference will be given to the underrepresented climates and project types if a proposed second round of studio evaluations takes place in the fall of 2008.

The Wingspread Conference Activities

The Wingspread conference is conceived of as an intensive, three-day workshop focused on the development of guidelines, tools, and resource lists for teaching carbon-neutral design. It will be organized around three activities: 1.) presentation and critical evaluation of the student work, 2.) presentation of position papers on a series of pre-identified topics and development of a series of common position statements, and 3.) evaluation and distillation of the approaches represented by both the student projects and the faculty position statements with the goal of codifying the core insights for the proposed workbook on teaching carbon-neutral design.

1.) The Evaluation of Student Work

Each participating instructor will be required to bring two representative student projects presented in a specified common format and mounted on boards for display (digital files will also be collected). The 50 student projects will represent a cross-section of current carbon-neutral design instruction. The group will be divided into mixed teams to evaluate these projects using a range of metrics, building up profiles of the strategies employed and their methods of representation and validation. At the same time, we will be building profiles of the weaknesses exhibited in the work, whether conceptual misunderstandings or procedural error.

This critical evaluation of the work is the foundation of the project, providing a clear-eyed assessment of what can actually be accomplished at various levels of the curriculum. This exercise will lead directly to the development of lists of best practices and avoidable conceptual errors that will be central to the workbook, and will provide a test of the draft evaluative tools themselves. The jury process will be structured to distance individual faculty from their students' work and to leverage the outside input of the invited academic and professional experts.

In addition to the above, this exercise will result in a collection of student projects vetted by the group with fully developed critical commentary for use as illustrative cases in the workbook.

2.) Participant Position Papers

Each instructor and invited expert will be asked to write a short (1,000-word) position paper on a specific topic for presentation at the Conference. The list of topics will cover the range of issues involved with teaching carbon-neutral design, the future of zero-emissions architecture, and with the difficult transitions between the academic setting and professional practice.

Working groups of six-to-eight participants will be formed around related topics and each group will take the position papers as the starting point for the development of a common statement on issues central to future faculty training in carbon-neutral design methodologies and pedagogies.

This exercise serves a number of purposes. By requiring focused thought before the event, the discussion at Wingspread is given shape and direction. By requiring that the non-studio instructors participate, their integration into the group ethos of the Conference is achieved. The resulting group discussions and statements form a core resource for the production of the workbook. And the individual essays themselves will be available as content for the workbook or other possible future publications where merited.

3.) Summation and Synthesis Work

The final exercise of the Conference will be a general discussion of the topic group conclusions and a general assessment of the pedagogical approaches drawn from the student work. The primary goal of this closing event will be to chart the course for a continuing project of carbon-neutral studio activities, events and evaluations feeding into the larger SBSE Design Education Project. For example, we will identify a core set of educational tools that a second round of carbon-neutral studio project instructors would agree to share, evaluate, and further refine for use in the Design Education Project's envisioned 'train the trainer' activities .

As a whole, this method of developing curriculum through a comparative critique of both student work and faculty position papers employs the iterative and self-critical method that is the heart of design education. Aspects of the Wingspread event will resemble the judging of a national design competition, with faculty/ jurors debating the strengths and weaknesses of individual projects one by one. The perhaps novel twist is that the purpose of the judging is not to raise up any single work, but to find within each the ideas that deserve to be gathered together and distilled for future design students to learn from. We consider it both a novel experiment in group critique and an intuitively clear extension of the process of self criticism that every faculty goes through in evaluating the results of their own design students' handiwork.

Pre- and Post- Conference Activities Relating the Carbon Neutral Design Studio Project to the Larger SBSE Carbon Neutral Design Education Project

The Wingspread Conference will be preceded and followed by working group meetings, with one major pre- and post- conference meeting funded through this proposed budget and others occurring on an ad-hoc basis at other events, such as have already taken place at the American Institute of Architects' 2007 convention in San Antonio, TX, and the American Solar Energy Society's SOLAR 2007 conference in Cleveland, OH.

The pre-event working group will meet after the completion of the Fall, 2007 semester to make a preliminary evaluation of the design studio work completed by that date and to establish the presentation

ground rules and essay topic areas for the Wingspread Conference. The post-event working group will provide both additional content and editorial input into the development of the Workbook and the shaping of additional web-based resources from the materials gathered together by the Wingspread project.

