

The logo for LMN Architecture Urban Design Interiors. The letters 'LMN' are in a large, bold, white sans-serif font. To the right of 'LMN', the words 'Architecture', 'Urban Design', and 'Interiors' are stacked vertically in a smaller, white sans-serif font.

LMN Architecture
Urban Design
Interiors

Sustainability Action Plan

AIA 2030 Commitment
December 2011



Introduction

Environmental Responsibility is one of eight LMN core values. We believe it is vitally important to promote environmental responsibility on each of our projects as well as in the ongoing operations of our firm. To this end, LMN is a signatory to the 2030 Challenge and the AIA 2030 Commitment.

In addition to architecture, LMN provides interior design and urban design services. Our interior design group is positioned to assist in specifying materials and systems that are socially and environmentally appropriate. The urban design group is working to create urban spaces that are more walkable, livable and dense. These three design disciplines work together synergistically to enhance our sustainable design approach.

LMN has a history of designing projects that enhance our society and honor the natural environment. Our designs take full advantage of their program, resources, context, and climate. We believe that an integrated design approach involving all project participants from the start of design provides the best opportunity to achieve success. Demonstrable, quantifiable results using the latest tools such as Building Information Modeling, energy modeling, and life cycle costing are required to validate the performance of our designs.

The 2030 Challenge and Commitment require a significant improvement in the efficiency and performance of our projects and the operation of our firm. We understand the magnitude of the challenge and the urgency with which we must address it.

People

All six LMN partners accept and embrace the challenge of meeting the AIA 2030 Commitment. In addition, the LMN Green Team has acted as a resource within the office for all things sustainable since 1998. The mission of the Green Team is to promote and facilitate the integration of sustainability into our design process and office culture. The Green Team is currently comprised of the following individuals:

Mark Arnold
Cailin Baker
Dan Belcher
Chris Eseman
Jennifer Hing
Brianna Holan
Clint Keithley
Animish Kudalkar
Adrian MacDonald
Sam Miller
Kathy Stallings
Stephen Van Dyck



These individuals contribute in significant ways to the efforts made by LMN to achieve the goals of the 2030 Commitment.

We also recognize that the 2030 Commitment requires every person at LMN to participate in the improvement of how we work and what we produce. Beyond that, we must partner with our clients, consultants, and contractors to achieve success—this is a challenge that we cannot solve alone.

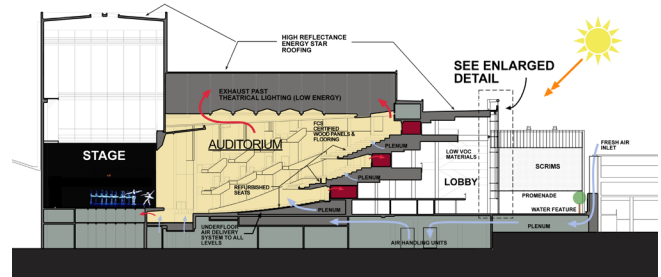
Our Goals

Over the past ten years many of our clients have chosen to work within the framework of LEED to define project sustainability goals. One of our projects has achieved LEED Platinum, seven have been certified Gold, and five LEED Silver. Another fifteen LEED projects are in various stages of design. LEED has been a good introduction to sustainable practices, and as a result, we have developed a LEED specification which has become the minimum standard for all our projects, whether targeting LEED certification or not.

Adopting the 2030 Challenge and Commitment, which we did in 2010, adds another dimension to our sustainable design work – achieving measurable fossil fuel reduction:

2030 Commitment Benchmarks

Today — 60% below 2003 CBECS
 2015 — 70% below 2003 CBECS
 2020 — 80% below 2003 CBECS
 2025 — 90% below 2003 CBECS
 2030 — 100% below 2003 CBECS (Carbon Neutral)



Marion Oliver McCaw Hall

The project reused 35% of the existing structure, and reduced energy and potable water consumption by 20% from baseline through a variety of strategies.

