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The Northeast Sustainable Energy Association (NESEA) is the region’s leading organization of professionals working in sustainable energy, whole systems thinking, and clean technology. We advance the adoption of sustainable energy practices in the built environment through this magazine (distributed to NESEA members), our annual BuildingEnergy conferences and trade shows, professional workshops, BuildingEnergy Bottom Lines, and more. A NESEA membership is $55/year, which includes BuildingEnergy magazine.
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SCALING OUR IMPACT:
PURSuing NEW PAThWAYS
to audience ENGAGEMENT

It used to be that people knew NESEA largely, if not exclusively, from our BuildingEnergy conference in Boston. In fact, for many longtime NESEA members and even board members, “NESEA” is still synonymous with our flagship conference. You often hear them say “I learned that at NESEA” or ask “Are you going to NESEA this year?”

Finally, however, after five years of attempts to diversify our programming, that’s starting to change. Within the last year, we’ve developed new on-ramps and ladders of engagement, in addition to our conferences, to introduce practitioners to the NESEA community.

One such on-ramp is the BuildingEnergy Masters Series – in particular, Marc Rosenbaum’s 10-week-long online Zero Net Energy Homes course.

One member taking advantage of this opportunity is Christian Belden, senior project manager at Church Community Housing Corporation. Christian took Marc’s course in the spring of 2013 and completed his capstone project. Then, he actually built the home that was the subject of that project. He offered it up for viewing and critique in a BuildingEnergy Pro Tour in Tiverton, R.I. in the fall of 2014.

Now, he intends to submit it as a case study for NESEA’s new BuildingEnergy case study database, which is featured on the page 38.

Christian had never been actively involved in NESEA prior to taking Marc’s course. Now he’s involved - and invested - in a big way. In fact, we’ve invited him to help us curate a more diverse series of Pro Tours in 2016, which will include all different building types from throughout NESEA’s 10-state region.

BuildingEnergy Pro Tours serve as another new on-ramp. Over the past year, we have offered 11 Pro Tours in five states – including a highly-efficient modular home in New Hampshire, a retrofit of mechanical systems in a correctional facility in the Berkshires, and a cohousing community in Martha’s Vineyard.

These tours capitalize on what NESEA does best: they bring sustainable-energy practitioners together face-to-face to share, with intense honesty, their successes and lessons learned. They provide an element of community, with coffee and networking beforehand and an informal workshop afterward. The workshops are often accompanied by a local microbrew and snacks.

BY JENNIFER MARRAPESE
Headshot taken by Matthew Cavanaugh

BUILDINGENERGY PRO TOUR PARTICIPANTS DISCOVER NEW IDEAS IN COLRAIN, MASS. ON FEB. 6, 2015.
These tours capitalize on what NESEA does best: they bring sustainable energy practitioners together face-to-face to share, with intense honesty, their successes and lessons learned.

Pro Tours have attracted their own set of groupies - a handful of newly-minted NESEA members who attend every one, almost without fail.

In the words of Ellen Richer, an enthusiastic recent attendee: “I am a student in Environment and Natural Resource Economics at the University of Rhode Island. I feel that my first Pro Tour with NESEA has helped me to grow and expand my practical knowledge in a way that I can take into the field. NESEA is a great force of help for energy students who will eventually shape the future of movements and technology.”

By reaching new audiences through these programs, NESEA is scaling up its impact. No longer are we just an organization whose name is synonymous with one of the best regional energy conferences in the country.

What’s next in the “impact-scaling department?” One thing the NESEA board has asked me to focus on is increasing our reach in the commercial and institutional (C&I) sector to build the capacity of practitioners to effect change among some of the largest users of energy in our region.

NESEA board member Michael Bruss describes in his letter from the chair in this issue how he transitioned his own work from primarily residential buildings to large C&I projects.

As a NESEA member, you are welcome to join me in expanding NESEA’s focus into the C&I arena by joining one of our many programming committees. For more information about these committees or the benefits of NESEA membership, please contact me at jmarrapese@nesea.org or call (413) 774-6051, ext. 23.

ABOUT THE AUTHOR
Jennifer Marrapese brings a philosophy of openness and collaboration to her work as the executive director of Northeast Sustainable Energy Association. She earned her B.A. in journalism from the University of Wisconsin-Madison; her J.D. from the University of California, Berkeley; and her M.A. in organizational management and development from Fielding University.
started my foray into the construction business in the early ’80s. After a stint as a sculptor’s apprentice and assistant, I opted for what I hoped would be a more stable life for my young family.

I had been raised in construction. My father, grandfather and uncles were all in construction. I picked up a hammer at an early age and was, with my father’s patience and guiding hand, fairly skilled in carpentry by the end of my high school years.

I worked my way through college as a framer and developed proficiency in cabinetmaking and fine carpentry by my mid-twenties. I had always wanted to have my own business. Construction was a natural choice for me.

I started out as a member of a small builder’s co-op that evolved into a partnership. In the ’80s, we built a couple of high-performance passive solar homes each year. We experimented with a number of strategies. The book “Building for Energy Independence: Sun/Earth Buffering and Superinsulation” was our Bible.

Ultimately, we moved toward strategies of superinsulation and airtightness and away from the hassles associated with sloped glass and movable insulation. After learning of Joe Lstiburek’s work, we quickly realized the Canadians were a lot smarter about building performance than we were. We started trying out various insulation and air-sealing strategies that were prevalent at the time.

We were a small outfit of trusted tradespeople with a steady flow of decent work through the ’80s. As I was challenging myself to have a positive impact on the environment, I did the math and recognized that we could have a bigger impact if we applied the same concepts to larger commercial buildings. Since this decision, I have had the good fortune to build and renovate close to one million square feet of high-performance building projects.

I needed a new kind of education! In addition to reading every book I could find about commercial construction project management, I enrolled in the Graduate Certificate in Construction Management program at Northeastern University. This commitment to three years of night school – while running a small business and raising two active kids – gave me a number of things that I needed to succeed as a commercial contractor. I already had the technical knowledge and a passion for constructing quality buildings. What I needed was the discipline and administrative consistency of recognized industry standards to be able to deliver a project in the commercial and institutional marketplace. The education I pursued gave me the knowledge and background to develop a construction management process that was designed to deliver innovative high-performance building projects.

The next step in my professional evolution was to set a goal for building high-performance buildings on a commercial scale. The following step was to understand that there was a lot that I didn’t know about running a commercial construction management company. After realizing what I didn’t know, I set myself on a course of study to learn the things I needed to know to attain that goal.

When I made the decision to take the company in this direction, I quickly realized that there was a lot that I didn’t know about project management on a commercial scale. I committed myself, with my family’s support, to a course of study that vastly improved my chance of success in this new venture.

I’ve summarized the key steps in my journey in hopes that they may prove useful to others in our community.

I tested my newly-developed process with a great team of building-performance gurus, including Stu White and Marc Rosenbaum, in 2001 on the first LEED Gold commercial building project built in New England.

I relied upon several folks from the NESEA community, including Marc, James Petersen, Bruce Coldham and Tom Hartman, who were always willing to take the time to discuss how to better deliver a quality building project. These conversations were often less about where to put the air barriers and more about how to motivate tradespeople to care about actual results.
I needed to redevelop my team-building and communication skills. Recognizing that institutional projects often required me to work with several “owners,” all of whom had different interests and agendas, I soon understood that these skills were essential. We were no longer working with couples who owned residential buildings; working with married partners has its own complexities. Often in an institutional project, the “owner” consisted of the heads of schools, directors of facilities, faculty members, directors of development, and business managers—all on one team!

Working with a strong design team to complete a quality high-performance building project with a process involving innovation and openness is a very rewarding experience. As I look back on the projects over the years, I recount the challenges and opportunities we encountered along the way and I find that the most successful projects all had a number of team members from the NESEA community. It is here that I find a supportive community that challenges me to reach for a better future.

ABOUT THE AUTHOR

Michael Bruss was the founder and president of Bruss Construction and Integrated Building Energy Associates, LLC. Michael’s passion and drive focus on building with green and efficient technologies, reusing historic structures, and preparing today’s buildings for future generations. With over 30 years of experience in project development and management with a diverse group of building projects, Michael brings collaboration, innovation and craftsmanship to every project that he is involved in.

The most successful projects all had a number of team members from the NESEA community.
NESEA MEMBERSHIP

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*B Business Member Benefit  I Individual Member Benefit

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• Listing in the NESEA Sustainable Green Pages business directory  B

• Access to and listing in online members-only directory on nesa.org  B I

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• Invitation to volunteer at BuildingEnergy conferences and events  B I

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Today’s university degrees in energy and environmental studies are almost devoid of classes about science, building science, math, and the building industry. NESEA is a great learning ground for students. We need to attract more of them. But more importantly, we need to call for the energy and environmental studies departments that train them to add more of what our high schools are also missing: education in science, technology, engineering and mathematics (STEM).

I think I speak for many people in the field when I say the current crop of grads is not prepared to help the building industry. Today’s grads are even less prepared than students in my generation were 30 to 40 years ago when we started our careers.

In the late 1970s, with the infusion of the first federal solar energy tax credits, many people entered the energy field. Everyone became a solar installer. Everyone wanted to fight the energy crisis. Solar domestic hot water systems were sold, but very few of them were installed properly.

When I attended the first meeting of New York City’s Metropolitan Solar Energy Society in 1979 (which later became a subchapter of NESEA), I met the president, Bill Bobenhausen. I told him I wanted to put solar panels on buildings in New York City. He said, “Wouldn’t it be a better idea if we made the buildings more energy-efficient first so the solar will pick up a larger portion of their load?”

I was stunned. Who was this mad scientist, preaching things they never taught us at Syracuse University? I had just graduated in the first class of the new Energy and Environmental Policy program at that basketball-focused school. I thought this must be new and under-reported information, as I had never learned it at school.

Who was this sage? And could he become a mentor of mine?

A year later, Bill wrote a recommendation for me to get a job running the Energy hotline in the Mayor’s Energy Office under Ed Koch.

People called the hotline and asked me stuff every day – and I had no clue. I took their names and numbers, called six people to find the answers, and called them back.

In a year, I learned 300 times what I had learned in college. I was very lucky to get a job like this where I could learn on the fly.

Over the years, I had many mentors, friends, and collections of what my smart young friends now call their “Boards of Directors.”

Bill put up with one of the dumbest youngsters in the field for years – and that would be me. Who knew that in my young state, I would accidentally amass a group of mentors that would take me from being a college-educated dope to being a fairly well-respected person in the CREADS of the building industry (comfort, resilience, energy, affordability, durability and sustainability)?

In 1982, I read an article in New Shelter Magazine about two Canadians who had figured out that if you seal the holes in the floor of the attic in a typical single-family home and stop the heat from rising around these bypasses, the houses get really efficient really fast.

Sounded simple to me. I did it in my parents’ home that October while I listened to playoff baseball on the radio. Over a weekend with six tubes of caulk, some sheet tin, some high-temperature sealant, a little of this new expanding foam stuff, and a case of beer for lubrication, it was done.
By April, my parents’ gas bill had dropped 40 percent. Their local gas company accused my father of tampering with the meter. Home run.

Trouble is, this is still not common practice in insulation installation. Further, simple tests like pressure diagnostics, where you can pre- and post-test houses to see how well you air-sealed the attic, are not required in programs, so people don’t do them as a matter of course – because “the program doesn’t want them to do it.” Worse, no one wants to do this.

On a dare from some of my really smart fellow building scientists, I surveyed every homeowner I knew and explained to them how to air-seal an attic. I said how inexpensive and cost-effective it was, but that it was a bit of work. Nobody was interested. Zero. They wanted a device they could put on their furnaces/boilers to instantly save 50 percent of the energy. They had all heard it was already invented and they just needed to buy it. They had heard from their uncles it was going to be available tomorrow.

Typically, people spend more money on fuel for their cars than fuel for their homes, so their interest in car efficiency is higher.

Jump forward to 1998. My friend and mentor, John Tooley, told me he was concerned the next generation of people who were going to take over our work in CREADS needed mentoring. He said I needed to get on it right away. He didn’t ask me – he ordered me.

I was in a weakened state at that time, so I agreed to do so. I had been doing mentoring ad-hoc for years, but I began to work with a few organizations, including NESEA, that had large professional memberships or regular conferences.

I asked them how they brought youngsters – or any emerging or transitioning professionals – into the field. And I asked how these emerging professionals not only got work, but got better at their jobs and moved up in the field. There did not seem to be a ladder anywhere – at least, not a structured one.

Over the years, I have worked with dozens of “kids” – what I call emerging or transitioning professionals – to help them get jobs in the field. Through GreenHomeNYC (another former NESEA subchapter), we have a monthly Green Career Meetup. We have succeeded in getting one emerging professional a real job every month for the last four years. It’s a great program. It’s great to be a part of it. But I’m still troubled.

Speaking as an energy policy (read: non-technical) grad, I left college dumb as a stone but got great experience in the field from people who beat me like a rented mule.

Throughout the last 35 years, I think I’ve increased my knowledge in the CREADS 100 percent each year, which makes work fun and interesting.

I’m worried that the new crop of kids think this is all about wheeling power and buying green roofs and water catchment devices rather than examining energy usage and cost and attacking that problem.

I feel the young-uns – like me at their age – don’t understand the importance of science in our work. I fear that our industry is getting ready to face another crash of bad publicity caused by inexperienced “experts” not listening to clients and making recommendations that don’t save energy/money and improve CREADS.
I think I speak for many people in the field when I say the current crop of grads is not prepared to help the building industry.

I guess I want them to not make the mistakes that many of us made that screwed up a bunch of buildings back in the day but helped us learn a lot.

A young dynamo I know opened a consulting company and got a high-profile client by agreeing to work pro bono. He felt he could cut his client’s bills in half for virtually no investment and use this as the springboard for more business.

I spoke to the consultant as a favor and he wanted me to perform an energy audit over three beers. He had no fuel records, no bills, and no idea what was the most expensive fuel or bill.

When people ask me this, typically I ask them about the patient in the emergency room five miles away who just fell off of their chair in the waiting room and collapsed to the floor. I ask them what is wrong with the patient. I get stark looks. And then I say, “I haven’t seen the patient, so I can’t make a diagnosis.”

This particular building is historic – almost 200 years old. Let’s just say it is a very important building in this city and many of you would recognize the name of the client and the restaurant.

Air-sealing this building would change the physics of the building. So its current ability to vent moisture would be stopped in a mostly-hot climate with bouts of high humidity. And it’s brick with no insulation.

I asked the young dynamo about condensation, downsizing AC, and removing moisture. Would condensation happen now on the single-pane windows? In short, would this retrofit create a problem that never existed previously?

He had never considered this, but was sure that one of his sub-consultants knew this stuff.

I mentioned the BS term – building science – and I was suddenly speaking a completely foreign language. Glazed look. What?

Over two years ago, I went to a GreenHomeNYC event and the usual informal cocktails after. Two young bucks came up to me and said, “Andy, we need client by agreeing to work pro bono. He felt they could your advice. We want to start a company that puts solar panels on buildings all over Brooklyn.”

I replied simply to these two young men, “Wouldn’t it be a better idea if we made the buildings more energy-efficient first so the solar will pick up a larger portion of their building load?”
They were stunned. And I felt that I had finally grabbed the light saber from the hands of Obi-Wan Kenobi and I was a true Jedi knight.

Sadly, one hour later, I found out my friend and mentor, Bill Bobenhausen, had just passed away. This cemented to me how much more we all need to fertilize the fields behind us – and how the old pros need to plead with the young ones even more today than they did when this field began.

Late last year, I taught a graduate-level architecture class. Over two hours, I introduced concepts of air-sealing, fire-stopping, meeting energy codes, exceeding insulation levels, changing framing from 18 to 24 inches on center, and downsizing HVAC.

30 young future architects looked at me completely stupefied. This was engineering. They didn’t need to know this. It was math, science, code and physics, all rolled into one, and it was not their responsibility.

Conversely, in June of this year, I was proud to accept the role of commencement speaker at the Urban Assembly High School for Green Careers in New York City. They graduated their first students who had been through three years of study – all 50 of them.

They teach building principles, horticulture, math, and a few kinds of science. But their goal in the future is to graduate every student with a Building Performance Institute (BPI) Building Science Principles Certificate of Knowledge. Not perfect – but wow, what a great step! If you are new to this field, please reach out and find your “Board of Directors.” Have them tell you where they screwed up so you won’t do it again.

If you’re not new to this field, be a mentor or a member of the “Board of Directors” of our future shining stars. My fondest moments at any conference are when I see one of my mentees presenting their experience and knocking it out of the park with a rapt audience. That is real career advancement.

ABOUT THE AUTHOR
F.L. Andrew Padian is a private consultant with 35 years of experience in the building science of multifamily buildings. He has performed energy analyses and successful solutions on thousands of buildings across the country. He is a frequent contributor to sustainable publications and speaks nationwide. A NESEA board member, he is an active volunteer in New York City’s Urban Assembly School for Green Careers, Clinton Community Garden, and GreenHomeNYC.
A BUILDINGENERGY CASE STUDY: ROOSEVELT LANDINGS

BY DAVID DAVENPORT, MARC ZULUAGA AND LARRY HARMON

In advance of the BuildingEnergy NYC 15 conference on Oct. 15, NESEA gathered insights into one of New York City’s most exciting and innovative projects: the deep energy retrofit of the Roosevelt Landings multifamily building on Roosevelt Island. The retrofit will be featured in a session at the conference.

Three of the primary professionals involved in this retrofit contributed to this article: David Davenport of Urban Greenfit, LLC (UG), Marc Zuluaga of Steven Winter Associates (SWA), and Larry Harmon of Air Barrier Solutions, Inc. (ABS). They have generously provided their reflections, data and insights.

