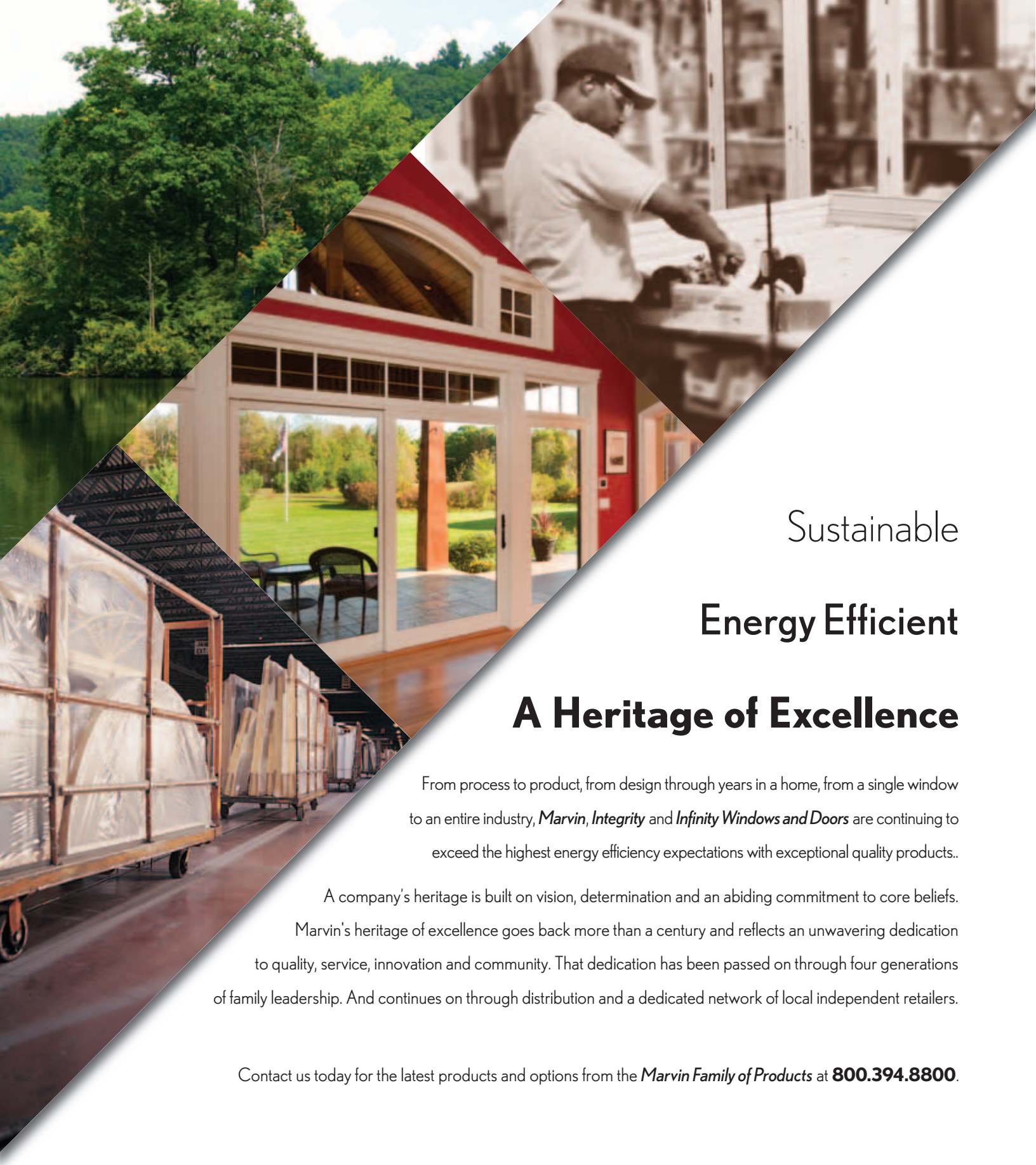
Vol. 30, No. 2 | fall 2012

BUILDING**ENERGY**

THE MAGAZINE OF THE NORTHEAST SUSTAINABLE ENERGY ASSOCIATION

Zero Net Energy Building Award: Six years in, look how far we've come

2012 Sustainable Green Pages Directory Inside



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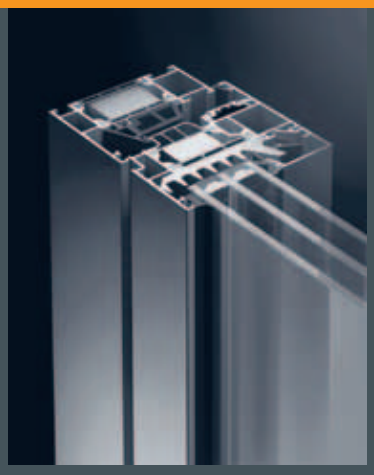