Fossil Fuel Based Energy Use Reduction

Every LMN project strives to maximize energy savings within the constraints of the project. Currently, we are committed to completing an energy model for all new building and substantial renovation projects. We work collaboratively with our clients, mechanical engineers, and other consultants to identify and incorporate the most appropriate energy conservation measures for all projects. We use life cycle cost analysis to inform owners of the long-term cost benefits of efficiency measures.

Next Steps

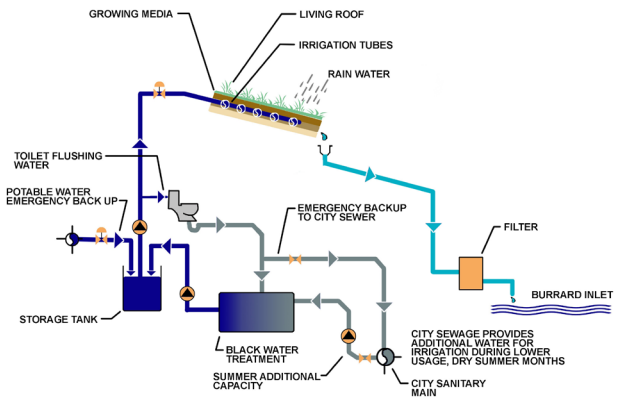
- Utilize collected performance data to improve our understanding of appropriate energy performance baselines for our project types, especially ones not well documented in CBECS including convention centers and performing arts venues.

Water Savings

A review of our recent benchmarked work shows that nearly every project achieves potable water savings of 30% or greater compared to the LEED baseline. Approximately half of our projects are reducing landscape water by 50% and several are eliminating potable water for landscape all together.

Next Steps

- Set 35% minimum water reduction as a standard for all projects and work to eliminate the use of potable water in the landscape on half our projects within five years.
- Educate clients on the value of sub-metering of water for domestic, process and landscape use.



Vancouver Convention Centre West, Vancouver, BC

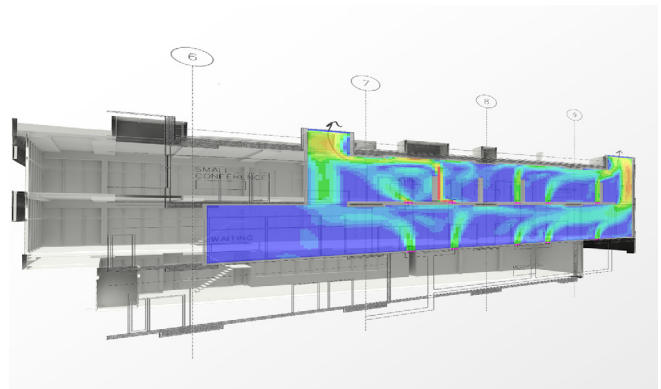
The water recycling & reuse strategy, including a living roof and on-site blackwater treatment plant reduces potable water use 73% from baseline. The project is certified LEED Platinum.

Indoor Air Quality

Today, as a first step toward indoor air quality and elimination of toxins, all our project specifications require that coatings, adhesives, sealants and floor coverings meet the most current low-VOC standards of Green Seal, Green Label or South Coast Air Quality Management District (SCAQMD).


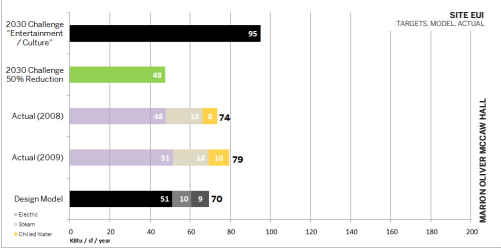
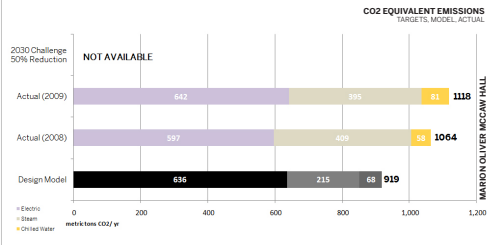
Next Steps

- Subscribe to Pharos and look beyond manufacturer’s claims to choose the most sustainable products.
- Begin a systematic search for viable alternatives to Red Listed Materials from the Living Building Challenge.