DEVELOPING THE LEADERSHIP AND IMPACT OF ROOSEVELT LANDINGS

The deep energy retrofit of the 1,003-unit multifamily building at the Roosevelt Landings property in New York City demonstrates what can be achieved when owners take the initiative and commit to comprehensive energy retrofits in partnership with a strong development team, building science professionals, and engineers.

Innovative financing was used to implement aggressive air-sealing, smart controls, and distributed-generation upgrades that resulted in significant savings even after traditional retrofits had already been completed. This approach resulted in reduced operating costs, improved resident comfort, enhanced resiliency, and exceptional returns to investors.

With traditional rebates unable to support the scale of energy-efficiency work that must be done in the future, the project’s most lasting legacy may be its demonstration of the business case for this type of work to hard-nosed investors.

In November 2012, UG closed on the $7.4 million transaction. The project leveraged city, state and federal initiatives to promote renewable energy and energy efficiency in residential housing. It began in January 2013.

The retrofit was projected to achieve 20 percent new energy savings, reduce grid electricity usage by 15 percent, and create 15 full-time jobs paying Davis-Bacon Act labor rates to all workers during construction. The estimated energy savings were 2,303,416 kWh per year or 6,311 kWh per day, reducing carbon emissions by 750 metric tons of pollutants each year.

This project has outperformed its expectations. To date, it has generated cumulative energy savings of 24 percent – exceeding projections. The project is also outperforming financial goals. The underwritten energy cost savings for the first full year of operation was $571,000. The actual energy cost savings was $708,000 – 124 percent of the projected amount. As of June 2015, the second year of operation, the project had already generated over $515,000 in energy cost savings – 88 percent of the 12-month projection – in its first six months.

In 2014, the first full year after the retrofit was completed, the net operating income of UG significantly exceeded projections. As a result, UG was able to meet and exceed investor return requirements. Based on a cap rate of 5 percent, the increase in net operating income translates into an increase in building valuation of $19 million.

This increase in building value was achieved with an overall investment of $8 million and the sponsor’s initial out-of-pocket-investment of $1.8 million – a return that any investor should find extremely attractive.

The project was sponsored by Urban American (UA), a real estate investment company that has provided safe, affordable and high-quality apartments for New York City residents for over a decade. Under the leadership of executive vice president Joshua Eisenberg, UA made a strategic decision to lead urban communities in the reduction of carbon emissions with over $10 million in investments in energy-efficiency and renewable-energy projects to reposition older multifamily housing as sustainable and empower residents as partners.

The formation of UG was a direct response to UAs need to fund improvements to the building without the building taking on additional debt. By creating an off-balance sheet special-purpose investment vehicle that raised the capital and funded the work,
UG enabled UA to turn a major capital improvement project into an operating expense. This was achieved through an energy-services agreement and power-purchase agreement between the building and this new special-purpose investment vehicle. This agreement allowed the building to pay the difference between baseline projections of energy use and the actual energy used after the energy savings. It also allowed the building to pay for the CHP plant.

This project has set a new precedent, as energy services agreements (ESAs) are more commonly used in the municipal, university, school, hospital and housing authority markets than in privately-owned multifamily buildings.

The project was led by UG and managed by David Davenport. UG conceived the scope of work, structured the financing, and developed the project. The energy-efficiency measures were engineered by a team led by Marc Zuluaga at SWA. The renewable-energy measures were engineered by Stephen Samohous of KGS Buildings and EVCO Mechanical. The principal energy-retrofit work was led by Larry Harmon of ABS and Richard Whiffen of H2O Degree. Legal support was provided by Peter Funk of Funk & Zeifer LLP and Michael Schwamm of Duane Morris LLP. Accounting support was provided by Novogradac & Company LLP.

**IMPROVING THE ORIGINAL DESIGN OF ROOSEVELT LANDINGS**

At the time of its construction in 1975, critics heralded the innovative design of Roosevelt Landings. Architect Josep Lluis Sert, dean of the Harvard Graduate School of Design, achieved efficiency in space usage by triple-loading corridors with duplex apartments so elevators and public corridors were only needed every three floors.

Unfortunately, since the design was conceived in an era when people thought electricity would soon be too cheap to meter, attention to spatial efficiency did not carry over to the energy-efficiency systems. Heating is provided by electric baseboard heaters. A single electric meter monitors all apartments and residential common areas. Also, residents are not billed separately for the electricity they use.

These shortcomings of the original design saddled the complex with increasingly higher operating costs – a problem UA encountered after it acquired the building in 2007.

Soon after the acquisition, UA embarked on a capital plan coordinated with a comprehensive energy-efficiency scope of work. New windows were installed throughout the complex. So were lights, ventilation-fan controls, ENERGY STAR refrigerators, and low-flow water fixtures. These measures were intended to meet NYSERDA’s program requirement of 15 percent energy savings for the whole building.

Sub-meters were also installed to enable a third-party company to bill residents for their electricity consumption, based on permission from the New York Public Service Commission (NYPSC). Despite prior approvals, the NYPSC reversed its decision and prohibited the complex from using the sub-meters to bill residents after the installation of the sub-meters had been completed at a cost of over $1 million.

As a result, UA found itself with reduced but still unsustainably-high operating costs. Moreover,
UA had already depleted available capital resources by implementing a comprehensive list of energy-efficiency upgrades.

To address both of these challenges, UA set out to develop an innovative scope of work that would allow deeper savings. It also created a new subsidiary, UG, to act as an energy-services company (ESCO) to finance and implement the scope of work at this building and eventually others. UG then implemented a new scope of work at Roosevelt Landings in 2012-2013.

Like many other buildings in New York City, Roosevelt Landings has been impacted by climate change. It suffered temporary power outages that affected a third of its apartments due to flooding of a subterranean electrical room during hurricane Sandy.

Combined heat and power (CHP) technology can help to address the power outages hurricanes can create. The building’s new CHP system will have a dramatic positive impact on people’s lives during emergencies. The CHP and boiler system is strategically located on the 21st floor of the property’s tallest building to support building resiliency by providing residents with hot water when the electric grid is down. In addition, electricity can be maintained in the generating room during power outages, creating an emergency-management command center with additional potential capabilities.

The use of wireless thermostats and an energy-management system was a direct response to the NYPSF’s rejection of UA’s attempt to sub-meter residents to reduce costs and encourage rational behavior. The new control system now allows UA to manage the heat centrally, increasing efficiency dramatically.

The project’s most lasting legacy may be its demonstration of the business case for this type of work to hard-nosed investors.

**DESIGNING THE SCOPE OF THE RETROFIT**

The retrofit’s scope included CHP, domestic hot water load reduction, heater replacement, wireless apartment thermostats, energy-management systems, programmable thermostats, corridor ventilation, resident education, floor-slab insulation, blower-door testing, and air-sealing.

**Heater Replacement**: UG replaced older-model baseboard heaters with new heaters that provide better performance in every apartment due to faster heating-coil materials and modern technology.

**CHP and Domestic Hot Water Load Reduction**: A two-part strategy was executed to reduce the domestic hot water requirements as much as possible prior to the installation of an appropriately-sized CHP system to address the remaining load. Low-flow aerators and showerheads were installed as part of the 2008 scope of work.

A condensing domestic hot water boiler plant installed in 2013 further reduced the energy load by drastically cutting standby losses. UG installed five 1.35-million-BTU water heaters that operate at 95-percent fuel efficiency. The heaters replaced four outdated Scotch Marine steam boilers that were 65-percent-efficient at best.

While construction delays and technical challenges delayed deployment of the CHP system, the system is now operating at 100-percent capacity. UG installed three 100-kw CHP modules that together have the capacity to generate 300 kW of electricity and 2.1 million BTU/hr of domestic hot water.

The CHP system creates 15 percent of the building’s electricity onsite and heats 40 percent of its domestic hot water. This system is also equipped with black start capabilities to function as an emergency generator supplying critical building systems – such as house pumps for providing water to all apartments – during grid outages.

**Wireless Apartment Thermostats and Energy-Management Systems**: The integration of resident-facing off-the-shelf digital thermostats with a wireless mesh network has been done before, though the scale of this installation is somewhat exceptional. Proving the savings at this scale is helping to catalyze the market for this retrofit.

One practical but also innovative aspect of the work was the incorporation of window sensors to reduce heat output in rooms with open windows. The wireless backbone and control infrastructure in place allowed magnetic sensors to be installed to sense whether windows are open at minimal extra cost. No system is completely tamper-proof, but the window-open alarms provide management information for a sprawling complex. They also send a strong signal to residents about the significance of open windows. This can be the first step in spurring behavioral change.

**Installation of Programmable Thermostats**: Dials and buttons on old baseboard heaters were replaced with wall-mounted programmable thermostats. Each thermostat sends a wireless signal to a paired controller on each baseboard heater. Residents are able to select target temperatures.
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**Corridor Ventilation:** The original design limited the number of public corridors in the complex compared to a traditional double-loaded corridor layout. But where there were corridors, they were configured with slider windows running nearly their entire lengths. The design was based on natural ventilation with operable windows to meet the fresh air requirements for the 40 public corridors.

This passive design strategy is ideal for the spring, summer, and fall. But during the heating season, this decision resulted in severe operational waste. Nearly every time SWA visited the site during the winter, the team observed one partially-open window in most public corridors.

When the mechanical ventilation is operating during the winter, windows are locked. In the spring, summer and fall, windows are unlocked and mechanical ventilation is disabled. This new scheme was filed with the New York City Department of Buildings and reviewed by the New York City Fire Department. In a traditional double-loaded corridor, there are usually no windows.

The current scheme results in enhanced year-round performance compared to most other similar buildings.

**Apartment Air-Sealing and Ventilation:** The air-sealing designed and installed by ABS provided operating cost benefits to the owner and comfort benefits to residents. There was also a synergy between these envelope upgrades and the new controls.

With insulation improvements, spaces can be more comfortable even at lower temperatures when they are not drafty. The gap between the deteriorated bottom of the sheetrock and the concrete-slab floor behind the electric baseboards, which created an extensive air-barrier defect throughout the property, was air-sealed.

Staff tightened the building envelope by air-sealing apartments to eliminate cold air infiltration and drafts during the heating season. This work also enhanced resident comfort during the cooling season by preventing warm, humid air from entering air-conditioned apartments. They performed six types of work in each apartment:

1. **plugging the holes behind the heaters and along the exterior walls that allowed drafts into the building**
2. **caulking the windows where leaks were evident**
3. **installing draft-blocking gaskets in exterior-wall electrical outlets**
4. **caulking beneath the sills of the outside windows**
5. **sealing holes near sink pipes that allowed drafts and pests to enter apartments**
6. **installing plugs over air conditioners and sleeves**

The crews also cleaned and retrofitted the ventilation register covers and installed orifices in resident kitchens and bathrooms. The metal interiors of the ventilation ducts were brushed and wiped clean. The new orifice plates were installed to regulate and distribute ventilation airflow more evenly among apartments.

**Common Area Air-Sealing:** In addition to working in apartments, ABS air-sealed common areas, including elevator machine rooms, stairwells, and HVAC rooms. Through-wall air-supply fans with filters were installed in each corridor. They operate when the windows are locked to meet New York's building code and ASHRAE's code guidelines. These measures have eliminated the wind-tunnel effect that many residents experienced in the halls during cold months. They also keep cold air out of the hallways and apartments.

The complex includes seven banks of elevators. Prior to the retrofit, the tops of the shafts were vented directly to the outside per code, resulting in thousands of cubic feet per minute of conditioned air escaping.

SWA's measurements of airflow escaping from elevator shafts before and after the retrofit were the impetus for “Spending through the Roof,” a study published by Urban Green Council. This study has drawn significant attention to the issue of elevator-shaft venting. The New York Times covered the study. The study quantified the $11 million in annual savings possible by addressing this leakage in New York City alone.

**Floor Slab Insulation:** ABS installed high-density spray foam directly below the concrete floor slabs and at the wall penetrations of apartments that protrude over walkways and sidewalk arcades. This has eliminated the key source of cold floors in these apartments and blocked cold air from leaking into the building.

In addition, fabricating ducts and sealing connections proved to be successful strategies.

Initially, the exhaust-ventilation connections in the building were not sealed to the primary shaft. Some had no ducts to connect the grilles to the shafts. Fabricating ducts and sealing these connections eliminated quite a bit of leakage.

The ventilation orifices further restricted and balanced airflow from the units. While installing polyurethane spray foam (SPF) on the underside of the cantilevered spaces, the team sealed a number of large penetrations as well by extending the
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foam down the sidewall towards the drop-in ceiling panel level.

Building Operator and Resident Education: To support UG’s efforts, UA put its key maintenance and management staff through Building Performance Institute’s Building Operator Certification course. Further, UA provides residents with helpful materials and education seminars on how to reduce their own households’ energy consumption.

Blower-Door Testing: ABS provided design assistance to the engineering consultant, SWA, by conducting a building-envelope evaluation in accordance with ASHRAE standards. Duct-blasters in blower-door frames were set up in a number of apartments. Their main use was to provide the pressure differential necessary for infrared, smoke-tracer, and hot-wire anemometer testing to identify leakage sites. Common areas were inspected with similar technologies using the buildings’ natural stack pressures as the driving force to identify leakage locations. A comprehensive report was submitted and eventually became part of a larger retrofit.

SWA had previously investigated the application of SPF to the underside of cantilevered spaces at this location. The crew also had specific treatments it was trying to implement in elevator-control rooms. The team was concerned about ventilation issues in the kitchen and bath areas. The crew decided to install orifices in the exhaust-ventilation duct grilles in the units to regulate airflow throughout the building.

Looking Toward the Future

An additional positive development has emerged from this solution. The infrastructure put in place for these new controls will be a platform for a planned future project to sub-meter residents only for the apartment-lighting and plug-load portions of their consumption.

With this new system, residents will be accountable for the portions of their consumption that they control completely. This will include their use of energy-efficient lights, appliances or outlets, but not their use of electric heaters. Metering of heaters has historically been the major cause of resistance to sub-metering in these types of buildings.

UA will continue to manage heating limits centrally and will always have an incentive to pursue further envelope upgrades to reduce heating requirements. The project team anticipates an additional 10-percent reduction in whole-building source energy use intensity as a result of this future project.

These resulting benefits will be realized nearly a decade after sub-metering was first proposed. While the process has been circuitous, politicized, and at times contentious, the final approach represents a thoughtful model for other electrically-heated buildings.

Urban American plans to replicate this proven scope of work on a group of other large postwar master-metered and electrically-heated complexes.

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UA plans to replicate this proven scope of work on a group of other large postwar master-metered and electrically-heated complexes.

With other owners, SWA is also engaged in a pipeline of close to two million square feet of electrically-heated complexes scheduled to start construction in 2015. These complexes have very similar scopes of work to the Roosevelt Landings project. Finally, SWA, with a grant from the Natural Resources Defense Council, is currently benchmarking the Mitchell Lama portfolio, which is made up of 180 large postwar complexes across New York state.

**APPLYING LESSONS LEARNED**

The vast majority of the upgrade work required access to apartment spaces. The coordination of multiple visits by electricians and air-sealing laborers across 1,003 apartments was a challenge met by a full-time onsite project manager overseeing all workers and coordinating resident engagement and communications.

One lesson the team learned from this project is that ensuring reliable access to apartments can save a great deal of time and effort.

At a cost of over $1 million, the extensive whole-building air-sealing scope of work was the largest air-sealing retrofit project in New York City. Because the deep and site-specific air-sealing scope did not fit into the simple prescriptive rebate-application forms, the project team spent extensive time documenting assumptions and calculations to successfully support an application for a $300,000 incentive from Con Edison.

Finally, the corridor-ventilation upgrade was nearly halted at an early stage as a result of a myth that had been perpetuated onsite for decades that the New York City Fire Department wouldn’t permit the corridor windows to be locked. In a conference call, the team found out that the fire department did have a concern about the corridor windows: to prevent falls, it simply wanted to make sure the windows could not be fully opened. Sometimes it pays to ask a question.

**ABOUT THE AUTHORS**

**David Davenport** is the managing principal of Urban Greenfit LLC, an energy-service company working with building owners in New York City to finance, develop and operate energy-efficiency equipment and onsite power generation in existing multifamily housing. He is also a managing director of 5 Stone Green Capital LLC, a real estate private-equity fund that acquires existing properties and develops new ones in urban markets.

As a vice president and director of SWA’s Multifamily Energy Services, **Marc Zuluaga** has directed energy audits on over 20 million square feet of existing buildings and leads a team committed to applying a rigorous technical approach to the evaluation and implementation of a wide range of building upgrades. He is also the project manager for the Deutsche Bank/Living Cities Energy Efficiency Data Report Project.

**Larry Harmon**, vice president of Air Barrier Solutions, LLC, consults with clients on building-envelope issues. He markets building-envelope services in the commercial, residential and institutional sectors. His company is currently involved in studies on air leakage in buildings with Center for Energy and Environment and ASHRAE. He was the founding executive director of Building Performance Institute. He has consulted with utilities, government organizations, contractors, manufacturers and developers.

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The Stellar Performance of the Concord Solar Challenge

BY JILL APPEL

The Concord Solar Challenge became the highest-performing community solar program in Massachusetts because a group of environmentally-minded citizens saw the potential for a program, borrowed some good ideas from Solarize Mass, and installed technology that reduced the town’s carbon footprint by more than one million pounds per year.

The community solar movement in the United States began in Portland, Ore. in 2009 as a community-level bulk purchasing program for residential solar systems. The Solarize movement has spread throughout large areas of the nation and is especially active in the Northeast at present.

Massachusetts joined the movement in 2011 when the Massachusetts Department of Energy Resources (DOER) and Massachusetts Clean Energy Center (MassCEC) started the Solarize Mass program. Seeing the benefits, many communities are now choosing to run their own solar programs.