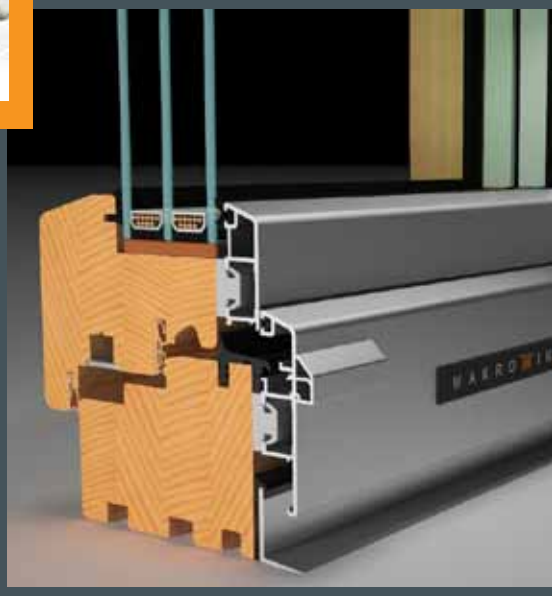

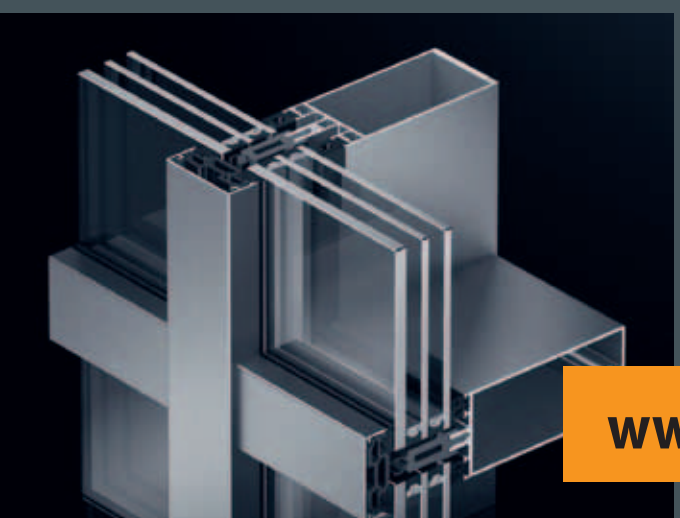

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On the cover
NESEA's 2012 Zero Net Energy Building Award went to the Ross residence, an Amherst, MA, rehab/retrofit by Coldham & Hartman Architects (energy systems advice and review by Marc Rosenbaum). But each of 2012's five diverse entrants could have won in its own category. Story starts on page 9.

About NESEA and *BuildingEnergy* Magazine
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 conference and trade show, professional workshops, our annual Green Buildings Open House, and more. A *BuildingEnergy* subscription is $55/year, which includes NESEA membership.

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Welcome to BuildingEnergy in Print

My guess is that you may not even have noticed our new masthead. If not, take a moment to flip back to the cover.... Now that you've seen it, let me explain: we have rebranded the magazine you've come to know and love, from the *Northeast Sun* to *BuildingEnergy.*

This rebranding is part of a larger initiative approved by the NESEA Board of Directors at their annual retreat in May. There, several board members remarked that when they go out into the sustainable energy community to promote NESEA and its programs, they often find themselves wasting two or three valuable minutes of their "elevator pitches" explaining who NESEA is and what we do. The NESEA acronym by itself does not help them connect others to our community. The same board members also shared that when they lead the conversation with "Building Energy," one of two things frequently happens: the person they're speaking with either knows about the BuildingEnergy conference and its stellar reputation or immediately understands what our organization might mean to them and to the sustainable energy community.

Prompted by these experiences, the NESEA board directed me to incorporate the BuildingEnergy brand into as many of our existing and future programs as possible—starting with the *Northeast Sun*. This may also mean that our Green Buildings Open House program becomes BuildingEnergy Tours and that our Sustainable Green Pages becomes BuildingEnergy Resources (or something similar). If we launch a series of in-person workshops, we may brand them BuildingEnergy on the Road. This is not a change to our fundamental strategy or our mission. Rather, it is simply a refocusing of our communication, especially vis-a-vis people who don't know us.

"Building energy" describes some of the core subject matter covered at our conference, as in "the energy consumed by buildings." It describes our process for creating community, as in "building energy to create a multidisciplinary network of practitioners." It describes our innovative spirit, as in "building clean energy resources." It also alludes to the whole systems thinking that we promote and the results we achieve when we do so effectively. It has long been a priority for us to make the annual BuildingEnergy conference live beyond the three days it is held in Boston. How better to do that than to use this brilliant brand as a constant reminder of who we are as a community and of what we do best?