Bellevue College Health Sciences Building

Targeting LEED Silver, the office wing of the building will be naturally ventilated. Computational Fluid Dynamics studies determine the optimum location of diffusers and their interaction with the thermal stack effect.

PROJECT NOTES	ACTUAL ¹	DESIGN ²	Marion Oliver McCaw Hall
<p>GENERAL INFORMATION: McCaw Hall is a 2300 seat opera house. Non-performance spaces include a 400 seat lecture hall, 6000 sf of reception rooms, a public cafe and 40,000 sf of reception space in main lobby. The project is 70% new construction and 30% renovation. It is noted that a campus Central Utility Plant utilizes natural gas and electricity to generate steam and chilled water to serve McCaw Hall.</p> <p>McCaw Hall was designed to a LEED Silver specification but certification was not pursued.</p> <p>SUSTAINABLE FEATURES: Energy Underfloor Air Distribution in the auditorium and orchestra pit. Radiant Floor Heating in Lobby Terrazzo Floor is heat sink for passive heating Low-tech solar chimney innovation: automatic operable blinds reduce solar heat gain on West glazing. CO2 Sensors High-Efficiency Chillers Variable Frequency Pumps Natural Ventilation - 14% of floor area, incl. lobby Daylighting - 17% of floor area</p> <p>Water Management Low-flow fixtures Drought-tolerant plants for landscaping Use of water recirculation and minimal water evaporation at the innovative water "sheet" fountain.</p> <p>Other Enhanced Commissioning Public Transportation Access Low-VOC Paints, Adhesives Bike Storage Zero designated parking spaces per person</p>	<p>ENERGY SITE EUI 74 kBtu/SF/YR</p> <p>SOURCE EUI 194 kBtu/SF/YR</p> <p>OCCUPANT ENERGY INTENSITY N/A kBtu/FTE/YR</p> <p>ANNUAL SITE ENERGY USE 20872 MBTU</p> <p>PERCENT RENEWABLE ENERGY 0%</p> <p>ENERGY REDUCTION 15%</p> <p>EMISSIONS³ TOTAL SITE EMISSIONS 1064 metric tons CO2-EQ/YR (2008)</p> <p>SITE CO2 EMISSIONS INTENSITY 8.27 lb-CO2-EQ/conditioned SF/YR</p> <p>WATER CONSUMPTION WATER USE (annual) 3955 CCF (2008)</p> <p>WATER USE REDUCTION NOT AVAILABLE</p> <p>OCCUPANT WATER INTENSITY NOT AVAILABLE</p>	<p>ENERGY SITE EUI 69 kBtu/SF/YR</p> <p>SOURCE EUI 193 kBtu/SF/YR</p> <p>OCCUPANT ENERGY INTENSITY N/A kBtu/FTE/YR</p> <p>ANNUAL SITE ENERGY USE 19668 MBTU</p> <p>PERCENT RENEWABLE ENERGY 0%</p> <p>ENERGY REDUCTION 21%</p> <p>EMISSIONS³ TOTAL SITE EMISSIONS 919 metric tons CO2-EQ/YR</p> <p>SITE CO2 EMISSIONS INTENSITY 7.15 lb-CO2-EQ/conditioned SF/YR</p> <p>WATER CONSUMPTION WATER USE (annual) 2035 CCF</p> <p>WATER USE REDUCTION 21% Based on 1992 Energy Policy Act</p> <p>OCCUPANT WATER INTENSITY NOT AVAILABLE</p>	<p>Building Type: Performing Arts Center Project Location: Seattle, Washington Climate Zone: 4 (ASHRAE 90.1) Completion Date: 6/1/2003 Total GSF: 283495 FTE: 14 Levels: LEED Rating: None LEED Score: N/A</p> <p>ENERGY STAR: No matching building type. The 2030 Challenge Target for "Entertainment/Culture" was used for site EUI comparison.</p> 
			
			

Project Energy Tracking LMN tracks performance data for built projects over time.