WHAT THE SOLARIZE MASS PROGRAM ACCOMPLISHES

The Solarize Mass program, which was developed and run by MassCEC and DOER, has been an unqualified success. It has empowered communities to take action on climate change, raised awareness, put solar power within the reach of thousands of homeowners, and helped the state to achieve its renewable-energy goals.

To date, 46 communities have participated in Solarize Mass, installing 2,400 systems for 16 MW of solar energy. Most of the communities that have participated have more than doubled their installed bases of residential systems because of the program.

If a community wants to participate in Solarize Mass, it submits a proposal to MassCEC that outlines its commitment to the program and contains its plan to generate interest. If the community is accepted, MassCEC facilitates the installer proposal and selection process, allocates $2,500 for marketing, provides program deadlines and a reporting structure, and monitors the program.

Inspired by Solarize Mass, several communities have chosen to run their own community solar programs, either by choice or by necessity. Some of these communities have either not been eligible for Solarize Mass or have not been accepted into it.
Some have felt that they know enough about how to select an installer to run a good program on their own. Others have wanted control and flexibility to set up the timing and characteristics of their programs in order to best meet the needs of their communities. By necessity, Concord ran its own program, but the added control and flexibility of having a community-led program helped the town achieve extraordinary results.

**HOW CONCORD SET A RECORD FOR COMMUNITY SOLAR INSTALLATIONS**

Concord has a long history of environmental activism. It was the home of Henry David Thoreau. It was also one of the first communities in the nation to ban the sale of single-serve bottled water, an unnecessary product whose manufacture wastes natural resources.

Concord is a Boston suburb with approximately 17,700 residents and 6,700 single-family homes or condominiums. It is also served by a municipal light plant. These plants are subject to much less regulation than investor-owned utilities in Massachusetts and can set their own policies on solar power.

Concord’s Comprehensive Sustainable Energy Committee (CSEC) was established in 2007 with a mission of developing and implementing programs for fostering energy conservation, energy efficiency, and renewable energy generation.

In early 2012, CSEC sponsored a Solar Fair with presentations and vendors. The fair resulted in 30 installations. While the fair introduced solar to many enthusiastic community members, the results were not sufficient to have a real impact on Concord’s carbon footprint. Going solar remained daunting for community members due to high prices and uncertainty about equipment and installers.

In late 2012, CSEC members heard about the outstanding results of the 2012 Solarize Mass program. However, because Concord has a municipal light plant, it was not eligible to apply for Solarize Mass. So CSEC set up a local program with a similar model.

Members spoke with solar coaches from Solarize Mass, reviewed community and installer information on the Solarize Mass website at www.masscec.com/solarizemass, put together selection criteria for a qualified solar installer, and interviewed four of the installers who had participated in Solarize Mass. CSEC selected Astrum Solar (now Direct Energy Solar) as its installer.

In April 2013, CSEC launched the Concord Solar Challenge. The goal of the challenge was to add 100 systems.

An extensive community-outreach program was conducted – including a kickoff workshop, local newspaper articles, tabling at events, a town-wide mailing announcing the program, and a mailing by high school students to homeowners whose homes had good solar potential.

Information about the program was disseminated widely throughout town. Solar power became the topic of conversation at formal and informal gatherings.

Solar power was a lively topic at church coffee hours. One church was able to inspire its congregation to support a solar installation on the church roof.

Lawn signs helped people see that their neighbors and friends were installing solar and encouraged them to do the same. In several areas, many solar installations were inspired by neighbor-to-neighbor conversations.

A CSEC member was the solar coach for the program, helping community members to understand the nuances of their solar decisions and move forward.

The initial deadline to sign a contract was July 31. As of that date, 360 people had expressed interest and 63 had signed contracts.

Community interest was high, but people needed more time to make their decisions. Staff extended the program to Oct. 31. To encourage earlier sales, the installer promised to install systems by the end of the year for everyone who signed a contract by Sept. 27.
In addition to its environmental benefits, the program generated a lot of excitement in town.

An additional 200 people signed up for free site surveys. By Oct. 31, 140 people had signed contracts. At that point, enrollment in the program was closed and homeowners were given until the end of December to make their final decisions.

After including a few latecomers in early 2014, the challenge completed 166 contracts. This yielded 1.3 MW of solar power.

This was the best result achieved by a community solar program in the state at the time. On a per-capita basis, this has still been the state’s most successful program to date. The close rate on total leads – the sales as a percentage of total customers interested – was 30 percent. This was significantly higher than the Solarize Mass program’s close rate, which was 18 percent.

Many factors led to the success of the challenge:

- The community has a strong culture of concern for the environment.
- There was some pent-up demand for solar power.
- The Concord Town Manager and the Concord Board of Selectmen endorsed the program.
- Information about the challenge was placed prominently on the town’s website.
- The installer provided a good price, a professional and qualified sales team, and strong marketing support.
- Systems were installed quickly because of installer capability and support from the town’s municipal light plant and building department.
- The Municipal Light Board enacted a net metering policy that both encouraged solar adoption and protected the ongoing operations of the municipal light plant.
- Town management decided that it was safe and legal for the municipal light plant to allow equipment lease contracts for solar power, making this less-expensive option available.
- Several installations in Concord’s historic district were approved by the progressive-thinking Concord Historic District Commission.

In addition to producing environmental benefits, the program generated a lot of excitement in town, enhanced connections between community members, and helped homeowners and nonprofits make an investment that will pay handsomely for many years to come.

As a result of the challenge’s excellent outcome, Direct Energy Solar donated $15,000 toward a community solar installation. This system was installed in April 2014 and supplies electricity to a town-owned farm residence and farm stand. The town sponsored a solar party to bring together all of the people in town who had installed solar. The party was a resounding success, with a great turnout and many shared stories of why homeowners chose to move forward and how happy they were that they did.

“Over two years ago, I looked into installing solar panels on my house,” said Steve Ippolito, a program participant, in an email interview. “I wanted to do my part to combat climate change, but was pleasantly surprised by how the financials worked out. The price quote using the solar challenge was significantly lower than the other quotes I got and the people from Astrum Solar seemed very competent. After the federal, state and local subsidies, I was expecting a five-year ROI and a 20-percent return thereafter. It was a no-brainer to proceed with the installation. It seems almost too good to be true, but after two years of experience, I can say I am getting the expected return. The system has performed perfectly since its installation. There is no maintenance and it is easy to forget that the system is there.”

WHY OTHER TOWNS SHOULD CONSIDER SIMILAR SOLAR PROGRAMS

Solar PV provides the foundation for community action on climate change. Not only does it convert electricity to clean power sources, it also provides a clean energy infrastructure to support the replacement of gasoline-powered vehicles with electricity-powered ones. In addition, PV supports the conversion of fossil fuel-based home heating systems to high-efficiency electric heat pumps.

Solar PV systems are also a very visible and compelling way to educate and engage local residents in supporting clean energy and energy efficiency. Therefore, a community solar program should be one of a town’s first steps in combating climate change.

Community solar programs can be accomplished by any town that is willing to make them a priority and spend some time reaching out to local homeowners.

Given the state of the Earth’s climate and our need to reduce carbon emissions rapidly, the generous incentives available to community members, and the sizable reductions in carbon emissions that can be achieved by community solar programs, every community in the Northeast should be actively working on kicking off its own community solar program.

ABOUT THE AUTHOR

Jill Appel has an undergraduate degree in Accountancy from Bentley University and a Masters in Health Care Management from the Harvard School of Public Health. She has 25 years of experience in strategic consulting, systems development, process improvement, and health care finance. She was the solar coach for the Concord Solar Challenge and now serves as Direct Energy Solar’s director of community programs in the Northeast.
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WHAT HAPPENS IF WE BRING THE NORTHEAST’S CRAFTSMEN INSIDE TO WORK?

In the Northeast, there is a proud history of the craftsman, the homebuilder, and the DIY hero and heroine. They work with sturdy tools, local materials, and real wood. They brave the mean winters, cut each stick with caution, and are frugal with lumber. They measure twice and cut once. They have done this the same way over many years. The product is consistent and steady, exactly the same as it would have been in 1953.

But we live in a very different world than we did in 1953.

The lumber is scarcer. The tools are more costly to run. And although the winters probably aren’t meaner, climate change has certainly made the weather more volatile. With skyrocketing fuel costs, our grandparents’ myth of the porous house as a good house is no longer viable.

What happens if we bring these craftsmen inside to work? What if we remove the gloves from their chilled, numb hands as they are trying to cut that 2x6 to a precise length – and trying to get that sloping valley rafter just right the first time? Well, their products are built better. And they might not mind being indoors either.
So then why are we not typically building our houses indoors like other high-quality products? According to an industry report from 2013, as the housing market and economy recover, demand for prefabricated housing is expected to rise. Despite the promise of lower construction costs, prefabricated home products have had limited market penetration. This is in part because of consumers’ familiarity with traditional construction practices. In the case of manufactured housing, there is also some stigma attached to the product itself, according to a 2013 report from Freedonia Group called “Prefabricated Housing.”

But this certainly wasn’t always the case. Consider the Sears Kit Homes of the 1920s. These homes were exactly cut, pre-assembled and taken apart to be put back together onsite in a quality-assured, consistent and cost-predictable way. The efficiency of the system led to it becoming a very cost-effective solution.

Somewhere along the way, cost eventually trumped quality in our various building booms from the ’60s through the beginning of the 21st century. But this wasn’t a flaw inherent in the construction method itself.

Take a trip to one of our longest-standing, local modular factories, Keiser Homes in Oxford, Maine, to visit one of my collaborators. What you see inside may surprise you.

It’s those same proud carpenters, working inside, with real wood and high-quality materials in top working conditions. Some of the results may be more-accurate cuts, less-backbreaking lifting, significantly more-airtight construction, less waste, higher efficiency, and greater oversight. These are real, high-quality homes. They just move.

And not only do they still usually cost less than the alternative, but they are inherently more environmentally-friendly as well.

Some of the most significant productivity findings from prefabrication and modularization companies include the following:

- Project schedules are decreased by four weeks or more.
- Project budgets are decreased by 6 percent or more.
- Construction site waste is decreased by 5 percent or more. (These data are from the 2011 SmartMarket Report by McGraw-Hill Construction, “Prefabrication and Modularization: Increasing Productivity in the Construction Industry.”)
- CO₂ emissions are reduced by 43 percent or more. (On average, conventional construction results in 14.3 months and 98.9 metric tons of CO₂ emissions while modular construction takes only 6.0 months and results in 56.3 metric tons of CO₂. These statistics were reported in the article “Modular Builders Get in on the Green,” published by TechHome Builder in 2014.)

And although these are large-scale industry findings, they actually feel low to some of us who have been working directly in this industry.

A study from the American Institute of Architects has found that up to 40 percent of the nation’s solid waste in landfills is building material. According to Sustainable Sources’s webpage on construction recycling, 8,000 pounds of waste are typically thrown into the landfill during the construction of a 2,000-square-foot home. (Yes, I know some of us are smarter than that.)

We now know that the market for green building is more than doubling – from $54 billion to $120 billion – from 2011 to what’s projected for 2015. These data are based on information from McGraw-Hill Construction’s report.

The report adds that according to the latest study by National Association of Home Builders, “[most] firms building new single-family homes report that they are doing more than 15 percent of their projects green.” This number holds for new multifamily construction as well.

“Greater consumer interest in green homes has contributed to the ongoing growth, leading us to anticipate that by 2016, the green single-family housing market alone will represent approximately 26 percent to 33 percent of the market, translating to an $80 billion to $101 billion opportunity based on current forecasts,” said Harvey Bernstein, vice president of industry insights and alliances for McGraw-Hill Construction.

So now that the demand for high-performance buildings is finally here, how do we keep up? Building faster sounds like a good idea, right?

About six years ago, our firm, Kaplan Thompson Architects (KTA), made a decision to do only design work that had lower energy consumption as a primary goal.

It was a definitive move that made us feel good, but there were a few problems with it. It had the potential to run in direct opposition to another goal of ours: providing attainable design to clients with relatively modest means. Plus, if builders were tasked with finding cheaper solutions, they usually had difficulty pairing this objective with creating higher-performance building shells.

Soon after KTA set this goal, Keiser Homes contacted us about teaming up to marry our skills. They believed better-designed, affordable, net-zero-energy homes – homes that produce as much energy as they consume annually - had potential in their market.

Our clients were telling us the same thing, but we had no predictable way of providing accurate pricing. So we partnered with Keiser Homes and created Modular Zero Homes together.

This project has evolved into our BrightBuilt Home line. The new line, branded after our very first net-zero-energy project, the prefabricated BrightBuilt Barn, has allowed us to serve the demographic of customers for whom a completely energy-independent home was previously unattainable.

And we’re certainly not the only ones working hard on this. Nor were we the first. Preferred Building Systems in New Hampshire incorporates
energy efficiency into all of its modular homes and dedicates a portion of its factory floor to explaining building science to its clients through mockups and demonstrations. Bensonwood is pursuing panelized high performance with its Unity Homes line. Texas architects Lake/Flato are doing similar things with the striking Porch House line. And Chris Corson’s ambitious EcoCor is kicking performance up to Passive House levels with panelization.

It’s important to note that sometimes costs for these homes decrease, but not always.

Bensonwood’s founder, Tedd Benson, is seeing the scale of this movement grow. He said, “We expect the growth to happen in big strides, not just one consumer at a time. We are in serious negotiations and conversations with 11 developer prospects.”

Unity has signed on with developers for a large first-phase design development agreement. And they’re working with “another prospect who’s doing about 50-60 per year and a few others with 20 to 50 homes planned.”

Bensonwood is just another harbinger of this trend. Lake/Flato principal Bill Aylor reports similar interest, which has been increasing steadily and rapidly after receiving their 2011 Builder’s Choice Project of the Year Award for the Porch House concept. They now have projects as far north as New York and serious interest from across the country.

Currently, more than two thirds of new single-family houses in Sweden are prefabricated. According to the 2003 report “The Application of Renewable Energy for Prefab Houses in Germany,” 14 percent of houses in Germany are prefabricated, many of which meet Passivhaus standards. In 2011, about 0.03 percent of homes in the United States were built in factories, according to an article by HowStuffWorks.com.

I could be wrong, but it sure seems like these builders overseas are just smarter about these things than we are.

Architects need to reevaluate this emerging but far-from-experimental means of building.

With these reliable and reproducible systems ensuring certain aspects of buildability and performance, we can spend more of our efforts — and our clients’ fees — on designing what’s visible, which we love to do.

A bonus opportunity that high-performance off-site construction can provide is the chance to be a more proficient and prolific designer. Still, we can’t get lazy. We need to be aware of a home’s specifications, limitations, context and performance. Perhaps it’s time to think of the whole-house system in the same manner. Select the appropriate system for its use and setting and have it delivered intact to its site, ready for installation. If we rightfully scoff at the idea of assembling a home’s individual components piece-by-piece, why do we still do so with the home itself? That’s so 1953.

AIA 2030’s CEO, Ed Mazria, said during a presentation at the Center for Architecture in New York City that about 60 percent of our housing stock will be replaced within the next 15 years. This is about 900 billion square feet of our built environment.

And as building codes change, the level of required performance will have to rise. This means that building higher-performing homes must go hand in hand with the need for speed.

And there’s plenty of work for those of us who are already doing the right thing. You’ll see it — including all of the above companies — on the floor of the BuildingEnergy 16 conference. NESEA is at the forefront of this movement. It’s where the leading edge is — and it’s where you are right now.

ABOUT THE AUTHOR
Phil Kaplan is a member of the NESEA Board of Directors and a principal at Kaplan Thompson Architects. Founded in 2004, the firm has emerged rapidly. Its motto, “Beautiful Sustainable Attainable,” reinforces its commitment to creating vibrant, healthy and durable buildings for all. His newest venture is BrightBuilt Home, which provides affordable, modular net-zero homes throughout the Northeast and Mid-Atlantic regions.
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More than 4,000 people and 100 exhibitors will gather in Boston for three days in March 2016 around a vision of a sustainable, energy-efficient world. The NESEA community, known for its technical expertise and aspirational ideas, has been promoting sustainable building practices, renewable energy, and resilient regenerative communities for over four decades.

BuildingEnergy 16, a conference and trade show for renewable energy and high-performance building practitioners, will continue the tradition of sharing best practices, measured successes, and lessons learned related to different building types and communities. And while the focus of each educational session is unique, the sessions share a common commitment to addressing the burning questions of our diverse community of practitioners.

The topics covered will include:

- **Best Building Practices** – From single-family houses to large institutional buildings, from renovations to new construction – what are the best building practices? What can we do better? What new practices, techniques and applications are on the horizon?
- **Myths and Traditions** – What are the critical assumptions that underlie our work? Which do we need to re-examine and why? For instance, is moving to all-electric buildings best? Is superinsulation the greenest strategy? Are individual net-zero buildings the greenest strategy? Where and how do we need to think differently?
- **Water and Carbon** – What are the footprints of our decisions about water and energy? How do we measure and evaluate our decisions?
- **Data and Metrics** – What are the numbers we have and the ones we need? What do the numbers tell us? What metrics should we be targeting? How do we know if we are progressing toward a healthy, resilient and regenerative world?
- **A Changing World** – Vulnerabilities to rising water, increased storms, and changing ecosystems affect our human habitats. What do we need to know?
- **Outreach** – How can best practices become the norm in the building and energy fields? How can we transform not just what people think, but what they do?
- **People and Place** – Have we forgotten beauty? Do we remember placemaking? Have we forgotten fun? What does a sustainable world look like?
- **Policy and Codes** – How can policies and codes better support a sustainable world? Which are most important to change and why? What programs are exceeding codes and setting new models?
- **Excitement** – What’s out there? What technologies are most exciting? Renewables? Energy storage? Better products? Better controls? What’s happening in Europe? What are the case studies and successes that inspire our work?