Neither the change from *Northeast Sun* to *BuildingEnergy* nor the larger shift in our branding means that the NESEA brand and name go away. We will remain the Northeast Sustainable Energy Association, a membership organization dedicated to advancing the adoption of sustainable energy practices in the built environment. Nor are we shifting away from renewables/solar energy toward energy efficiency. As an organization, NESEA has long been defined by the fact that we are a "big tent." We will continue to cater to a multidisciplinary group of practitioners in diverse sectors related to sustainable energy in the built environment.

As always, I welcome your feedback. Feel free to email me at jmarrapese@nesea.org, to friend NESEA on Facebook, or to respond via twitter @NESEA.org.

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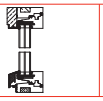

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Agreed: It's (Almost) All About BuildingEnergy

Each May the NESEA Board of Directors gathers for a two-day retreat. The word *retreat* makes it sound like fun and games. I'd prefer to call it a two-day board meeting, because that's what it is. On second thought, we perhaps should stick with *retreat* as a ploy to ensure good attendance.

Our 2012 retreat was very successful. We put our heads together, worked hard, and have something to show for it. We established seven directives for the organization, many of which involve strengthening the BuildingEnergy conference and explicitly letting it define us. What gives these directives particular authority is the fact that they came easily to the group. There was little or no wrangling, dissention, or the like. Nor was there any hand-holding or singing of "Kumbaya." Rather, it was easy as stating the obvious.

I am delighted to share with you the good work of the board and of Executive Director Jennifer Marrapese. These directives are the "ends" we as a board have charged Jennifer and the staff with achieving. We have given Jennifer maximum flexibility to figure out exactly how to do so.

Directive 1: Change the brand from "NESEA" to "BuildingEnergy"
The organization name and the brand name need not be the same. Only NESEA insiders and their best friends know what NESEA is. BuildingEnergy is the brand name that we can pound the pavement with to get across what, why, and how we do what we do. One of our first steps in implementing this directive is reflected in this magazine, formerly known as the *Northeast Sun* and now retitled *BuildingEnergy.*

Directive 2: Redesign Green Buildings Open House (GBOH)
The redesign may start with changing the name from GBOH to BuildingEnergy Tours. "Green" and "house" don't serve NESEA well. "BuildingEnergy Tours" would open up the potential for this program to become the fieldwork equivalent of the BuildingEnergy conference.

Directive 3: Launch BuildingEnergy "NY Metro"
In addition to Yankees fans and pigeons, the New York metro area has a lot of buildings. Nearly 19 million people work, live, and play there. NESEA already has a strong connection with the NY metro area, but in the future it will be much stronger. It may begin small. Maybe with a multifamily housing conference. Paraphrasing from *Field of Dreams*, if we build, they will come.

Directive 4: Collaborate with independent publishers and publications
NESEA's greatest success is the BuildingEnergy conference, where practitioners working in the built environment gather to strengthen their skills and networks. BE presenters and attendees are leaders in the industry. The successes that occur at BE will be amplified by strong connections between NESEA and leading publishers. What's in it for publishers? The BuildingEnergy conference and other NESEA programs represent a concentrated resource of people they need to meet, cutting-edge expertise, and hands-on opportunity.

Directive 5: Develop a more strategic conference planning process
While one of the strengths of BE is its grassroots planning process, it is also a weakness. To strengthen the conference and its advancement of sustainability, NESEA will institute more year-to-year consistency in its planning. We will also continue to solidify the target audience as "bricks and mortar" decision makers and serve them well.

Directive 6: Clarify the purpose of membership as "service to mission"
The purpose of membership is to create a source of revenue and an affiliated cadre of professionals, both of which support

continued on page 42

Zero Net Energy Building Award

A landmark program comes of age

By Andrew Webster

Since its inauguration in 2007 by Massachusetts Governor Deval Patrick, NESEA's Zero Net Energy Building Award (ZNEBA) has been a revealing part of the annual BuildingEnergy conference, where the winners are announced. This year was notable. If it were the Academy Awards, each of the five entrants featured here might have won in a different category: retrofit, gut rehab, spec housing, affordable housing, commercial/institutional. It's testament to how far and how fast the NESEA community has moved.

By recognizing the Northeast's best net zero buildings, the award aims to spur the market. The buildings must first and foremost demonstrate net zero performance. As the National Renewable Energy Laboratory (NREL) has defined it, that means they "reduce energy load to the minimum practical level, then capture on-site the required amount of renewable energy to satisfy the remaining needs." Other criteria include continuous occupancy, replicability, stellar systems, marketability, and design elegance.

Thanks to solar renewable energy credits and the low interest rates of 2009, the Ross residence's PV system is a moneymaker.