Green Building Evaluation and Project Documentation

This spring we launched our Project Energy Tracking site on our internal intranet making it mandatory, and easy, for every project to document project performance information in a consistent manner. We now require every project to set an energy reduction target and record progress toward the target EUI and other 2030 Commitment goals.

Next Steps

- Within one year, identify at least two projects that will perform whole-building predictive energy modeling, beyond the minimum LEED and Energy Code requirements.
- Educate ourselves and our clients on the benefits of sub-metering, and strive to incorporate sub-metering on half the projects we design within the next five years.
- Ensure that tenant improvement projects also set and record goals and relevant information in our Project Energy Tracking tool (PET), such as Lighting Power Density and EUI targets if HVAC systems are replaced.

Training

LMN's Continuing Education mission is to elevate the knowledge and effectiveness of the firm as a whole by enhancing the professional development of all LMN employees. Our Quality Control manager oversees both our Continuing Education and Quality Control programs, a purposeful pairing that recognizes the important relationship between exploration and feedback. Sustainability and the 2030 Commitment are a major component of our Continuing Education program:

- Every LMN employee is given a yearly education allowance (money and time) to pursue self-directed workshops, seminars and conferences outside the office.
- Over the past three years combined, LMN has subscribed to eleven seats in the AIA + 2030 Series, exposing our staff to the “hows and whys” of achieving the 2030 Commitment.
- We hold weekly Noon Forums that routinely focus on information needed to set and implement energy reduction goals. Presentations are posted on our internal intranet for future reference.
- Our in-house design technology research group, LMN Tech Studio, teaches project teams to use conceptual modeling and simulation software. Tech Studio also assists teams by modeling early design alternatives, including daylight and ventilation strategies, and assisting project teams in interfacing effectively with energy modelers.
- Projects rotate in presenting their design work at our bi-monthly Project Design Reviews (PDR's) open to the entire office. Design discussion includes sustainable strategies with feedback and questions from the entire office.
- To share and leverage energy-related design experience across our firm, our designers and managers regularly meet to discuss sustainable strategies undertaken or studied on specific projects. Discussions include issues of cost, technology, material, jurisdictional hurdles, management, modeling, etc.
- Three times a year we host an all-office meeting featuring topics of firm-wide interest and importance. Recent topics have included the 2030 Commitment, the launch of our Project Energy Tracking intranet site, reports on our firm's carbon footprint and updates on our Benchmarking efforts.
- LMN encourages all members of the firm to become LEED accredited. Toward that end, we hold in-house training sessions and the firm pays the cost of exams for new or additional accreditation. As of this writing, 39% of our total staff and 48% of our professional staff is LEED accredited.



Process

LMN's design process is inclusive, collaborative, iterative and inter-disciplinary. We rely on the broad expertise of our staff, our consultants, our clients and our diverse project types to inform each new project from inception to post-occupancy evaluation. We look for simple solutions to the most complex problems and have found that the most successful projects are those with a thoughtful integration of structure, building systems, function and site.

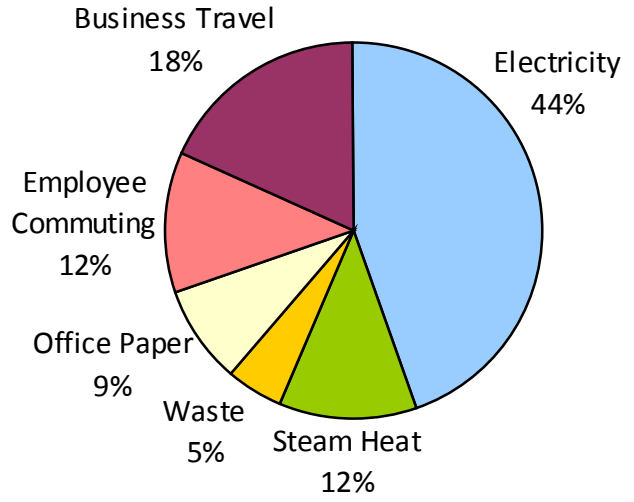
Each project begins with a commitment and an expectation – a commitment to pushing the building to be as sustainable as possible, and an expectation that the design team and client will work together to achieve an energy efficient, sustainable design. The following strategies help us to accomplish this:

- Assign a sustainability point person to every project team to keep all members of the design team on track, measuring performance and reminding the group of the sustainable design goals throughout the length of the project.
- Conduct an early sustainability charrette on every project to discuss and brainstorm sustainable goals and strategies for the project.
- Set an EUI target aligning with the 2030 Challenge for each project.
- Develop early design studies to adjust building form and mass responding to local climate conditions to maximize the potential use of sun, wind, water and other conditions particular to the site.



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- Implement early and frequent energy modeling in early collaboration with the project mechanical engineer.
 - Employ an integrated team approach starting with early charrettes with all appropriate consultants and owner representatives to identify promising design opportunities at a stage where they can be effectively incorporated into the project.
 - Leverage BIM to develop early building models for use in simulation and analysis.
 - Utilize LMN Tech Studio for interdisciplinary research and development using simulation, parametric modeling, digital fabrication, and interaction to improve building performance.
 - Offer seminar/lecture opportunities to encourage further learning for staff and interested clients.
 - Encourage clients to use Portfolio Manager to track and assess energy and water consumption.
 - Evaluate actual performance and gather data post occupancy and record data on LMN's intranet using our Project Energy Tracking tool.
 - Document case studies; review and analyze across our project spectrum. Update benchmark data for specific project types where appropriate.