The unique strength of BuildingEnergy is the professional diversity of the community. The conference draws from decision makers and practitioners across a wide range of scales and sectors. From builders, architects and engineers to owners, developers and policymakers, BuildingEnergy affords each of us an opportunity to learn from our peers both within and outside our regular spheres of practice. From the workshops, exhibitors and tours on Tuesday to the Wednesday keynote and the wrap-up on Thursday, it is the not-to-be-missed event for knowledge, inspiration, challenges, experience and community.
NEW YORK COMPETES WITH BOSTON IN ENERGY EFFICIENCY

Editor’s Note: The article below is a dialogue between F.L. Andrew Padian and Charles Komanoff.

WHY NEW YORK CITY IS #2: A BUILDINGS GEEK LEARNS THE IMPORTANCE OF TRANSPORTATION IN A YANKEES VS. RED SOX WORLD

THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE) RECENTLY RELEASED ITS NEW “CITY ENERGY EFFICIENCY SCORECARD.” CASTING AWAY LOGIC (AND FOR THE SECOND CONSECUTIVE TIME), THE REPORT RANKED BOSTON #1 AND NEW YORK #2.

HERE’S THE RUB. IN THE TABLE SHOWN ON THE NEXT PAGE ARE ACEEE’S SCORES FOR THE TWO CITIES. (BOSTON WON BY A COMPARATIVE BILL BUCKNER ERROR.) AS YOU CAN SEE, BOSTON’S VICTORY MARGIN WAS IN 1) LOCAL UTILITY PROGRAMS AND 2) TRANSPORTATION POLICY.

IN ESSENCE, NEW YORK CITY LOST THE TROPHY BECAUSE NEW YORK STATE DOESN’T MAKE UTILITIES INVEST IN ENERGY EFFICIENCY IN NEW YORK CITY AS MUCH AS MASSACHUSETTS DOES IN BOSTON. ALSO, NEW YORK STATE IS BLOCKING PROGRAMS TO REDUCE CAR TRAFFIC IN AND AROUND NEW YORK CITY.

YES, THAT’S NEW YORK’S STATE POLICIES. THE DECISIONS THAT MOST CRITICALLY SHAPE TRANSPORTATION IN NEW YORK CITY – CONCERNING FUNDING FOR MASS TRANSIT AND CHARGING DRIVERS A “SOCIAL PRICE” FOR CAR USE – ARE MADE IN THE STATE CAPITAL.

THAT WOULD BE ALBANY. THE LOCATION AND CULTURE OF ALBANY ARE IN A MARKED CONTRAST TO THOSE OF NEW YORK CITY. WHEREAS ANY STATE DECISIONS AFFECTING BOSTON ARE MADE IN THE CAPITAL OF MASSACHUSETTS. THAT WOULD BE BOSTON. IN THE SAME WAY THAT ANYWHERE A FEW MILES OUTSIDE OF THE BOSTON METRO AREA IS CONSIDERED “WESTERN MASS,” THE COUNTIES NORTH OF THE BRONX ARE CONSIDERED BY MANY TO BE “UPSTATE.”

IT IS EASIER FOR MASSACHUSETTS, A STATE OF FEWER THAN SEVEN MILLION, TO INVEST IN ITS CAPITAL AND THE METRO REGION, THAN IT IS FOR NEW YORK TO DO THE SAME.

70 PERCENT OF THE STATE’S POPULATION LIVES WITHIN THE BOSTON METROPOLITAN AREA. IN NEW YORK STATE, ADD WESTCHESTER AND LONG ISLAND TO NEW YORK CITY, AND THE POPULATION IS 11.9 MILLION OF 19.1 MILLION STATEWIDE, A RESPECTABLE 62 PERCENT.

BUT NEW YORK CITY IS NOT THE CAPITAL – AND AS THEY SAY, ALL POLITICS ARE LOCAL. NEW YORK STATE CONTINUALLY REBUFFS POLICY PROPOSALS THAT COULD HELP NEW YORK CITY RESIDENTS.

IF NEW YORK CITY IS #2, IT’S BECAUSE WE HAVE ARCHAIC POLICIES THAT ALLOW PEOPLE TO DRIVE INTO MANHATTAN WITHOUT PAYING A CHARGE FOR CONTRIBUTING TO CONGESTION. IT IS A SAD AND COWARDLY REFUSAL OF UPSTATE LEGISLATORS, WHOSE ONLY PEDESTRIAN TRAFFIC INVOLVES WALKING TO THEIR CARS, TO UNDERSTAND THE DEPTH OF HEALTH, MONETARY AND CARBON BENEFITS NEW YORK CITY AND ITS METRO AREA WOULD GET FROM CHANGING THE WAY WE TREAT VEHICLES ENTERING THE HEART OF THE CITY.

THE BUILT ENVIRONMENT, RATHER THAN TRANSPORTATION, IS OUR FIRST CONCERN AT NESEA. BUT OUR HEADS WERE SPUN AROUND BY PROJAL DUTTA OF THE METROPOLITAN TRANSPORTATION AUTHORITY IN NEW YORK AT A RECENT NESEA ANNUAL MEETING. HE REMINDED US THAT A SUPER-EFFICIENT OFFICE BUILDING IN A BIG CITY IS SIGNIFICANTLY MORE EFFICIENT THAN ITS COUNTERPART IN THE SUBURBS BECAUSE ITS EMPLOYEES OFTEN TAKE MASS TRANSIT, WALK OR BIKE TO WORK. IN THE SUBURBS, IT’S ALL ABOUT “ARCHITECTURE.”

SOME OF THOSE “EFFICIENT” SUBURBAN BUILDINGS, DUTTA POINTED OUT, USE FIVE TO TEN TIMES MORE ENERGY IN TRANSPORTING WORKERS TO THEIR PREMISES THAN THEY USE IN POWER AND HEAT. THIS MAKES THE WONDERFUL
The building design is insignificant in comparison to the energy and carbon created by the cars. Added to that is the space wasted for these typically low-rise buildings. Ugh.

The fact that cars use more fuel energy than efficient buildings do is known to many; the stark reality was discussed after Dutta’s presentation. Some expressed both concern and resignation that our work in buildings was putting our “energy” in the wrong sector.

We talk about transit-oriented development and we are all “enviros,” but most of our conference attendees drive their cars or fly to our Boston BuildingEnergy conference while most take mass transit to our New York City BuildingEnergy conference. Does this sound like a competition? Well, ask anyone – it is.

To understand the depth of this problem and compare New York City to Boston in transportation, I asked one of my first mentors, the true energy genius Charles Komanoff, to ponder the transportation contributions of energy efficiency and carbon in New York City and Boston.

For the record, New York City is the city with 29 World Series trophies. (That includes the Mets, who have two; I forgot whom they beat the last time they won.) I’m just sayin’.

---

ACEEE’s 2015 Energy Efficiency Scores for Boston and New York City

<table>
<thead>
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<th>Category</th>
<th>Boston Rank</th>
<th>Boston Score</th>
<th>New York Rank</th>
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<td>19.5/28</td>
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<td>17.5/28</td>
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</tbody>
</table>

Source: The 2015 City Energy Efficiency Scorecard
Published by American Council for an Energy-Efficient Economy
aceee.org/research-report/u1502
NESEA is excited to unveil its new database of high-performance buildings on October 15, 2015 at BuildingEnergy NYC, beginning with this past year’s Zero Net Energy Building Award winner, the Giordano-Smeltz residence.

To construct a net-zero home today, builders need to simply follow “The Formula:” insulate using the R20-40-60 rule, get the ACH50 below 0.6, use triple-pane windows, and install a 5-10 kW PV system. The question now is how to bring down costs, get by with a smaller PV system and decrease the energy needed to create the building.

When building this residence, Spartan and Hannah answered the call to improve upon “The Formula” – not through any single measure but through a myriad of small design solutions, most of which, like passive solar, incur little or no additional cost.

Last winter, the average indoor temperature of the Giordano-Smeltz residence was 68 degrees, while the heat pump used a mere $190 worth of electricity. Also, during the first year of operation, the 4.5 kW PV system produced a 500-kWh surplus, easily securing a net-positive title for the all-electric home.

Although it is important to decrease the operational costs of a building, this year's winners chose to focus on the often-overlooked embodied energy of construction. Throughout construction, they made an effort to use recycled or second-market products and decrease the use of materials with heavy carbon footprints like concrete, aluminum, drywall and foam.

To dive into the data and learn more about this masterful building, visit NESEA’s BuildingEnergy Case Study Database today: 

nesea.org/case-studies

Explore other high-performance buildings at: nesea.org/case-studies
Andy is too kind. But on the matter at hand – whether Boston deserves top billing over New York City in ACEEE’s energy efficiency report – I think he’s absolutely right: we New Yorkers wuz robbed. ACEEE’s scoring didn’t take into account the fact that New Yorkers drive much less than Beantown residents.

Indeed, residents of Boston drive around two-thirds more miles per person than residents of New York City. Even downgrading New York City for its preponderance of stop-and-go traffic, which adds to its emissions per mile, Boston’s per capita CO₂ emissions from motor vehicles are 50 percent higher than New York City’s: an estimated 16.5 pounds of carbon dioxide per Beantown resident per day vs. 10.8 per New Yorker. (These figures apportion all miles driven in each city among city residents only, which probably overstates per-capita miles, but it does not bias the city comparison.)

Many factors account for this difference between the two cities. The top ones are these:

1. Traffic congestion is more intense and widespread in New York City. While that raises per-mile emissions, it erodes the utility of driving and thus reduces New York City’s miles driven per capita.
2. New York City has twice Boston’s population density. With all else equal, density reduces driving since more destinations are in proximity and thus are more reachable by walking, bicycling and transit use.
3. At least two and arguably all four of the above factors are policy-driven. Round-trip tolls on eight different New York City tunnels and bridges easily exceed $10. That high level is for the explicit purpose of financing mass transit.
4. Moreover, those tolls are only one of a number of fees and taxes on petroleum products, payrolls, real-estate transactions, and general sales that finance operations, upgrades and expansion of the regional transit network.
5. And recently, in a nascent but striking turnaround from the prior century, city government policies are taking street space from drivers and allocating it to bus riders, walkers and bicycle riders – in effect, ratifying traffic gridlock rather than seeking to accommodate it. Moreover, the last-listed factor militating against driving, New York’s density, is itself enabled by the ubiquity of mass transit.
Now let’s put driving in context. By coincidence, New Yorkers’ daily CO₂ footprints from electricity and driving are virtually identical: 10.5 and 10.8 pounds per person per day, respectively. (The national average for electricity, by the way, is around 38 pounds.)

In New York City’s low electric carbon footprint, we see the impact of both small residences and a per-kWh CO₂ emission rate that’s barely half the national average due to domination by natural gas (63 percent) supplemented by nuclear power (27 percent).

I haven’t been able to calculate Boston’s per-capita electricity carbon footprint, but it would be surprising if it was even close to New York City’s.

Returning to driving: the upshot is that New York City’s five-to-six pounds-per-day advantage over Boston is both a big deal numerically and largely an outcome of public policy.

This makes it somewhat bizarre that the ACEEE scorers ranked Boston ahead of New York in transportation policies – by 19.5 points vs. 17.5 points. Simply reversing those scores would have offset Boston’s net advantage of two points in the other criteria, leading to a tie in the overall score.

I’m well aware that the ratings are at least as much about policies as outcomes. That’s why I took pains to elucidate that New York City’s lead over Boston in driving-related carbon emissions is largely policy-driven.

Moreover – and here I build on an argument Andy advanced above – our automotive carbon footprint would be lower still, but the state legislature refuses to let us reform our road and bridge tolls and rationalize both driving and transit.

Albany’s rejection in 2008 of then-mayor Michael Bloomberg’s congestion pricing initiative is well known.

Less widely-recognized is the newer toll plan advanced by advocates including myself that would have fixed the inequities in the Bloomberg proposal and created a robust new revenue stream to finance the next tranche of subway improvements. I say “would have” because our plan has run into the same legislative brick wall.

Our plan, called Move NY, would charge drivers to enter and leave Manhattan south of 60th Street while cutting by nearly half the toll rates on outer-borough bridges like the Triborough Bridge and the Verrazano-Narrows Bridge. The net revenue, capitalized, would plug the $15-billion hole in the Metropolitan Transportation Authority’s next capital plan, letting the transit agency modernize its creaking subways that are straining to carry record numbers of riders.

Our proposal represents the boldest conception for meeting the city’s transportation and traffic needs since the revolutionary (and destructive) highway-building in the early Robert Moses era 80 years ago. Its promise to lower tolls on all seven Moses bridges would end decades of forcing outer-borough bridge users and long-haul truckers to fund transit so that a million car trips a day into and out of the gridlocked Manhattan core can remain un-tolled. The monetary gains in air quality, street safety, and, above all, time savings for drivers and transit users alike would outweigh the new tolls by two to three billion dollars a year, by my estimates.

Interestingly, the reduced carbon footprint accounts for only one to two percent of this net benefit. This is a measure of the fact that the vehicle trips which the Move NY plan would toll are only a tiny fraction of citywide vehicular travel. The tolls are meant not to eliminate these auto trips but to charge a social price for them: don’t ban the cars, bill them. The plan’s real carbon benefit would come from enabling our inherently green city to function and grow and thus absorb a million or more new people and jobs that would otherwise flow to some car-dependent suburban ring.

While our plan’s poor prospects make for a bitter pill, the blame shouldn’t be pinned on the city, where support has been robust. But notwithstanding this setback, New York City’s clear and largely policy-driven supremacy in vehicular carbon emissions is hard to reconcile with Boston’s getting the nod on transportation policies. “Deflate-gate” it’s not, but you gotta wonder if ACEEE’s judges, like the refs in last winter’s American Football Conference championship, were mesmerized by Brady and Belichick and took their eyes off the ball.

New York City’s clear and largely policy-driven supremacy in vehicular carbon emissions is hard to reconcile with Boston’s getting the nod on transportation policies.

ABOUT THE AUTHORS

Charles Komanoff is an activist, economist and policy analyst. He directs the Carbon Tax Center and develops traffic-pricing modeling tools for the Nurture Nature Foundation. His work includes books (Power Plant Cost Escalation, Killed by Automobile, The Bicycle Blueprint), computer models, scholarly articles, and journalism. An honors graduate of Harvard in math and economics, Charles lives with his wife and two sons in lower Manhattan.

F.L. Andrew Padian is a private consultant with 35 years of experience in the building science of multifamily buildings. He has performed energy analyses and successful solutions on thousands of buildings across the country. He is a frequent contributor to sustainable publications and speaks nationwide. A NESEA board member, he is an active volunteer in New York City’s Urban Assembly School for Green Careers, Clinton Community Garden, and GreenHomeNYC.

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This book radically reframes the approach for people to take to address global warming. To make this book work for you, you have to suspend your historical assumptions and work with the material. Let it churn your heart and soul rather than using your mind. When you engage with the book in this way, it will change how you think, act and are in the world.

The key is in the book’s subtitle: “Toward a New Psychology of Climate Action.” The book is based on psychology and the spirit first and science second. Let’s make the change we want personal – solo and with others – and not global. It is a bottom-up approach.

Per Espen Stoknes, a psychologist and economist from Norway, aims to change the conversation and practice of what we do to reduce carbon emissions. He is a colleague, and like me, a student of James Hillman – one of the creators of archetypal psychology.

My love of cities and place comes from Hillman. Hillman built on the work of Carl Jung and Alfred Adler, but challenged and went beyond both of them. This kind of psychology and Stoknes’s book are rooted in universal, ancient patterns of understanding and behavior with a heavy dose of aesthetics such as “breathing in the soul of the world.” Hillman described this approach in 1975 in his book, “Re-Visioning Psychology.”

The book unfolds in three sections that focus on thinking, doing and being.

THINKING: UNDERSTANDING THE CLIMATE PARADOX

This book does not refute that the climate is changing – and not for the better. Rather, it invites us to let go of many decades of using four approaches: rationality, data, doomsday prophesies, and global policy change.

The more the science and data are presented to those who are not aligned with them, the more people go numb. Keep pounding with the logic and data and even more resistance rises up.

In archetypal psychology, rationality and data are Apollo-driven, using this approach: “I am in charge, so follow my command and control over you.” Follow me. And right now there are two different Apollos – those aligned with and those positioned against the conditions of a changing climate.

It is like dueling banjos with no resolution – each banjo keeps notching it up. And now we are numb. So Stoknes suggests we stop playing both banjos by putting the facts in our back pockets and using them “just in time,” when they come up in conversation with others. Lead with your doing and being.

DOING: IF IT DOESN’T WORK, DO SOMETHING ELSE

John Dewey loved to say all learning springs from doing. Then after doing, create the space to reflect on what you did. And sometimes the reflection leads, if necessary, to a change in the next doing. This is
the essence of what Stoknes asks of us. Let’s not get trapped in our old short lists of to-dos. Try stuff. Experiment. And make the doing both personal and communal.

Instead of talking about destruction and demise, using mounds of data, state a vision of what is possible. Explain there is Herculean work to do for us to get there. People will engage in what is possible. Affirm what is possible, but not with a guarantee.

My old teacher, Robert Fritz, author of “The Path of Least Resistance,” taught students to focus on the vision of what they want to create and not the current reality – the doom.

By doing this, you can move beyond current reality into actualizing what you want to create. Fritz used to teach this way of working by holding a rubber band between his two hands with each hand representing structural tension. One end of the rubber band, the top, was the vision of what one wants to create. The other end was current reality – below the vision hand. Since all tension seeks resolution, focus on what is to be created. It can happen.

In our doing, Stoknes asks us to focus on our locality and nurture its sense of place. What actions can you take that reduce carbon use? Show people what you are doing without demanding they do the same.

His premise, based on social psychology research, is this: people change their behavior more when part of and influenced by a group of peers or a social network of people they value because they want to be included in what is happening.