Both pre- and post-event meetings will take on the additional task of assessing current architectural educational efforts beyond these specific studio projects and developing the proposal for Phase II of the SBSE Carbon Neutral Design Education Project- the multi-year implementation of regionally specific ‘train-the-trainer’ events across North America. Thus, everything developed out of the Wingspread event will be tied directly to the larger goal of actively disseminating the resulting knowledge.

Both pre- and post- event meetings will fund the participation of 4 core team members and four invited experts from diverse backgrounds, and will seek participation from other faculty and experts. Meeting dates and participant lists are to be established. The Aldo Leopold Legacy Center in Baraboo, WI. has been identified as the tentative venue for both meetings. This recently opened LEED Platinum building has pioneered the documentation of carbon neutrality; receiving the first Innovation in Design Credit for ‘carbon neutral operations.’

Project Deliverables

The primary deliverable of the SBSE Carbon Neutral Design Studio project is a publication ready workbook on the topic for design studio instructors. The second deliverable of the pre- and post- event meetings will be a fully developed proposal/ implementation plan for Phase II of the SBSE Carbon Neutral Design Education Project. We also expect that elements of this workbook and of the supporting materials gathered by the project will be ready content for the related website resource project (separately funded). The elements of the workbook can be seen in the immediate deliverables of the Wingspread Conference:

- 50 student projects formatted for presentation as vetted by the participating faculty. (electronic files for web and/or print publication + mounted display for potential future exhibition)
- 10–20 student projects with fully developed jury critique as vetted by the Wingspread group.
- Consensus notes on the pedagogical tools and strategies illustrated by the student work.
- 40 short faculty and expert essays on focused topics of carbon-neutral design and pedagogy. Available for publication as is or as background material.
- Consensus notes on focused topics of carbon-neutral design and pedagogy.
- Consensus notes on future actions, including tool testing and refinement.

More specifically, there are several key topics and design studio tools that we will seek to develop and illustrate through the conference and its surrounding activities:

- Definition of terms and standards (eg. a design studio-appropriate definition of carbon neutrality)
- Simplified checklists of climate- and type-specific do’s and don’ts for carbon-neutral design.
- Carbon-neutral scoring tools that apply various levels of analytical sophistication. (e.g., evaluation of tools spanning from the Wells Checklist to energy simulation software to physical modeling)
- A rubric of simplified metrics for evaluating student work for claims of carbon neutrality (e.g., spanning from statement of intent to evidence within the design, to evidence explicitly called out and described, to evidence of rule-of-thumb evaluation, to evidence of more sophisticated evaluation.)

- Sample problem statements and learning objective statements
- Sample design assignments

Timeline

- Summer, 2007. Call for participation. COMPLETE. Discussion group established.
- Spring, 2008. Pre-event working group meeting.
- Summer, 2008. Wingspread Conference (Dates dependent on Wingspread venue availability)
- July 22- 23, 2008. Royal Institute of British Architects' Oxford Conference 2008- "50 Years On—Resetting the Agenda For Architectural Education (SBSE cosponsoring organization)
- July 24- 26, 2008. SBSE Oxford Retreat on the topic of 'resetting the agenda for carbon-neutral design education.' (P.I. Wasley and Studio Instructor Quale retreat content organizers.)
- Fall, 2008. Post-event working group meeting.
- Fall 2008. Optional second-round studios pilot testing specific tools (additional funding required)
- January 2009. Final completion of workbook and Phase II proposal. Web-based tools for teaching carbon-neutral design posted as additional funding allows.

Co-Sponsoring Organizations

The Society of Building Science Educators is working with the following organizations to make the SBSE Carbon Neutral Design Education Project a reality:

- Architecture 2030
- The American Collegiate Schools of Architecture (ACSA)
- The American Institute of Architects Department of Education (AIA)
- The American Institute of Architects Committee on the Environment (AIA COTE)
- The United States Green Building Council Formal Education Committee (USGBC)
- BuildingGreen.com