Operations

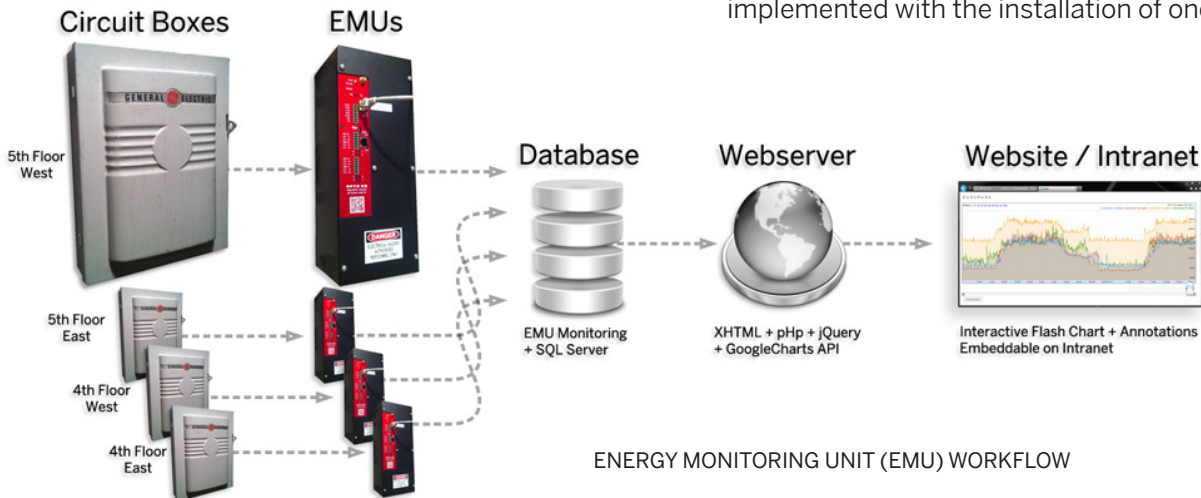


LMN CARBON FOOTPRINT

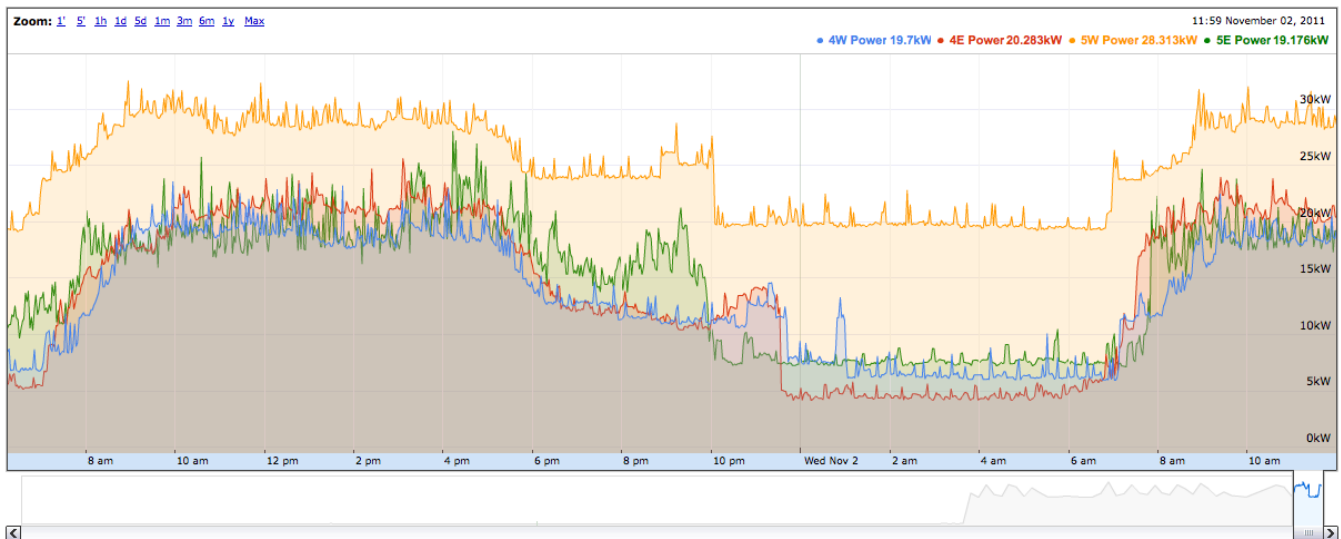
In a continuing effort to improve our operations, LMN has completed a carbon footprint analysis of our office every year since 2007. Our analysis has included an evaluation of air quality, transportation practices, waste disposal, and energy use. The results show a carbon footprint for 2010 of 1.7 metric tons of CO2 per employee with the majority of greenhouse gas emissions coming from business related air travel. We evaluated these findings and developed a plan to lower the office carbon footprint.

Office Energy Use

- LMN recently invested in electricity sub-meters for our office floors to monitor electricity use. This data will assist in better understanding our electricity use and conservation strategies. It will also help us better understand the electricity use of the projects we are designing.
- Ten percent of the general overhead florescent lighting was removed and replaced with individual task lighting for each work station.
- CRT computer monitors were replaced with more energy efficient LCD screens.
- Office policy requires computers and monitors to be shut off during non-work hours.
- An energy monitoring pilot program has been implemented with the installation of one monitor.



ENERGY MONITORING UNIT (EMU) WORKFLOW



Energy Submetering Data The interactive chart of our electricity use on our intranet allows any user to track variable time-scales (from one minute to one year) broken out by quadrant. The user can highlight any point in the chart and get the kW reading at that minute.

Waste Reduction and Supplies

- Recycling and composting bins for paper, glass, plastic, aluminum and food waste are distributed throughout the office.
- Disposable plates, cups and cutlery are biodegradable and composted after use.
- LMN provides water pitchers and glassware for visitors to the office. No disposable plastic water bottles are purchased.
- Local, organic fruit is delivered for snacks.
- All in-house copying and printing is on 100% recycled paper. Printers default to duplex printing.
- All printing done at the off-site reprographics house is on recycled paper.
- Presentation materials are attached by clips to recycled/reusable/recyclable Ecoboard.