People want to belong. They want to be part of the local crowd doing stuff. Reflect on what you see everywhere with more people recycling and composting now than before. Banging them over the head with logic and facts turns the next potential change-agents away from change.

Being with the pain or the depression of climate destruction is what matters. Depression is a teacher of what the soul of the world wants us to do. It is as important as saying “Up – let’s do it.”

Throughout the book, Stoknes tells his stories of insights as he reframes what is happening to him and his assessment of the planet. His personal stories are one part of what makes the book a compelling read.

**TAKING IN OUR CHARGE: MAKE CHANGE**

To take in the power of this book, we must suspend our reliance on a historical framework, lists of facts, and once-proven practices about climate. We are invited to take on the roles of local doers and storytellers.

Lead by example and make it personal. Work in groups. Again, feel the Earth’s pain and share that pain with others. It is not about wallowing in the pain. It is about having the courage to create change, locally and with others. And when you are sad, you are sad and that is OK.

Gandhi said it best: “Be the change you wish to see in the world.”

**ABOUT THE AUTHOR**

Robert J. Leaver has more than 43 years of experience organizing more than 500 projects for clients in the Northeast. He is a community psychologist. As a convener, facilitator and provocateur, he has led thousands of groups on the journey from confusion to clarity – managing each group’s unique dynamic to help people generate their best thinking, identify the connections to required capabilities, and implement a fresh plan of action. His passions and areas of focus: cities, place and community; the future of teaching and learning; and the impact of digital technology on everything. His company is New Commons.
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Advanced Solar Products, Inc (ASP) has been in the business of designing, building and maintaining solar photovoltaic systems for over 21 years. As leaders in the development of renewable energy policy and promoting green (LEED) construction, the principals of Advanced Solar Products have been instrumental in moving the solar industry forward for the past two decades.
Specialties: Alternative Energy, Photovoltaics

Aegis Energy Services
55 Jackson St.
Holyoke, Massachusetts 01040
413-536-1155
info@aegisenergyservices.com
http://www.aegisenergyservices.com
Aegis will design and install a solar electric or solar thermal system ideally suited to your needs. We are fully licensed in CT and an approved CCEF installer.
Specialties: Photovoltaics, Solar Thermal

Air Barrier Solutions, Inc.
257 Middle Road
Crown Point, New York 12928
518-597-4503
lharmon@airbarriersolutions.com
http://www.airbarriersolutions.com
We provide air barrier and insulation inspection/audit services, including bulk foam installation, across the U.S. and Canada. All of our projects begin with a state-of-the-art diagnostic evaluation. Customized retrofit plans are developed for each building. The scope of the work is implemented by Air Barrier Solutions own crews and project managers, using proprietary, quality assurance, and measurement verification methodologies.
Specialties: Consultancy, Energy Auditing, Insulation

Alap Contractors
444 Francisco St.
San Francisco, California 94133
205-417-1054
alapcontractors@gmail.com
Specialties: Building Design - Construction, Energy Conservation, Remodeling/DER

Aley Building Contractors
185 Wilton Road
Westport, Connecticut 06880
203-322-3933
jaley@jaley.com
http://www.jaley.com
We specialize in energy-efficient home remodeling, green building and historic preservation. Our projects include additions, bathrooms, kitchens and whole-house renovations that blend seamlessly with the architectural style and period details of your home while enhancing its energy efficiency, functionality and comfort.
We pride ourselves on attention to detail, and re-endorse our commitment to high standards through ongoing education in energy-efficiency and sustainable-building materials and methods.
We strive to establish a relationship with our clients based on trust and integrity. Whether an addition, historic renovation, energy-efficiency improvements or new Energy Star home, we maintain the highest standards and see each project through, from inception to completion.

Allied Building Contractors, LLC
1234 West Hill Road
Roxbury, Vermont 05669
802-485-3563
info@alliedbuildingvt.com
http://www.alliedbuildingvt.com/
Allied Building Contractors is a unique design/build general contracting firm in Central Vermont that has a focus on both the quality of the end result and the client’s experience throughout the entire process of the project.

a3E Store Inc.
43 Broad St. Suite A408
Hudson, Massachusetts 01749
877-878-4060
sascha.deni@altestore.com
http://www.altestore.com
Founded in 1999, a3E, Inc. has catered to customers on every continent of the globe. A 2006 Inc. 500 awarded company, a3E aims to continue to fulfill its motto, Making Renewable Do-able, by offering cost competitive and high-quality renewable energy related products to Solar Installers and Do-It-Yourselfers.
Specialties: Photovoltaics, Solar Thermal, Wind
Apricus USA, Inc.
1150 South Milliken Ave.
Ontario, California 91761
909-374-9800
inquiry-usa@apricus.com
http://www.apricus.com
Apricus is a leading designer and manufacturer of solar hot water and hydronic heating products. Founded in 2003 by Australian Mick Humphreys with a specific focus on solar thermal solutions, Apricus has since grown into a global company with distribution and support offices worldwide.

Atelier Ten, LLC
45 East 20th St. Floor 4
New York, New York 10003
212-254-4500
newyork@atelierten.com
http://www.atelierten.com
Atelier Ten are environmental designers and building services engineers committed to the application of low-energy and sustainable design principles. Our core objective is to develop well-integrated buildings with simple systems that work with the natural

Auburndale Builders
305 Auburn St.
Newton, Massachusetts 02466
617-467-4171
nick@auburndalebuilders.com
http://www.auburndalebuilders.com
We are passionate about high-performance homes: new construction, renovation, Passive and Net-Zero. Our team knows the integrated process necessary for a truly high-performance home and works with the right experts to ensure excellent results. We believe in making the process as good as the product to enhance the lives of those who live there.

Baker & Lewis Architects
243 Jackson Road
Shavertown, Pennsylvania 18708
570-675-8843
mbaker@bakker-lewis.com
http://www.bakker-lewis.com
We are a small architectural firm specializing in designing new and retrofitting existing buildings which are both responsive to individual needs and that contribute to a greener environment.

Bales Energy Associates
50 Miles St.
Greenfield, Massachusetts 01301
413-863-5020
bart.bales@balesenergy.com
http://www.balesenergy.com/
Bales Energy Associates provides whole building energy analyses; high-performance mechanical design; and solar energy & wind energy systems analysis & design services.

Barnstable Water Pollution Division
617 Bearses Way
Hyannis, Massachusetts 02601
508-790-6335
peter.doyle@town.barnstable.ma.us
http://www.townofbarnstable.us/WaterPollution/
The Water Pollution Control Program, an enterprise account-funded program under the Department of Public Works, manages a wastewater collection, treatment and disposal system, including the operation and maintenance of a secondary wastewater treatment plant, 30 sewage pump stations and 55 miles of sewer lines. The Program also includes the operation of a pretreatment program and a laboratory for testing the quality of sewage and septage to prevent the introduction of toxic wastes into the system and to ensure compliance with Federal and State regulations. In addition, the Program manages an accounts receivable and billing system for users of the sewer system.

Bakker & Lewis Architects
243 Jackson Road
Shavertown, Pennsylvania 18708
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http://www.bakker-lewis.com
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Specialties: Building Design & Construction, Energy Conservation, Remodeling/DER

Bales Energy Associates
50 Miles St.
Greenfield, Massachusetts 01301
413-863-5020
bart.bales@balesenergy.com
http://www.balesenergy.com/
Bales Energy Associates provides whole building energy analyses; high-performance mechanical design; and solar energy & wind energy systems analysis & design services.

Specialties: Building Design & Construction, Energy Conservation, Remodeling/DER

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Specialties: Cities & Communities

Andelman and Lelek Engineering
1408 Providence Highway
Norwood, Massachusetts 02062
781-769-8773
mike@andelmanlelek.com
http://www.andelmanlelek.com
Andelman and Lelek Engineering, Inc. is an engineering consulting and design firm specializing in building energy modeling, energy efficiency consulting, commissioning services, design of energy efficient HVAC systems, and facilities planning and sustainable building development as related to mechanical systems. We have provided energy modeling and analysis services to utility companies, architects, engineers, and building owners since 2002. Our staff of nine includes six mechanical engineers and one electrical engineer. The two principals have over forty-five years of energy modeling experience.

Specialties: Energy Auditing, Energy Conservation, Engineering

Antioch New England Graduate School
40 Avon St.
Keene, New Hampshire 03431
603-283-2107
jfiderio@antioch.edu
http://www.antiochne.edu
In addition to an institutional commitment to sustainability and social justice, AUNE offers the MBA in Sustainability (Green MBA). Competency in sustainability methods, systems thinking, leadership, and collaboration is developed across our integrated curriculum. Our 36-credit MBA in Sustainability is a 2-year weekend program.

Specialties: Commercial & Institutional, Education

Apricus USA, Inc.
1150 South Milliken Ave.
Ontario, California 91761
909-374-9800
inquiry-usa@apricus.com
http://www.apricus.com
Apricus is a leading designer and manufacturer of solar hot water and hydronic heating products. Founded in 2003 by Australian Mick Humphreys with a specific focus on solar thermal solutions, Apricus has since grown into a global company with distribution and support offices worldwide.

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http://www.atelierten.com
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We are passionate about high-performance homes: new construction, renovation, Passive and Net-Zero. Our team knows the integrated process necessary for a truly high-performance home and works with the right experts to ensure excellent results. We believe in making the process as good as the product to enhance the lives of those who live there.


Austin Design, Inc.
16 Call Road
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413-624-9669
office@austindesign.biz
http://www.austindesign.biz
Austin Design, Inc. provides architectural design services for homes, businesses and communities. We advocate a team approach between client, builder and architect that encourages the sharing of expertise and a passion for good design.


Baker & Lewis Architects
243 Jackson Road
Shavertown, Pennsylvania 18708
570-675-8843
mbaker@bakker-lewis.com
http://www.bakker-lewis.com
We are a small architectural firm specializing in designing new and retrofitting existing buildings which are both responsive to individual needs and that contribute to a greener environment.

Specialties: Building Design & Construction, Energy Conservation, Remodeling/DER

Bales Energy Associates
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http://www.balesenergy.com/
Bales Energy Associates provides whole building energy analyses; high-performance mechanical design; and solar energy & wind energy systems analysis & design services.

Specialties: Building Design & Construction, Energy Auditing, Photovoltaics

Barnstable Water Pollution Division
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The Water Pollution Control Program, an enterprise account-funded program under the Department of Public Works, manages a wastewater collection, treatment and disposal system, including the operation and maintenance of a secondary wastewater treatment plant, 30 sewage pump stations and 55 miles of sewer lines. The Program also includes the operation of a pretreatment program and a laboratory for testing the quality of sewage and septage to prevent the introduction of toxic wastes into the system and to ensure compliance with Federal and State regulations. In addition, the Program manages an accounts receivable and billing system for users of the sewer system.

Specialties: Cities & Communities
Basnett Design/Build/Remodel  
14 Gilson Road  
Littleton, Massachusetts 01460  
978-952-2552  
jim@basnettldr.com  
http://www.basnettldr.com  
Full service residential remodeling company with extensive experience in all phases of residential construction. We are passionate about energy efficiency, durability, low maintenance, and indoor air quality and bring that passion to every job that includes repair or modification to the building envelope and/or mechanical systems.  
Specialties: Building Design  Construction, Remodeling/DER  

Baukraft Engineering  
307 14th St.  
Brooklyn, New York 11215  
347-674-4287  
cramer@baukraft.com  
http://www.baukraft.com  
Baukraft Engineering provides design and consulting services for high-performance buildings in the residential and small commercial market, focusing on HVAC systems and enclosure design—detailing for both new construction and renovation projects. Certified (CPhC) Passive House Consultant and Professional Engineer (PE) on staff.  
Specialties: Building Design  Construction, Consultancy, Home Inspection  

Benjamin & Company, Inc.  
136 Maine St. #3  
Brunswick, Maine 04011  
207-729-7171  
ben@benjamin-co.com  
http://www.benjamin-co.com/  
With a blend of fine New England craftsmanship and innovative, modern building methods, Benjamin and Company Timber Frames and Custom Homes proudly offers a broad range of custom home building resources in Midcoast Maine including creative design, fine construction, and general contracting.  

Bensonwood Homes  
6 Blackjacq Crossing  
Walpole, New Hampshire 03608  
877-203-3562  
info@bensonwood.com  
http://www.bensonwood.com  
Bensonwood is acknowledged as a premier designer-builder of energy-efficient timber frame, hybrid and other high-performance homes and commercial buildings. Our mission is to find better ways to build, while consistently improving people’s lives. Bensonwood is also deeply engaged in bringing a vision of sustainability to the future of housing. We understand that the housing industry must change so it is both responsive to the consumer and responsible to the earth. To create a sustainable society one must build sustainable homes—with approaches to home building that link beauty and craft, ecology and wise resource use, simplicity and elegance.  
Specialties: Building Design  Construction, Design Process  

Berkshire Photovoltaic Services (BPVS)  
46 Howland Ave.  
Adams, Massachusetts 01220  
413-743-0152  
info@bpvs.com  
http://www.bpvs.com/  
Since 1985, the highest quality design and installation of efficient and durable photovoltaic systems for residential, commercial & institutional customers. Visit www.BPVS.com for more information!  
Specialties: Alternative Energy, Energy Conservation, Photovoltaics  

BETTER, Inc.  
7 Kilburn St. Suite 210  
Burlington, Vermont 05401  
802-540-0843  
david@photonica.bz  
http://www.better-bee.com  
EFFICIENCY THE BETTER WAY-From strategic planning and design, to project financing, better helps its clients to achieve their goals of highly energy efficient buildings and communities worldwide.  
Specialties: Building Design  Construction, Research, Finance/CPA  

Beyond Green Construction  
13 Terrace View  
Easthampton, Massachusetts 01027  
413-529-0544  
info@beyondgreen.biz  
http://beyondgreen.biz/  
Beyond Green Construction is a family owned and operated green building company based in Easthampton, MA. The BGC family, Sean, Andy and Jamey Jeffords, were raised in a tradition of craftsmanship, developed through apprenticeships with their father’s company specializing in historic restoration and fine woodworking. The brothers honed their skills with additional education and experience for cutting edge green building, insulation and alternative energy techniques to prepare properties to meet the energy challenges of the 21st Century.  
Specialties: Remodeling/DER, Insulation  

Black Mountain Design Build  
16 Academy St.  
Saranac Lake, New York 12983  
518-354-8340  
info@blackmountaindesignbuild.com/  
Black Mountain Design Build provides exceptional service, thoughtful design, and step-by-step education enabling clients to meet their goals. The firm specializes in high quality, regionally focused design; high performance energy consulting; and ecologically sensitive landscape design. With a focus on sustainable design, BMBD can help clients achieve a variety of objectives from LEED certification and NetZero energy use to ensure that your home is healthy and situated gracefully on its site.  

Blake Group  
4 New Park Road  
East Windsor, Connecticut 06088  
800-353-1100  
sales@blakequip.com  
http://www.blakequip.com  
The Blake Group is a specialty distributor and manufacturers’ representative offering solutions that allow sustained use of water and thermal energy resources. We serve our partners who design, build, maintain and manage these systems; providing innovation through technology and best in class products and services...for a better world.  
Specialties: Solar Thermal, Geothermal, Alternative Energy, Renewables  The Grid  

Blue Sea Development Company, LLC  
164 Main St.  
Huntington, New York 11743  
631-923-0081  
les.bluestone@blueseadev.com  
Blue Sea Development Company/Blue Sea Construction Company is an affordable housing developer/general contractor working primarily in the New York City metropolitan area.  
Specialties: Building Design  Construction  

BPC Green Builders, LLC  
523 Danbury Road  
Wilton, Connecticut 06897  
203-563-9909  
mike@bpcgreenbuilders.com  
http://www.bpcgreenbuilders.com  
Green building for new and existing homes based on building science and sustainability criteria. Award-winning builder with extensive local experience. 100% Energy Star. Certified Passive House, Multiple LEED homes, including four at Platinum. Certified Passive House Consultant services available.  
Specialties: Building Design  Construction, Consultancy, Remodeling/DER  

Brand Cool Marketing  
2300 East Ave.  
Rochester, New York 14610  
585-381-3350  
suekochan@brandcool.com  
http://brandcool.com/  
Business is a powerful force. And when it balances people, profit and planet, it works in everyone’s favor. Brand Cool is a B-Corp committed to empowering brands that build a better world by designing strategies, programs, integrating campaigns with humanity at their core. We’re also a proud woman-owned business (WBE) and an approved contractor for the U.S. General Services Administration (GSA) for specific advertising and integrated marketing solutions.  
Specialties: Marketing
Building Shelter, Inc.
P. O. Box 2297
Vineyard Haven, Massachusetts 02568
508-966-3757
info@buildingshelter.com
http://www.buildingshelter.com
We build homes from nature. Our construction practices are based on building science and the tradition of our trade. Our team is trained to understand how buildings work well and why they can cause harm. We are RESNET trained, a Certified Passive House Builder, Certified Passive House Consultant, EPA Lead Safe Certified Firm, certified Building Performance Institute Home Analyst Professional. Our carpenters are trained to understand that a house is more than parts assembly. A building incorrectly conceived and executed can be expensive to maintain and harmful to live in and harmful to nature on which we depend. We value honesty and good relationships with our clients, helping our community and respect for nature.

Specialties: Building Design & Construction, Consultancy

BuildingGreen, Inc.
122 Birge St. Suite 30
Brattleboro, Vermont 05301
802-257-7300
jerelyn@buildinggreen.com
http://www.BuildingGreen.com
BuildingGreen provides building industry professionals with well-researched information on environmentally sound building practices and green products. Online resources include BuildingGreen and LEEDeuser.


BuildingLogic, Inc.
P. O. Box 210
Gardiner, New York 12525
845-443-0657
lillianmaurer210@gmail.com
http://buildinglogicinc.com/
We design and build beautiful high performance homes. Our full service company integrates traditional craft, science, and modern design, to create durable efficient homes that people love to live in. Certified Passive House Consultant and Tradesperson.