Proposed Carbon Neutral Studio Project Budget

Carbon Neutral Studio Research Support		\$20,000
<ul style="list-style-type: none"> Studio sponsorship- exhibit board production, capture of web-ready studio background information and resources (20 grants @\$1,000 ea.) 	\$20,000	
Wingspread Conference (40 attendees x \$1,000 allowance per attendee)		\$40,000
<ul style="list-style-type: none"> Wingspread event (if accepted) will be free except for housing. This includes conference planning and operations, food, local airport transportation. 	0	
<ul style="list-style-type: none"> Lodging (2 nights at the Wingspread Guest House x 60% discount rate of \$200/person/night) per attendee 	\$400	
<ul style="list-style-type: none"> Travel allowance per attendee 	\$600	
Project Administration		\$75,000
Faculty buy-out (P.I. Wasley- one summer month Summer 2008 + one course release Fall 2008)	\$22,,500	
Project Assistant and student hourly (support staff)	\$25,000	
Planning and Workbook production meetings for core project team (Min. of 2 meetings - one before and one following the Conf.)	\$20,000	
Supplies and expenses outside of conference- draft workbook production, dissemination of group materials.	\$7,500	
	SUB-TOTAL	\$135,000
UWM overhead rate 15% x \$135,000 = \$20,250		\$20,250
	TOTAL	\$155,250

Related SBSE Carbon Neutral Design Education (Phase I) Project Budgets (to be funded separately or as a package)

1. 2010 Education Website and Wiki: An Online Learning Community		\$25,000
Coordinators: Terri Meyer Boake, U. Ontario, Chris Theis, LSU		
2. 2010 Resources and Tools: Resources for the Next Generation		\$80,000
Coordinators – 2010 Design Processes, Guidelines, and Case Studies: Mary Guzowski, U. Minn, and Sandy Stannard, Cal Poly San Luis Obispo		
Coordinators – 2010 Benchmarks and Modeling Tools: Marc Schiler, USC, Murray Milne, UCLA, and Harvey Bryan, Arizona State University		
	GRAND TOTAL	\$260,250

SBSE Carbon Neutral Design Education Project- Carbon Neutral Studio Lists

JW October 14, 2007 DRAFT

NORTH AMERICAN FACULTY STUDIO GROUP

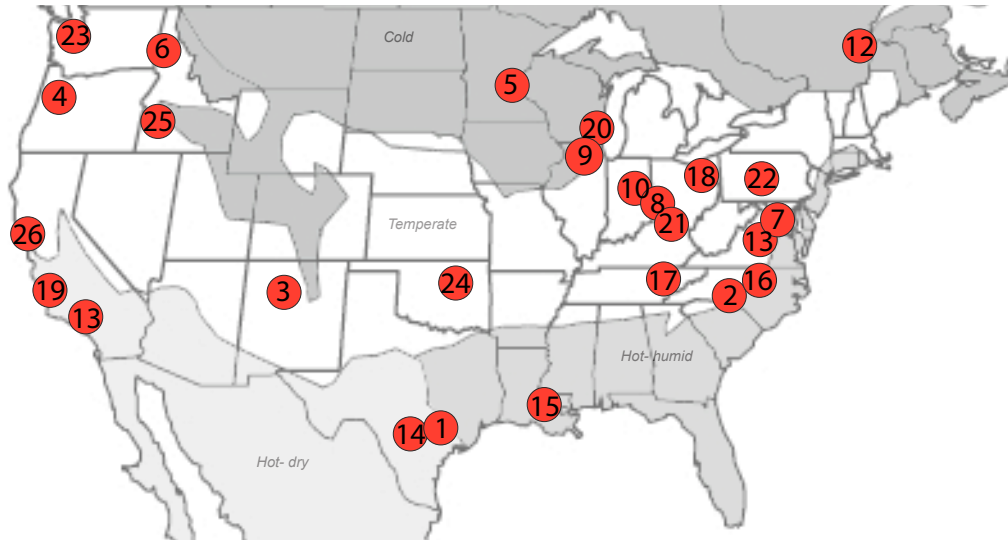
- | | | | |
|----|---|----|---|
| 1 | Amr Bagneid ,
Visiting Assistant Professor
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Assistant Professor of Architecture
ecoMOD Project Director
University of Virginia |
| 2 | Dale Brentrup , AIA IESNA
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Director, DAYLIGHTING + ENERGY PERFORMANCE
LABORATORY
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| 3 | Stephen Dent ,
Associate Professor of Architecture
Univ. New Mexico | 18 | Hazem Rashed-Ali , Ph.D.
Assistant Professor of Architecture
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| 4 | Dr. Ihab Elzeyadi
Associate Professor of Architecture
Rome Architecture Program Director
University of Oregon | 19 | Traci Rose Rider , LEED(r) AP
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| 5 | Mary Guzowski
Associate Professor of Architecture
University of Minnesota | 20 | Ted Shelton , AIA
Assistant Professor of Architecture
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| 6 | Bruce Haglund
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Kent State University |
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Associate Professor of Architecture
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| 8 | Lisa Iulo
Assistant Professor of Architecture
Pennsylvania State University | 23 | Chris Theis
Professor of Architecture
Louisiana State University |
| 9 | Scott Johnston
Professor of Architecture and Interior Design
Miami University | 24 | Gregory Thomson
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| 11 | Robert J. Koester AIA, LEED AP
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Director, Center for Energy Research/Education/Service
Ball State University | 26 | Hofu Wu , Arch.D, FAIA
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| 12 | Alison G. Kwok , Ph.D., AIA, LEED AP
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University of Oregon | 27 | Michael Zaretsky , Architect
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| 13 | Khaled Mansy , Ph.D.
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Design
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| 14 | Robert Peña
Associate Professor of Architecture
University of Washington | 29 | Susan Ubbelohde
Assoc. Professor
Department of Architecture
University of California Berkeley |
| 15 | Andre Potvin , Ph.D
Professeur agrégé
GRAP (Groupe de recherche en ambiances physiques)
Université Laval | | |