Transportation

- We have made increasing use of our teleconference and web-based meeting capabilities in an attempt to reduce our business related air travel.
- LMN has a mass transit subsidy program for employees which has been in place since 1998.

- LMN encourages biking to work, and has participated in the annual Architectural/Engineering community “Bike to Work” Challenge since 2008. Shower and changing facilities have been added in our building to encourage biking and walking.
- Partner cars are used as general office vehicles and by policy they are to meet the requirements of the EPA Smartway program or carbon offsets are purchased by the partner for the vehicle.

Meetings

- Any food brought into the office for meetings or presentations is required to be on platters – there are to be no individual boxed lunches.

Indoor Environment

- Rigid foam for model making is limited to Immitari modeling foam which was tested to release no measurable toxins.
- Use of spray adhesive or spray paint is prohibited.

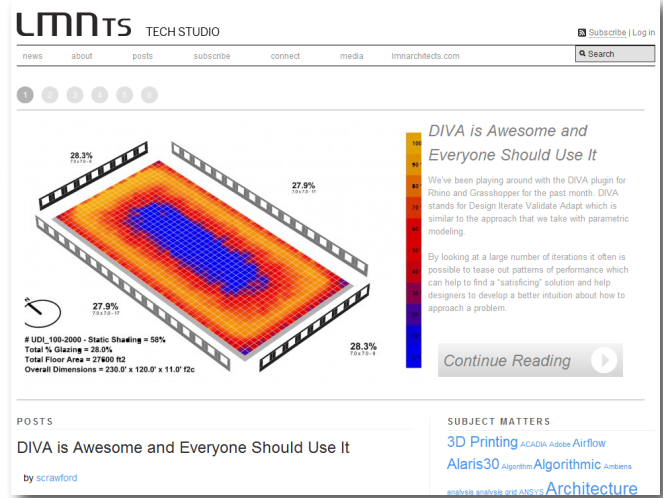
Since 2009, LMN has purchased carbon offsets for total carbon equivalency from the Bonneville Environmental Foundation, making LMN a net carbon neutral company.

Business Strategy

Our projects can only be as sustainable as the aspirations of our clients. With this in mind, there are two opportunities for LMN to increase the sustainability of our projects: attract more clients who are already committed to the principles of green design and educate and convince existing clients to further their sustainable goals. Both of these approaches require LMN to effectively communicate to the marketplace our expertise and passion for sustainable design and the 2030 Challenge. We currently employ the following measures in our interactions with clients:

Marketing Collateral

We include a sustainability section in nearly all of our marketing material outlining our philosophy, experience, and approach. We provide case studies demonstrating the successful application of these in our past projects.



LMN Tech Studio <http://lmnts.lmnarchitects.com/>

LMN Tech Studio

We are actively invested in research and development about ways to improve building performance and sustainable design process through computational modeling. Tech Studio shares its work on its blog and through presentations to industry groups and academia. In addition, we include case studies of Tech Studio work in our marketing collateral. LMN Tech Studio serves as a firm-wide resource to our projects, collaborators, business partners, and clients.

Professional Engagement

We actively seek out groups and entities interested in sustainable design to influence, support, and further their notion of the 2030 Challenge and encourage employee accreditation and membership in professional associations related to sustainability.



Carbon Footprint

We seek to reduce the carbon footprint of our business activity by investing in communications technology that limits the need for business travel such as skype, video conferencing, go-to meetings, and conference calls. This sends a message to our clients and collaborators that we are serious about reducing our carbon footprint and demonstrates a low-impact business approach that we promote to our clients.

Progressive Media

To better support an increasingly complex marketing message driven by data and process, we are actively exploring ways to increase the reach and versatility of our communications and reduce resource consumption through interactive graphics, data visualization, social media, video, and portable devices.

Next Steps

- Post Occupancy Evaluation – leverage our Project Energy Tracking tool to monitor and improve the performance of our buildings. In addition, we intend to expand our post-occupancy evaluations of projects to consider their performance in areas other than energy and water consumption. This will strengthen links with past clients. We are in the process of developing a policy around how we share collected information.