Specialties: Building Design & Construction, Energy Conservation, Remodeling/DER

Bygmeister, Inc.
667A Sawmill Brook Parkway
Newton, Massachusetts 02459
617-527-7837
info@bygmeister.com
http://bygmeister.com
Bygmeister is a residential design/build remodeling firm founded in 1983. Our priorities for each project are comfort, durability, and efficiency and a unique level of accountability.

Specialties: Building Design & Construction, Remodeling/DER

C

CED Greentech East
15 Commerce Way
South Windsor, Connecticut 06074
860-436-5321
solarteam@cedgreentecheast.com
http://www.cedgreentecheast.com/
CED Greentech East serves East of the Mississippi in the ever-expanding solar industry. We work closely with installers and have both excellent service and extensive experience in the electrical and photovoltaic fields. Our goal is to meet your project requirements at a competitive price, and to manage and deliver your system in a timely and professional manner. Our stock of material and accessories will help complete your jobs without any holdups! Greentech personally handles daily deliveries throughout the region, ensuring that your complete system arrives on time and at no additional cost to you! We get low freight rates through our corporate account and your order will be shipped out same day.

Specialties: Photovoltaics

Celebration Contracting
736 Boston Post Road Suite C
Madison, Connecticut 06443
860-883-6200
bfreeman@celebrationcontracting.com
http://celebrationcontracting.com/
At Celebration Contracting we are proud to have been part of the emphasis on energy efficiency from its earliest phases when the Energy Star program began in the 1990’s. Since then, we have been major advocates and practitioners of Green Building. Our company is not only passionate, but as a team, we have extensive experience on the dirt knowledge and experience utilizing many types of energy-efficient construction practices while continuing our education and certification to keep abreast of the latest technologies and products as they become available.

Specialties: Building Design & Construction, Construction Process
Sustainable Green Pages

Celtic Energy, Inc.
701 Hebron Ave.
Glastonbury, Connecticut 06033
860-882-1516
info@celticenergy.com
http://www.celticenergy.com

Celtic Energy is an independent consulting firm founded to help energy users and associated organizations maximize their cost reduction and productivity benefits in the ever-changing energy marketplace.

Specialties: Alternative Energy, Beyond Energy

Center for EcoTechnology (CET)
320 Riverside Drive
Northampton, Massachusetts 01062
413-586-7350
susan.ash@cetonline.org
http://www.cetonline.org

The Center for EcoTechnology helps people and businesses in Massachusetts save energy and reduce waste. We make green make sense. For more than 35 years, we’ve offered proven advice and resources to save you money, make you more comfortable at home, and help your business perform better. As a non-profit 501(c)(3), CET works with partners throughout the region to help transform the way we live and work for a better community, economy, and environment.


Centerbrook Architects and Planners, LLP
67 Main St.
Centerbrook, Connecticut 06409
860-767-0175
coan@centerbrook.com
http://www.centerbrook.com

Centerbrook has been a leading firm in the practice of green and sustainable design since the 1970s. These are essential components of all its projects.


Central Home Energy Experts
9 North Maple St.
Woburn, Massachusetts 01801
781-813-0188
dhamilton@centralcooling.com
http://www.centralhomeenergy.com/

We recently opened a new division, Central Home Energy Experts, to help you prevent energy loss throughout your home all year round. We offer Mass Save® Home Energy Assessments as a Mass Save partner. We have the tools to provide a truly comprehensive home energy assessment. When we visit your home, we can evaluate its total energy envelope including duct work and ventilation, insulation and weatherization, heating and cooling efficiency, indoor air quality and more. As a Mass Save partner and accredited members of the Building Performance Institute, we are the HVAC experts you can trust.

Specialties: Energy Auditing, Energy Conservation, HVAC, Indoor Air Quality, Insulation, Single Family

Clark & Green Architects
113 Bridge St.
Great Barrington, Massachusetts 01230
413-528-5180
info@clarkandgreen.com
http://www.clarkandgreen.com/

Clark & Green, Inc. is committed to meaningful architectural design. Since 1988, it has applied its design principles to a variety of building types. In addition to residential work, the firm has executed major commercial, institutional and municipal projects. These include the adaptive reuse of an historic building into a mixed-use, six-screen cinema and the conversion of an athletic field house into a multi-use theater complex. The firm relies on strong relationships with consultants supporting the special needs of each project. Collaboration enables Clark & Green to integrate quality design with complex engineering requirements.

Specialties: Architecture

Clean Energy Design, LLC
11 Oak Lane
Osterville, Massachusetts 02656
508-563-6990
info@cleanenergydesign.com
http://www.cleanenergydesign.com

Clean Energy Design, LLC, was founded by Tom Wineman in 1996, to meet the growing need for quality renewable energy services in New England. CED handles every aspect of the design, construction, installation, and maintenance of residential and commercial solar photovoltaics and solar thermal panels and systems. In addition, we provide small wind energy solutions for residences, farms and businesses. We are committed to providing a comprehensive and thoughtful approach to the design and implementation of renewable energy systems including professional advice on financing, rebates, tax incentives and the sale of renewable energy credits (SRECs). Serving Cape Cod, Massachusetts, Rhode Island, Connecticut, New Hampshire, Vermont, South Eastern New England and beyond.

Specialties: Photovoltaics, Solar Thermal, Wind

Climate Change & Environmental Services, LLC
1506 Henry Ave.
Mamaroneck, New York 10543
914-584-6720
karell@ccesworld.com
http://www.ccesworld.com

Climate Change & Environmental Services (www.CCESworld.com) specializes in sustainability, energy, and environmental compliance. We deliver maximum financial and environmental benefits to our clients. For Sustainability and Energy, we perform carbon footprinting, ASHRAE I-III energy audits, develop strategies to reduce GHGs and energy usage, and manage such projects. For environmental compliance, we perform air and other emission inventories, compliance audits, strategic advice to cost-effectively comply, permitting, and design of APC devices and of appropriate monitoring, recordkeeping, and reporting systems. Climate Change & Environmental Services Principal Marc Karell, P.E., CEM has over 25 years of experience in these areas.


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Coastal Window & Exteriors, Inc.
100 Cummings Center #236H
Beverly, Massachusetts 01915
978-304-0495
svanderbilt@mycoastalwindows.com
http://mycoastalwindows.com/
You don’t want to settle for an ordinary company. Coastal Windows & Exteriors is a woman-owned exterior home remodeling company, a rarity in a male-dominated industry. Owner, Stephanie Vanderbilt, a former Teacher of the Deaf, is hard-wired to bring a full intensity to everything she does. Besides giving back to the community through work with local non-profits, she is committed to bringing empathy and passion for service to her business. She wants every homeowner to have the BEST customer experience—the kind of experience that 6E ‘wowed’ customers, had them raving to others, and make them loyal, lifetime customers.

Specialties: Roofing, Windows

Community Preservation Corporation
28 East 28th St. 9th floor
New York, New York 10016
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edeny@communitypty.com
http://communitypty.com/
A nationally recognized leader in affordable housing finance, CPC has provided a consistent source of capital to underserved housing markets throughout New York State since our inception, in 1974. CPC is committed to delivering financing, technical expertise and to working closely with a range of community partners to create and preserve affordable housing. Over our 39-year history, CPC has contributed to the preservation or creation of over 157,000 units of affordable housing, initiated numerous downtown revitalizations, and improved the quality and energy efficiency of the multifamily stock.

Specialties: Finance/CPA, Social Services

Con Edison Green Team
100 Summit Lake Drive
Valhalla, New York 10595
212-460-4771
nathanson@conedsolutions.com
http://www.conedsolutions.com/Home.aspx
Con Edison provides energy to 3.4 million customers in New York and Westchester County, New York. Newsweek recently named the company the ‘Greenest’ utility in the United States. To learn more about our energy-saving programs, visit coned.com/greenteam.

Specialties: Alternative Energy

Conergy
2460 West 26th Ave. Suite 280C
Denver, Colorado 80211
888-396-6611
info@conergy.us
http://www.conergy.us/
Conergy knows solar. For more than 15 years, we have been a global leader in providing clean, renewable solar energy. When you choose Conergy you can rest assured that you’re receiving the best possible solar solution and service.

Specialties: Photovoltaics

Conservation Services Group, Inc. (CSG)
50 Washington St. Suite 3000
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alisaa.holt@csgrp.com
http://www.csgrp.com
Conservation Services Group (CSG) designs and delivers cost-effective energy efficiency programs to help millions of homeowners save energy. As the most trusted leader in residential energy efficiency, we focus on engaging with customers to make smart energy decisions. CSG brings 31 years of experience and successful collaboration to everything we do. We work with utilities, state and federal agencies, housing authorities, communities, and others who want to increase program participation and reduce consumer energy use.

Specialties: Consultancy, Consumer Information

Cornerstone Architecture
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rhammad@cornerstonearchitecture.ca
http://www.cornerstonearchitecture.ca
Established in 1991, our firm has developed a wide range of experience in a variety of sectors from children’s facilities to seniors’ communities; as well as educational, administrative, healthcare, and community projects. Our clients include both public and private sector organizations, as well as not-for-profit groups and private individuals. As the leading firm in our region, we encourage all of our clients to consider opportunities for reducing the impact of their buildings on the environment.

Specialties: Architecture

Cotuit Solar, LLC
P.O. Box 89
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508-428-8442
conrad@cape.com
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Specialties: Multifamily, Single Family, Mechanical Systems & Lighting, HVAC, Photovoltaics, Wind

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Easthampton, Massachusetts 01027
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Specialties: Commercial & Institutional, Energy Auditing, Insulation, Multifamily, Single Family

The Crown Heights Jewish Community Council, Inc.
387 Kingston Ave.
Brooklyn, New York 11225
718-771-9000
mail@chjcc.org
http://www.chjcc.org/
The Crown Heights Jewish Community Council (CHJCC) was created in 1969 in response to deteriorating social and economic conditions in the Crown Heights neighborhood of Brooklyn, with the mission of assisting all people of the Crown Heights community with a focus on the rapidly growing Jewish population.

Specialties: Social Services, The Big Picture

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mdudlos@deapgroup.com
http://www.deapgroup.com
DEAP Energy Group provides comprehensive consulting services to improve the quality of life and energy efficiency of homes. Our work encompasses both new construction and existing home retrofits. We work on single-family homes, multi-family up to three stories, and small-scale commercial and institutional projects.

Specialties: Building Design & Construction, Energy Conservation, Remodeling/DER

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413-281-0046
joseph@decumanusgreen.com
http://decumanusgreen.com/
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astevens@dmilinc.com
http://www.dmilinc.com

DMI specializes in providing expert consulting and engineering services to improve energy efficiency and operation of commercial, industrial, institutional, and large-scale residential facilities. DMI has established itself as one of the most respected energy engineering firms in New England with unsurpassed attention to detail and quality.

**Specialties:** Energy Auditing, Energy Conservation

**Dietz & Company Architects, Inc.**
17 Hamden St.
Springfield, Massachusetts 01103
413-733-6798
office@dietzarch.com
http://www.dietzarch.com/

Dietz & Company Architects provides a full range of architectural services in both the public and private sectors. The breadth and depth of our experience is evidenced by our housing, education, healthcare, commercial, historic preservation and sustainable projects. In addition to planning memorable buildings, we’ve also helped to plan large, complex developments, including entire neighborhoods. Whenever possible, we seek to bring the benefits of integrated design into all types of projects.

**Specialties:** Architecture, Design Process

**Dominic Paul Mercadante Architecture**
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With over 20 years of experience I bring creativity and attention to detail to my practice of residential architecture creating buildings that perform well environmentally, functionally and aesthetically.

**Specialties:** Architecture, Building Design & Construction, Consultancy

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http://janusweltondesignworks.com/home/

Eco Architecture DesignWorks is a bridge-linking the contradictions, simplifying the complexities, and shaping an innovative design sensibility for the 21st century.

**Specialties:** Architecture, Design Process

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**Specialties:** Alternative Energy, Commercial & Institutional, Photovoltaics, Single Family

**Eco_logic STUDIO, architecture & engineering, PLLC**
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http://www.eco_logicSTUDIO.com

**eco_logic STUDIO is an architecture, engineering and planning firm focusing on green design and community revitalization. Specializing in high performance new and retrofit design of custom homes, affordable housing, institutional facilities, commercial development, urban design and planning, and green infrastructure. Certified Passive House Designer, Architects, and Engineer on staff. Experience in natural building, solar systems and living roofs. Architectural registration in NY, NJ, MI, NC, SC, and CT.**

**Specialties:** Architecture, Building Design - Construction, Passive Housing, Roofing, Single Family, Cities & Communities, Consultancy, Design Process, Engineering, Envelope - Enclosure, Insulation, Multifamily, Net Zero Energy

**EcoRealty**
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**Specialties:** Real Estate

**Ely Beach Solar, LLC.**
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646-837-8580
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http://www.elybeach.com

Ely Beach Solar is a solar thermal company. We specialize in the design, installation, monitoring and control of solar hot water systems. Our focus is on commercial & large multi-family residential buildings in the New York City area.

**Specialties:** Solar Thermal, HVAC, Mechanical Systems - Lighting, Energy Auditing, Energy Conservation

**EcoRural Technologies, Inc.**
320 Sunnybrook Road
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**Specialties:** Passive House, Insulation, Manufacturing, Construction, Consultancy, Multifamily
The Green Engineer, Inc.  
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The Green Engineer, Inc. is a sustainable design consulting firm specializing in solutions to design, build, and operate buildings with improved energy efficiency and reduced impact on the environment. Founded in 2005 by Chris Schaffner, PE, LEED Fellow  
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Home Energy Technologies is a RESNET-accredited Home Energy Rating System Provider. Our services include HERS ratings, ENERGY STAR & NGBS certification, comprehensive home energy audits, building performance testing and other energy diagnostic and analytical services. Our clients include architects, builders and owners of single-family and multi-family homes in Connecticut and adjoining areas.
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Specialties: Building Design & Construction

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Hudson Valley Community College’s Malta facility, TEC-SMART, stands for Training and Education Center for Semiconductor Manufacturing and Alternative and Renewable Technologies. TEC-SMART serves as a community resource for demonstrating energy efficient design and building techniques and ties into several of the College’s education and training programs. Incorporating green building techniques, as well as passive solar design in construction it achieved US Green Building Council’s LEED platinum certification in 2011.
Specialties: Commercial & Institutional, Education, Money & Business

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Specialties: Building Design & Construction

Independence Solar
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http://independencesolar.com/index.php
Independence Solar is a developer and installer of turnkey commercial solar energy projects. Since 2007, their team of renewables experts have managed the development of over $200 million of solar projects, including the largest rooftop solar array (9 MW) in North America at the Gloucester Marine Terminal in NJ.
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Specialties: Engineering

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Specialties: Building Design + Construction, Remodeling/DER

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Specialties: Building Design + Construction, Consultancy, Remodeling/DER

Kraus-Fitch Architects, Inc. 110 Pulpit Hill Road Amherst, Massachusetts 01002 413-549-5799 mkrans@krausfitch.com http://www.krausfitch.com/ Kraus-Fitch Architects offers a full range of services emphasizing ecologically sound and socially responsible design. Our work ranges from deep energy retrofits and zero net energy buildings to cohousing communities and other smart-growth projects. Our interactive approach allows us to realize your vision with practical, innovative, and cost-effective solutions. Skilled in group process facilitation and active listening, we build consensus within families, communities, and building committees. We have received numerous awards for green design and smart growth development, are internationally recognized for our expertise in cohousing, and were named one of the Top Ten Green Architects for 2005 by Natural Home and Garden magazine.

Specialties: Architecture, Commercial + Institutional, Multifamily, Net Zero Energy, Remodeling/DER

Landmark Services, Inc. 326 Washington St. Annex Building Wellesley Hills, Massachusetts 02481 508-533-8393 brian@landmarkservices.com http://www.landmarkservices.com Landmark Services, Inc specializes in renovating and restoring period homes, and building new, energy efficient homes inspired by traditional architecture. We believe that saving old homes can and should be a key part of any sustainable housing strategy in New England and beyond. Building Zero Net Energy/Renewable new homes aligns with the principals’ life long passion for fostering and supporting sustainable innovation. We believe that it is our highest calling as builders, and citizens, to be conscious, compassionate stewards of the natural world. Wherever we can we support people and businesses that share this mission.