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- 1 **Michael Donn**
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- 2 **Paul Kenny**
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Lecturer, UCD Architecture
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- 3 **Shamim Javed**
Assistant Professor
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- 4 **Dr. Ahmad Okeil**, Fellow
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- 5 **Abraham Yezioro**, D.Sc.
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- 6 **Dr Rajat Gupta**
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Interim Head, Graduate Architecture Program
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- 9 **Barbara Erwine**, LEED AP
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- 10 **Jeff S. Haberl**
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- 11 **Joe Hackler**
Research Associate
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- 12 **Chris Luebke**
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- 13 **Terri Meyer Boake**
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- 14 **Nick Rajkovich**
Pacific Energy Center
- 15 **Christoph Reinhart**
Harvard (ET instructor Sp.08)
- 16 **Catherine M. Roussel**
Director of Education
The American Institute of Architects
- 17 **Stet Sanborn**
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- 18 **Mike Utzinger**
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- 19 **Kevin Van Den Wymelenberg**
Director, Integrated Design Lab Boise,
Assistant Professor of Architecture
University of Idaho Boise Center
- 20 **Michael Wentz**
Online Services Manager
BuildingGreen



- | | | |
|---|---------------------------------------|---|
| 1. Prairie View A&M University | 10. Ball State University | 19. Cal Poly San Luis Obispo |
| 2. University of North Carolina - Charlotte | 11. Université Laval | 20. University of Wisconsin - Milwaukee |
| 3. University of New Mexico | 12. University of Virginia | 21. University of Cincinnati |
| 4. University of Oregon | 13. Cal Poly Pomona | 22. Pennsylvania State University |
| 5. University of Minnesota - Twin Cities | 14. University of Texas - San Antonio | 23. University of Washington |
| 6. University of Idaho | 15. Louisiana State University | 24. Oklahoma State University |
| 7. Howard University | 16. North Carolina State University | 25. University of Idaho Boise Center |
| 8. Miami University | 17. University of Tennessee | 26. University of California Berkeley |
| 9. Judson College | 18. Kent State University | |

Carbon Neutral Design Studio Project Participating Institutions
 mapped on the four climate zones of North America

<i>Project/ Climate Types</i>	Small <i>(climate dominated building design)</i>	Large <i>(interior load dominated building design)</i>	X-Large <i>(ecological land planning/ urban + neighborhood design)</i>
Hot-humid	Bagneid Koester Kwok Rashed Rose Rider	Rashed Rose Rider	Rashed
Hot-dry	Bagneid Koester La Roche	Wu	Elzeyadi
Temperate	Bagneid Dent Haglund Johnston Kaiser Koester Kwok Quale La Roche Shelton Peña	Elzeyadi Haglund Shelton Wu Zaretsky Mansy	Elzeyadi Haglund Johnston Kaiser Quale Iulo
Cold	Bagneid Guzowski Koester Thomson	Potvin/Demers Sharag-Eldin Wasley	

Carbon Neutral Design Studios by Climate and Type