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*Specialties: Energy Auditing, Marketing, Remodeling/DER*

**Little Green Homes**  
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chris@littlegreenhomes.com  
http://www.littlegreenhomes.com  
*Little Green Homes, LLC is a residential design-build company focusing on healthy, durable and energy efficient new homes and renovation/ addition projects.*  
*Specialties: Building Design & Construction*

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*M.G. Kane Properties specializes in building Net Zero Energy “Attainable” homes.*  
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**Maclay Architects**  
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*Maclay Architects specializes in ecological planning and architecture, healthy building design, micro-load and net zero building design and received the 2012 NESEA Zero Net Energy Building Award. The firm’s project portfolio includes ten LEED Gold or Platinum certified buildings, and five net zero or net zero ready institutional and commercial projects. Bill Maclay and Maclay Architects authored a book titled: The New Net Zero: Leading-Edge Design and Construction of Homes and Buildings for a Renewable Energy Future, by Chelsea Green Publishing. Bill Maclay, AIA, LEED-AP, and founding principal of Maclay Architects, has been recognized as a leader in innovative, healthy, and ecological planning and architectural design since 1971.*  

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*Maine Association of Building Efficiency Professionals (MABEP) was established in 2009 to represent and advance the interests of businesses and individuals providing energy efficiency and renewable energy services and equipment, including but not limited to architects, builders, engineers, energy auditors, HVAC and electrical contractors, building envelope professionals, manufacturers and suppliers, and all other persons and businesses who seek to improve the energy efficiency of residential and commercial buildings and to reduce our dependence upon fossil fuels.*  
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*Specialties: Building Design & Construction*

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bpoor@massaudubon.org  
http://www.massaudubon.org  
*Mass Audubon works to protect the nature of Massachusetts for people and wildlife. Together with more than 100,000 members, we care for 35,000 acres of conservation land, provide school, camp, and other educational programs for 225,000 children and adults annually, and advocate for sound environmental policies at local, state, and federal levels. Founded in 1866 by two inspirational women who were committed to the protection of birds, Mass Audubon is now one of the largest and most prominent conservation organizations in New England. Today we are respected for our sound science, successful advocacy, and innovative approaches to connecting people and nature.*  
*Specialties: Consumer Information, Education, Public Policy*

**Massachusetts Clean Energy Center (MassCEC)**  
63 Franklin St. Floor 3  
Boston, Massachusetts 02110  
617-315-9311  
info@masscec.org  
http://www.masscec.org  
The Massachusetts Clean Energy Center (MassCEC) is dedicated to accelerating the success of clean energy technologies, companies and projects in Massachusetts, while creating high-quality jobs and long-term economic growth for the people of Massachusetts.  
*Specialties: Consumer Information, Education, Energy Conservation, Public Policy*

**McCauley Lyman, LLC**  
10 Speen St.  
Framingham, Massachusetts 01701  
508-665-5801  
inquiries@mccauleylyman.com  
http://www.mccauleylyman.com  
*McCauley Lyman advises people about energy and business law and represents them in business-related transactions. We have a particular focus on the energy industry, including energy regulatory agencies, and have done a great deal of work with all aspects of developing, financing and operating independent energy projects. We help people negotiate letters of intent and contracts, arrange financings, buy and sell businesses and their assets, resolve disputes, and do the myriad other things business people (and government officials who deal with business people) need to get done in order to accomplish their business objectives.*  
*Specialties: Consultancy, Public Policy*
Menck Windows
77 Champion Drive
Chicopee, Massachusetts 01020
408-593-3140
alanwall@menckwindows.com
http://www.menckwindows.com/
Menck Windows German Window Engineering now in America. This year, the U.S. will import over $150 million worth of windows to meet the increasing demand for energy-efficient building products. Because windows represent up to one-third of a building’s energy-loss, architects and builders have increasingly turned to German manufacturers for technologically advanced and highly engineered windows and doors. Recognizing that the need for energy-efficient, environmentally friendly, and competitively priced windows will continue to grow, Menck Windows USA is building a new manufacturing facility in the United States. The new U.S. operation will produce windows and doors to the exacting specifications found at Menck-Fenster’s production facility in Schwerin, Germany.

Specialties: Windows

Mulberry Tree Builders, LLC
24 Old Amherst Road
Mont Vernon, New Hampshire 03057
603-673-2693
mulbrytreebuilders@gmail.com
http://www.mulbrytreebuilders.com
Mulberry Tree Builders has been a leader in high performance architectural design and construction since 1981. We achieved Passivhaus Infiltration standards in 1988, in a modest Cape in Standish, Maine, employing Canadian Double Walled building techniques. We are now one of 150 firms in the US to have earned Passive House Certified Builders status. We are currently working closely w/ some of the top building science firms in the Northeast in an effort to build on these early ground breaking accomplishments. Our hope is to collaborate w/ our clients to construct attractive, comfortable and environmentally resilient homes and business venues in Southern NH, Northeastern Mass, Greater Portland, and the Hallowell/Augusta areas of Maine.

Specialties: Building Design & Construction, Consultancy, Remodeling/DER

National Grid
939 Southbridge St.
Worcester, Massachusetts 01610
508-860-6000
benjamin.williams@nationalgrid.com
http://www.nationalgridus.com
We serve a total of 1.2 million customers in 168 Massachusetts communities and are an electricity distribution subsidiary of National Grid. We contribute to the quality of life in communities across the Northeast. Care for the environment is integrated.

Specialties: Energy Conservation

Natural Resources Defense Council (NRDC)
40 West 20th St.
New York, New York 10011
212-460-4489
nrinfo@nrdc.org
http://www.nrdc.org/
NRDC is the nation’s most effective environmental action organization. We use law, science and the support of more than 2 million members and online activists to protect the planet’s wildlife and wild places and to ensure a safe and healthy environment for all living things.

Specialties: Education, The Big Picture

Neighborhood Housing Services of New Haven, Inc.
333 Sherman Ave.
New Haven, Connecticut 06511
203-562-0598
kfay@nhsofnewhaven.org
http://www.nhsofnewhaven.org/
Neighborhood Housing Services of New Haven was incorporated in 1979 with a mission to revitalize selected neighborhoods in New Haven. Over time, our mission has evolved to focus on positioning New Haven’s neighborhoods to succeed by increasing homeownership—making homes beautiful, energy-efficient, and affordable; and helping residents take charge of their neighborhoods. We believe that increased owner-occupancy rates, educated homeowners, and rehabilitated houses will produce stable, revitalized neighborhoods that our clients will be proud to call home. During the course of our 35-year history, NHS has fully renovated and sold nearly 450 units to low- and moderate-income families.

Specialties: Social Services, Remodeling/DER

New Commons
545 Pawtucket Ave. Suite 106A
Pawtucket, Rhode Island 02860
401-475-6762
releaver@newcommons.com
http://www.newcommons.com
New Commons is a whole new kind of think tank which helps clients move from thought to action by helping them build a fresh network and then mobilize that network to get the job done.

Specialties: Consultancy, Commercial & Institutional

New Energy Works
jonathan@newenergyworks.com
1180 Commercial Drive
Farmington, New York, 14425
800-486-0661
http://timberframe-postandbeamhomes.com
Nearly three decades ago we started a small timber frame company. Today, along with our sister company Pioneer Millworks, we employ nearly 100 designers, timberwrights, engineers, craftspeople, and community members. Together, we design and build some of the most lyrical and efficient timber frames in the industry, using reclaimed timbers, environmentally responsible practices, and state-of-the-art technology and software.

Specialties: Building Design & Construction, Consultancy, Remodeling/DER

New Commons
545 Pawtucket Ave. Suite 106A
Pawtucket, Rhode Island 02860
401-475-6762
releaver@newcommons.com
http://www.newcommons.com
New Commons is a whole new kind of think tank which helps clients move from thought to action by helping them build a fresh network and then mobilize that network to get the job done.

Specialties: Consultancy, Commercial & Institutional

New England Geothermal Professional Association (NEGPA)
240 Millbury St.
Auburn, Massachusetts 01501
508-832-4485
info@negpa.org
http://www.negpa.org
NEGPA is a regional non-profit association formed to address issues with geothermal that are specific to New England. Our mission is to educate the public and advocate with state and federal officials, as well as utilities, to give Geothermal System a chance.

Specialties: Geothermal

New Frameworks Natural Building
1 Mill St. Suite 163
Burlington, Vermont 05404
802-917-4059
info@newframeworks.com
http://newframeworks.com/
New Frameworks Natural Design/Build is a full-service contracting, consultation, and education company specializing in the integration of natural materials and technologies and high-performance building systems. We are passionate about working in healthy environments and creating positive relationships to build structures that are truly sustainable. We enjoy working directly alongside clients in both design and construction, and firmly believe in the importance of social justice and skills access to enable people of all creeds and economic backgrounds access to safe, beautiful, and affordable shelter.

Specialties: Building Design & Construction, Construction Process
New York State Energy Research and Development Authority (NYSERDA)
17 Columbia Circle
Albany, New York 12203
518-862-1090
info@nyserda.ny.gov
http://www.nyserda.ny.gov/NYSERDA offers objective information and analysis, innovative programs, technical expertise, and funding to help New York businesses and residents increase energy efficiency, save money, use renewable energy, and reduce their reliance on fossil fuels.

Specialties: Consultancy

Newport Solar
14 Vernon Ave.
Newport, Rhode Island 02840
401-787-5682
doug@newportsolar.com
http://www.newportsolar.com/Newport Solar is a Rhode Island based business specializing in the design and installation of residential and small commercial photovoltaic systems. Newport Solar provides free roof analyses and cost estimates including financial analysis.

Specialties: Photovoltaics

Noble Home, LLC
P.O. Box 476
Noble Home, LLC
Noble Home is a house kit designed for each building site, easily assembled by an owner-builder. The Noble Home is a house kit designed for each building site, easily assembled by an owner-builder. The Noble Home is a house kit designed for each building site, easily assembled by an owner-builder.


North By East Building Company
P.O. Box 4521
Portland, Maine 04112
207-420-1525
peter@northbyeastbuildingco.com
http://northbyeastbuildingco.com
We are a full service building firm providing southern Maine (and beyond) with a range of smart building solutions for residential and light commercial projects. We combine unparalleled craftsmanship with a systematic approach to budgeting and scheduling. Our goal is to provide clients with a refreshing design/build experience. We have tremendous respect for our coastal Maine environment and are proud to implement sustainable building practices and to use quality, locally sourced materials whenever possible.

Specialties: Building Design & Construction, Construction Process

NorthEast Electrical-Sonepar NE
560 Oak St.
Brockton, Massachusetts 02301
781-401-8500
nate.pedro@neecdo.com
http://www.neecdo.com/
NorthEast is a full-service electrical distributor to Electrical Contractors, Industrial, OEM, Utility, and Institutional customers. With its’ Industrial/OEM Division, NorthEast Electrical Distributors has grown into one of the largest electrical distributors in New England offering more than 30 convenient locations. The company operates these strategically located branches throughout the 6 New England States in order to make exceptional customer service available to our customers.

Specialties: Photovoltaics, Lighting Supply, Manufacturing

Northeast Solar
136 Elm St.
Hatfield, Massachusetts 01038
413-247-6045
info@northeastsolar.biz
http://northeast-solar.com/
NorthEast Solar provides professional design and turnkey installation of commercial, municipal, residential and village solar electric systems using the latest in state-of-the-art design and installation methods. We use a whole systems design approach balancing the technical and economic tradeoffs with the non-technical needs of the client to ensure you get the very best system possible.

Specialties: Photovoltaics, Electrical

Northern Manhattan Improvement Corporation (NMIC)
45 Wadsworth Ave.
New York, New York 10033
212-822-8300
dannie@nmic.org
http://nmic.org/
NMIC Has been providing Weatherization Services for over 30 years. If you have a multi-family building in Manhattan we can help you reduce your heating/hot water costs. We have helped dozens of buildings save as much as a 35%. NMIC is BPI certified with cumulative staff experience of over 100 years in the energy conservation and retrofit industry.

Specialties: Energy Auditing, Energy Conservation, HVAC, Mechanical Systems & Lighting, Multifamily, Single Family

Optimal Energy Solutions
64 Peg Shop Road
Keene, New Hampshire 03431
603-283-0366
hcs@optimalenergysolutions.net
Optimal Energy Solutions
Comprehensive building system analysis and design, including: building envelope, high-efficiency HVAC (esp. hydronic), customized control systems and renewable energy. Also provide biomass heat as a service (non-residential) through xylogen.net.

Specialties: Biomass, Engineering

Paquette Electric Co., Inc.
368 Killingly Road
Pomfret Center, Vermont 06259
860-963-7078
tedd@paquetteelectric.com
http://paquetteelectric.com
In 1979, Paquette Electric Company was established by our founder, current President, and CEO, John M. Paquette. Since incorporation in 1982, Paquette Electric has grown to be the largest electrical contracting firm in northeastern Connecticut; serving residential, commercial, and industrial customers throughout the state, Massachusetts, and Rhode Island. Our company-located in beautiful Pomfret Center-has earned a distinct reputation for providing quality workmanship, exceptional customer service, and a competitive standard for today’s marketplace. Paquette Electric’s success would not be possible without our strong office support and qualified field personnel.

Specialties: Construction Process, Electrical

Partners for Architecture, Inc.
48 Union St. Building 1
Stamford, Connecticut 06906
203-708-0047
lagrasso@pfarch.net
http://www_pfarch.net
After a combined 75 years of working for many successful organizations, Partners For Architecture Inc. was inaugurated in 1999 with the dedication to establish an architectural firm that provides comprehensive and environmentally sensitive architectural services.


Passive House Academy
334 Douglas St.
Brooklyn, New York 11217
718-233-1365
info@passivehouseacademy.com
http://www.passivehouseacademy.com/
PHA is proud to be one of the leading training providers globally in Passive House (Passivhaus), offering a wide range of internationally accredited Passive House Courses on both sides of the Atlantic. Our team of highly experienced educators has been delivering informed and stimulating training since 2002 to audiences around the world who want to get to grips with the most challenging of energy efficiency standards. PHA has trained over 800 graduates of the Certified Passive House Designer, Certified Passive House Tradesperson and PHPP trainings, graduates who are now providing design, consulting and contracting services on leading high performance projects.

Specialties: Passive Housing
Pavers by Ideal
45 Power Road
Westford, Massachusetts 01886
978-692-3676
info@idealconcreteblock.com
http://www.idealConcreteBlock.com
Ideal manufactures a full line of interlocking concrete pavers and retaining wall systems. Products include Eco-Stone, Aqua-Bric, and Turfstone, environmentally friendly, permeable pavers. Pavers by Ideal offers a GREEN solution.
Specialties: Landscape Design, Pavement

Pella Windows and Doors
240 Mohawk Trail
Greenfield, Massachusetts 01301
978-373-5200
dorouke@184.pellapdsn.com
http://www.pella.com/home/default.aspx
Pella has a proud 90-year history of environmental stewardship and has been recognized for its energy efficiency leadership and sustainable business practices. You can feel good about choosing Pella windows and doors.
Specialties: Windows

Performance Building Supply
111 Fox St.
Portland, Maine 04101
207-780-1500
info@mainegreenbuilding.com
http://www.performancebuildingsupply.com
Performance Building Supply provides construction products and information to make buildings high performing, energy efficient, durable, resilient, healthy and more comfortable for the occupants. Every product we offer is thoroughly researched and chosen based on energy performance, environmental and health effects, manufacturing process and location, durability and practical use.
Specialties: HVAC, Mechanical Systems & Lighting, Solar Thermal, Windows

Peterson Engineering Group
25 Van Zant St.
Norwalk, Connecticut 06855
203-253-7513
info@peg-eng.com
http://www.peg-eng.com
Peterson Engineering Group, LLC has been open since 2008. All employees have multiple years experience in consulting engineering for MEP or PP trades. The team has worked on projects from hotels to marinas to airports. PEG takes part in the energy efficiency incentive program. PEG pays special attention to energy efficiency savings as well as operational maintenance issues. PEG deals with these issues early in the design stage rather than at the end of the project to ensure a successful lifetime of the building. The principal of PEG is Mr. Donald C. Peterson. He has been in the consulting engineering trade for the past twenty years. Mr. Peterson is a LEED AP with certifications in Energy Management, Commissioning & Green Building Engineering on Department of Energy Star site.
Specialties: Consultancy, Engineering

Picton Brothers, LLC
10 Titus Road
Washington Depot, Connecticut 06794
860-866-5907
info@pictonbrothers.com
http://www.pictonbrothers.com
We are a construction general contracting co. interested in progressive projects that incorporate practical & pleasing design geared to long term sustainable use of resources.
Specialties: Building Design & Construction, Remodeling/DER

Pill-Maharam Architects
53 Falls Road
Shelburne, Vermont 05482
802-735-1286
dpill@pillmaharam.com
http://www.pillmaharam.com
Pill-Maharam Architects, founded in 1991 by David Pill offers comprehensive architectural services for institutional, commercial and residential clients. With hands on experience in the construction field, our staff brings to each project a realistic body of knowledge to create a buildable innovative solution. We fuse creative ideas with functional, budgetary and programmatic requirements to create finely detailed sculptural spaces and buildings.

Placentailor, Inc.
51 Heath St.
Boston, Massachusetts 02130
617-442-2101
staff@placentailor.com
http://www.placentailor.com
Placentailor-made projects are always built to the highest efficiency possible with a particular eye toward comfort. Where a well placed window captures the sun’s energy to heat a house, a heat recovery ventilator streams fresh winter air into a room without bringing in the winter temperature. We keep heat when we want it and get rid of it when we don’t.
Specialties: Building Design & Construction

Powers Air
68 Hamilton Drive
Conway, Massachusetts 01341
413-539-7032
powersair@comcast.net
http://powersair.net/
HVAC Systems and Indoor Air Quality. Designing with Load Calculations, Installing and Servicing. Including Ductless systems, High Efficient Warm Air and Energy Recovery Systems. LEEDS Certified. Whether your a Builder or Homeowner, new or retro fit. Feel free to call/text me at 413-539-7032. Drew Powers
Specialties: HVAC, Indoor Air Quality, Mechanical Systems & Lighting, Remodeling/DER

Project Planning and Management
224 Follen Road
Lexington, Massachusetts 02421
781-861-9545
paul@paulhilapointe.com
http://www.paulhilapointe.com
Plan and manage construction projects for environmentally conscious educational and cultural institutions; represent institutions throughout the project delivery process; assist institutions in selecting architects, consultants, and contractors.
Specialties: Building Design & Construction

PV Squared
311 Wells St. Suite B
Greenfield, Massachusetts 01301
413-772-8788
info@pvsquared.coop
http://pvsquared.coop/
PV Squared is a worker-owned cooperative dedicated to making our shared community a better place to work and live. We are based out of two offices in western Massachusetts and central Connecticut. (PV)Â_ has over 12 years of experience providing renewable energy solutions to home owners and businesses in the Pioneer Valley and the surrounding regions.
Specialties: Photovoltaics

QCoefficient, Inc.
35 East Wacker Drive Suite 1816
Chicago, Illinois 60601
312-945-3143
vince@qcoefficient.com
http://www.qcoefficient.com
QCoefficient, Inc. (QCo) uses scalable, automated, cloud-based technology to harness building mass in large commercial buildings (e.g. drywall and concrete) as a thermal energy storage (‘TES’) medium; and then uses that storage to ‘economically dispatch’ electric chillers and to optimally integrate HVAC operations with electric grid operations and markets in large metropolitan areas...dramatically reducing cooling expense and emissions. QCo’s TES requires no capital expense or space, and deploys in 2-4 weeks.
SUSTAINABLE GREEN PAGES

**Quigley Builders, Inc.**
P.O. Box 2008
Ashfield, Massachusetts 01330
413-625-2301
maryquigley@quigleybuilders.com
http://www.quigleybuilders.com

Quigley Builders is a woman-owned construction and renovation firm located in the hills of Western Massachusetts. We specialize in deep energy retrofits of historic buildings, using new materials and techniques in traditional configurations that respect and honor the vernacular architecture. Our goal is to achieve elegance and efficiency not just in appearance but also especially – in the function of every project we undertake. This means conserving resources in materials and labor, as well as investing in the life of the building over the next hundred years.

**Specialties:** Building Design & Construction, Energy Conservation, Renewables & The Grid

**Ra Solar Company**
P.O. Box 2222
Littleton, Massachusetts 01460
802-436-9496
yimb098@gmail.net
http://www.rasolar.ca/

Builders of energy efficient, solar, green homes, additions, alterations & renovations since 1978. We can provide complete design/build services to our clients. We also offer green project consulting, plans modification, and specifications writing.

**Specialties:** Alternative Energy, Building Design & Construction, Passive Housing

**RBI Solar, Inc.**
5513 Vine St.
Cincinnati, Ohio 45217
513-618-7214
hkaur@ribisolar.com
http://www.ribisolar.com

RBI Solar, Inc. is the leading turn-key supplier of solar-mounting systems. As a specialist in ground mount, roof mount, landfill solar, and custom designed specialty solar structures, RBI Solar focuses on providing the most robust solar racking systems, installation services and project management capabilities to serve owners and integrators. RBI Solar has engineers on staff licensed in all 50 states and offers complete design, high tech manufacturing, nationwide installation, and technical support to help solve the toughest challenges in the industry. Leveraging more than 80 years of experience in the commercial design-build specialty structures market, RBI Solar works with its clients to identify the most economical, durable and robust solution for solar installations.

**Specialties:** Photovoltaics

**REinsulation, Inc.**
340 McKinstry Ave.
Chicopee, Massachusetts 01013
413-559-4884
reinsulation@gmail.com
http://www.reinsul.com

REinsulation reclaims useable rigid insulation boards from commercial flat roofs at our Chicopee, Massachusetts warehouse. The insulation is in usable condition at about 1/2 the price of new insulation. This combination results in equivalent thermal performance for 50% or more off cost of new insulation, or twice the thermal performance at cost similar to new. We also stock innovative rigid insulation products not available at lumberyards.

**Specialties:** Building Design & Construction, Commercial & Institutional, Consultancy, Education, Energy Conservation, Envelope & Enclosure, Insulation

**Retrotec Energy Innovations, Ltd.**
1060 East Pole Road
Everson, Washington 98247
604-732-0142
beci@retrotec.com
http://www.reetrotec.com

Retrotec is the world’s leading manufacturer of building diagnostic tools. They make blower doors, duct testers, digital manometers, and air leakage testing software. Retrotec promotes green building through air tightness and enclosure integrity testing with equipment, software & training.

**Specialties:** Certifications – Standards, Consultancy, Energy Auditing, Envelope & Enclosure, Home Inspection, HVAC, Indoor Air Quality, Insulation, Mechanical Systems – Lighting, Multifamily, Passive Housing, Research, Single Family, The Big Picture, Windows

**RHI Irving Homebuilders**
543 West Salisbury Road
Salisbury, New Hampshire 03268
603-344-6488
bob@rhirvinghomebuilders.com
http://www.rhirvinghomebuilders.com


**Specialties:** Building Design & Construction, Remodeling/DER

**Rhode Island Commerce Corporation**
315 Iron Horse Way Suite 101
Providence, Rhode Island 02908
401-278-9100
ref@commerceri.com
http://www.commerceri.com

The Commerce RI Renewable Energy Fund (REF) is dedicated to increasing the role of renewable energy throughout the state. The REF provides grants and loans for renewable energy projects with the potential to make electricity in a cleaner, more sustainable manner, while stimulating job growth in the green technology and energy sectors of Rhode Island’s economy. Using funds from the ‘system benefit charge’ on electric bills and Alternative Compliance Payments, Commerce RI will fund renewable energy projects in small-scale solar, feasibility studies and commercial development.

**Specialties:** Consumer Information, Education
S

S+H Solar, Division of S+H Construction
26 New St.
Cambridge, Massachusetts 02138
617-876-8255
jamie@sconstruction.com
http://www.shsolar.com/
An award-winning general contractor in Cambridge. Our Renewable Energy Division designs and installs solar electric and hot water systems, and offers energy management consulting.

Specialties: Building Design & Construction, Photovoltaics, Solar Thermal

Sage Builders, LLC
672 Chestnut St.
Newton, Massachusetts 02468
617-965-5272
info@sagebuilders.com
http://www.sagebuilders.com
Award-winning, full service Boston area residential design-build company committed to responsible design and construction practices. Experts in energy efficiency and weatherization.

Specialties: Building Design - Construction, Energy Conservation, Remodeling / DER

Saltonstall Architects
380 Wareham St.
Marion, Massachusetts 02738
508-748-1043
will@saltonstallarchitects.com
http://www.saltonstallarchitects.com
Providing architectural services to residential, commercial and institutional clients the firm is committed to sustainable design practices; focusing on working closely with our clients to design thoughtful, innovative, healthy and energy-efficient places to live and work.

Specialties: Architecture

Richard Renner | Architects
35 Pleasant St.
Portland, Maine 04101
207-773-9809
info@rennerarchitects.com
http://www.rennerarchitects.com/

Richard Renner | Architects, a full-service architectural firm with offices in Portland, Maine and Sherborn, Massachusetts, is a richly varied practice creating inspired places for living, working, and learning. Environmentally responsible design is a cornerstone of the practice, and for over a decade, the firm has expanded and refined the process of designing effective “green” buildings.


RST Thermal
372 University Ave.
Westwood, Massachusetts 02090
617-908-1665
mehickey@rstreps.com
http://www.RSTThermal.com

RST Thermal is a Manufacturer’s Representatives in the New England area covering Eastern Massachusetts, New Hampshire, Maine, Connecticut, and Rhode Island for multiple leading manufacturers whose products offer a systems approach to comfortable heating and cooling. We provide technical and sales support to our wholesale distributor partners and contractors. For homeowners, we provide geographic lists of installing and servicing contractors to help them find the “best fit” for the project to be done.

Specialties: Multifamily, Single Family, Mechanical Systems & Lighting, HVAC

Sandri Energy, LLC
400 Chapman St.
Greenfield, Massachusetts 01301
413-772-2121
jgoodyear@sandri.com
http://www.sandri.com/renewable-energy
Sandri is a full service energy provider for your home or business. We are family owned company that has been in business for 80 years. Our direct service area encompasses Western MA and Southern VT and NH. We wholesale our products throughout the North East.

Specialties: Biomass, Photovoltaics, Solar Thermal

Schock USA, Inc.
100 Overlook Center 2nd Floor
Princeton, New Jersey 08540
855-572-4625
info@schock-us.com
http://www.schock-us.com
Our company and Schöck Isokarb® are known globally in the construction industry. In Europe, we are market leaders for reinforcement technology and building physics solutions that minimise thermal bridges and acoustical bridges.

Specialties: Manufacturing

Sellars Lathrop Architects, LLC
1 Kings Highway North
Westport, Connecticut 06880
203-222-0229
ann@sellarslathrop.com
http://www.sla-arch.com
Small, woman-owned firm designing upgrades, additions and renovations for 21st century living. Primary projects are residential and light commercial work in Fairfield County, CT., emphasizing energy efficiency and smart building technologies to create high quality solutions with character and style.

Specialties: Building Design & Construction

Shift Energy, LLC
2 Main St. Suite 17-302T
Biddeford, Maine 04005
207-710-6116
mick@shiftng.com
http://www.shiftng.com
We’re passionate about: Putting heat from the sun to good use, Providing ventilation and increased occupant comfort without increased cost. Clean energy solutions that make sense, are easy to use and look amazing. Offering the fastest investment paybacks of any clean energy solution, Providing a solar energy solution that can remove the costs of expensive siding solutions.

Specialties: Energy Auditing, Energy Conservation

Sandri Energy, LLC
400 Chapman St.
Greenfield, Massachusetts 01301
413-772-2121
jgoodyear@sandri.com
http://www.sandri.com/renewable-energy
Sandri is a full service energy provider for your home or business. We are family owned company that has been in business for 80 years. Our direct service area encompasses Western MA and Southern VT and NH. We wholesale our products throughout the North East.

Specialties: Biomass, Photovoltaics, Solar Thermal
Siga Cover, Inc.
8001 Irvine Center Drive Suite 400
Irvine, California 92618
949-733-9442
info@sigacover.com
http://www.sigacover.com
Siga high-performance adhesives offer first-class quality. With the easy to apply SIGA system you create an air and windtight layer which offers you the best reliability and comfort for the entire lifespan of your house. You have our word!
Specialties: Indoor Air Quality, Manufacturing, Windows

SJP Environmental Consulting
P.O. Box 303
Montague, Massachusetts 01351
413-559-7257
sjp@crocker.com
http://sjpconsulting.biz/
Offering Pioneer Valley, MA, residents an unbiased, fee-based advice; live energy saving and renewable energy options for their homes, helping them: explore α-prioritize cost-effective measures for a cozier, healthier home with less wasted energy, understand renewable energy options like solar, top incentives, and learn about financing for energy projects. I also have a list of local energy contractors. For businesses α-nonprofits, my services include: writing articles, press releases, grant proposals, and website text; managing and promoting projects; collaborating with organizations; and public education.

Smart Energy of New England, Inc.
1930 US Route 3
Columbia, New Hampshire 03576
800-668-6140
david@smartenergynh.com
http://www.smartenergynh.com
Smart Energy of New England is a seven-year-old corporation located in Columbia, New Hampshire. We serve the conservation, restructuring, renewable energy options like solar, top incentives, and learn about financing for energy projects. We are an up-and-coming provider of energy efficient systems, both commercial and residential. Our main focus is on Solar Photovoltaic Systems and we are becoming well-known for our attention to detail and our satisfied-customer business model. We are currently increasing our presence in the international marketplace with new projects in the Bahamas and potential projects in Africa. Our mission is to introduce our customers to local natural resources to save them money while reducing our collective carbon footprint and decreasing our dependence on fossil fuels and imports.
Specialties: Biomass, Photovoltaics, Solar Thermal, Wind

SolarBlock
1 Federal St. Building 101
Springfield, Massachusetts 01105
339-230-4600
pquinn@solablock.com
http://www.solablock.com
SolarBlock LLC manufactures permanently PV-clad building materials, providing a cost-competitive solar solution to meet most of the electric load in a energy-efficient building.
Specialties: Wind, Photovoltaics, Building Design α Construction

Solaire Generation
102 West 38th St. 7th Floor
New York, New York 10018
212-219-0270
tluden@solairegeneration.com
http://www.solairegeneration.com
Solaire Generation is the market leader for the design and installation of innovative solar structures and systems. Solaire is an awing, industry-acclaimed company, having won the project of the year distinction at both Intersolar North America and SPI in 2014. In 2013, Solaire was awarded project of the year by Solar Builder and was recognized by GreenTech Media for being one of the top ten clean tech leaders in NYC.
Specialties: Photovoltaics

Solar Store of Greenfield
2 Fiske Ave.
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claire@solarmarketofgreenfield.com
http://www.solarstoreofgreenfield.com
Local Western MA renewable energy consultants in a brick and mortar storefront. We provide Advice, Design, and Installation of Solar PV and Hot Water systems for residential and commercial settings. All projects are turnkey from beginning to end, covering all permits, incentives, utility interconnection and SREC aggregation. We also offer battery backup systems for grid and off grid PV systems. Additionally, composting toilets, biodiesel, solar clothes drying racks, books and Eat More Kale t-shirts are available.
Specialties: Energy Conservation, Photovoltaics, Solar Thermal

Solar Wave Energy, Inc.
31 Cambridge Terrace
Cambridge, Massachusetts 02140
617-242-2150
hkv@solarwave.com
http://solarwave.com
Solar Wave Energy has been installing and servicing Solar energy systems 1978. Today we provide controller integrated web-based monitoring for solar thermal (heating α-hot water) systems allowing installers and building owners to oversee and manage their systems remotely. We currently have integrated performance monitoring for solar controllers including Resol, Cafelii, Stiebel Eltron, Viessmann and more. Call or see demo at www.solarwave.com
Specialties: Energy Auditing, Energy Conservation, Solar Thermal

SolarReviews
777 South Wadsworth Boulevard
Building 1, Suite 1-202
Lakewood, Colorado 80226
720-328-8928
pete@solarreviews.com
http://www.solarreviews.com
SolarReviews operates in harmony with our other solar industry websites, www.Solar-Estimate.org and www.SolarPanelTalk.com. Together these sites answer many common questions that people or business’s have when they are considering solar. This resource is free to the consumer and installers/manufacturers can have a free listing on www.SolarReviews.com, our combined sites got over 2 million unique visitors in 2014.
Specialties: Consulting, Consumer Information, Marketing, Photovoltaics, Solar Thermal

Solec Energy Development
89 Hayden Rowe St. Suite E
Hopkinton, Massachusetts 01748
508-598-3511
info@solec.com
http://solec.com/
Solec, Inc. is a solar renewable energy development company focused on the deployment of solar photovoltaic (PV) systems. Solec works with the appropriate financial partners to fund the deployment of solar renewable energy systems.
Specialties: Photovoltaics

Solectra-A Yaskawa Company
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Lawrence, Massachusetts 01843
978-683-9700
inventors@solectria.com
http://www.solectria.com
Solectra – A Yaskawa Company, a wholly-owned subsidiary of Yaskawa America, Inc., is a leading U.S.-based grid-tied PV inverter combiner α-web-based monitoring manufacturer for residential, commercial α-utility-scale solar projects. Solectria’s products include 3.8 to 750 kW inverters. Solectria is backed by over 100 years of power electronics and inverter experience. All of Solectria’s three-phase central inverters are made in the USA. PV System owners, developers and EPCs rely on the high performance, reliability and bankability of Solectra – A Yaskawa Company.
Specialties: Manufacturing, Photovoltaics, Renewables α The Grid

South Mountain Company
15 Red Arrow Road
West Tisbury, Massachusetts, 02575
508-693-4850
info@somoco.com
http://www.somoco.com
South Mountain Company, located on Martha’s Vineyard, is a multi-faceted firm offering architecture, engineering, building, interiors, woodworking, and energy services.
Specialties: Building Design α Construction, Energy Conservation, Photovoltaics

Sparhawk Group
81 Bridge St. Suite 107
Yarmouth, Maine 04096
207-846-7726
admin@sparhawkgroup.com
http://www.sparhawkgroup.com
From offices in New York City and Portland, Maine, we have driven energy efficiency into over 25,000 units of multifamily buildings, commissioned $300+ million in new construction and provided leadership in energy efficiency since 1990. Early in the company’s history, Sparhawk Group began with pay-for-performance energy efficiency projects delivering 3.5 megawatts of electrical power conservation at industrial, institutional, commercial and government buildings. These projects were commissioned to ensure savings, and thus payments for performance, were realized. This grounding in energy performance and commissioning, drives our company vision to this day.
Specialties: Consultancy, Energy Auditing, Engineering
Spartan Solar
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Greenfield, Massachusetts 01301
413-768-0035
gospartansolar@gmail.com
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Spirit Solar
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Springfield, Massachusetts 01138
413-883-3144
info@spiritsoolar.net
Spirit Solar provides installation and service for all types of solar hot water systems, solar educational services, and third party PV system verification.

Specialties: Consultancy, Education, Solar Thermal

SPL Development Group
71 Deer Hill Circle
Peltam, New Hampshire 03076
603-582-0151
spagueti@spllc.com
Steve has over 28 years experience in real estate development, construction and property management. After earning a bachelor’s degree in management in 1984, he began working in real estate development, acquiring development sites. He has been a registered Massachusetts Real Estate Broker since 1987. In 1988, Steve began developing multi-family apartment sites for 5K Properties. During that time, he developed over 600 units of elderly and family properties in three New England States. He also developed and managed the build out of several single-family subdivisions, the latter of which was a 43-unit development in the southern part of Manchester, NH Heritage Common, completed in 1997.

Specialties: Building Design & Construction

Steele Kellogg AIA
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Madison, New Jersey 07940
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steelekellogg@gmail.com
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Specialties: Architecture, Design Process

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Specialties: Building Design & Construction, Design Process

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Specialties: Construction Process

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http://www.swinter.com
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Specialties: Energy Auditing, Engineering, Consultancy

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Specialties: Remodeling/DER

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17 West St.
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413-247-3380
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Specialties: Energy Conservation, Manufacturing, Solar Thermal

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4 Militia Drive Suite 6
Lexington, Massachusetts 02421
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energystar@sea.us.com
http://www.sea.us.com/
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Specialties: Consultancy, Renewables & The Grid, Single Family

SWZ Architects
1 Edgehill Road
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617-890-8807
shelly@swzarchitects.com
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Specialties: Architecture, Design Process, Engineering

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Timeless Architecture is an architectural office specializing in residential & light commercial work, focused on the integration of historic preservation and green design. **Specialties:** Building Design & Construction, Energy Conservation, Remodeling/DER

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Specialties: Alternative Energy, Education

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Specialties: Architecture, Design Process

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