Winner

Ross Residence

Coldham & Hartman Architects

Cash-positive PV from day one

This project came to Coldham & Hartman (C&H) as a rehab/retrofit job with both aesthetic and environmental aspirations. The owners of the Amherst, MA, home were eager to create a resource-conscious, energy-efficient building that also delighted their modernist senses.

The original house sported a warren of rooms, including a first-floor bathroom that opened directly toward the front door. Self-constrained to the existing footprint and as much of the existing building as was practical, the renovation converted those spaces to an open floor plan, reserving the upstairs for family and adding a full-height third-floor guest space and office.

The plan called for superinsulation and airtight construction. With energy systems advice and review by Marc Rosenbaum, PE, the insulation scheme includes a cost-effective collection of strategies: spray-applied foam on the interior of the fieldstone basement wall, 3 inches of rigid polyisocyanurate insulation above grade, and a 2-inch by 12-foot flash-and-fill rafter cavity (2 inches of foam to create an air/moisture barrier and the remainder in cellulose). Windows are triple-pane argon-filled fiberglass units with warm-edge spacers. None of the assemblies was extreme, although exterior foam board insulation was a new approach in residential construction for C&H. The infiltration target was 1 ACH50, which the design team considered ambitious but not impractical in a retrofit. The final test achieved 1.02 ACH50.

Photo by Ethan Drinker

The Ross residence is energy efficient, but it also delights the owners' modernist senses. From left: the master bath; Coldham & Hartman turned the original warren of rooms into an airy, open kitchen and living area.

Mechanical systems, designed with Adam Kohler at Kohler & Lewis Engineering, include a 4-ton multiport air-source heat pump with five indoor heads (both ducted and wall-mounted) and a heat recovery ventilator (HRV) to supply fresh air to the second and third floors. Renewable generation is provided by a 12.4 kW photovoltaic (PV) system on the roof.

Interestingly, the design goals did not include a net zero energy target until construction was three months underway. The south-facing roof had been unified and cleared of penetrations in anticipation of PV, but no further action was expected. However, the financial landscape in Massachusetts around PV was changing rapidly. The introduction of solar renewable energy credits (SRECs) and the low interest rates of 2009 promised to make the system cash-flow positive from day one. Suddenly, the PV system that had been put on hold, pending finances, was a moneymaker.

Lessons Learned

This project was one of Coldham & Hartman's early forays into air-source heat pumps. Although the multiport, multizoned system employed here was not a simple, low-cost solution, it still cost less than a comparably sized ground-source heat pump and was a reassuringly straightforward, single-sub installation project.

The exterior insulation scheme—inspired by Betsy Pettit's Concord, MA, foursquare retrofit—proved reasonable to build and has joined the ranks of C&H wall strategies, particularly for retrofits.

Kraus-Fabel Residence

Kraus-Fitch Architects

Practicing the art of the possible

The Kraus-Fabel residence, part of an attached duplex in the Pioneer Valley Cohousing community in Amherst, MA, wasn't crying out for renovation. Built in 1994, it lacked the lead-encrusted siding, rattling windows, and failed boiler that make for a perfect deep energy retrofit (DER). The primary challenge of this building was that there were no real challenges. It already worked well. With annual energy bills of $1,500 (electricity and propane), it wasn't even a financial hardship to operate. But the professional lure of the art of the possible nudged owner Mary Kraus of Kraus-Fitch Architects into aiming for net zero. That and a 3,000-square-foot DER that her firm had done. Kraus remembers thinking, "If a house of that size can do it, for my little cohousing cape, it should be a piece of cake."

Working with Marc Rosenbaum to calculate loads and gains, Kraus and her husband, John, considered the options. Built to early 1990s Energy Crafted Home standards, the 22- by 28-foot house already had 2x6 walls strapped to the inside to create 7-inch cavities for cellulose. The rafters were 2x12s with fiberglass, the basement walls were already insulated to the inside, and the windows were double-glazed casements. It was the kind of home NESEA members have been designing and building for years now. The blower door showed results around 500 CFM50: very good. What Rosenbaum's numbers told Kraus was that net zero was within reach.

Photos from top: Ethan Drinker (2); Mary Kraus and John Fabel

A 6 kW PV system drove the Kraus-Fabel residence to net zero. "Having no energy bills has been great," says Mary Kraus.

Don't overlook the mundane," says architect Mary Kraus. Top-of-the-list for the Kraus-Fabel residence was replacing the inefficient 16-year-old refrigerator.

The home was moderately sized, and the Kraus-Fabels were already good energy consumers. Steering clear of disruptive and expensive solutions, Kraus found the sweet spot for deep energy retrofits: for $60,000, she drove this residence to net zero. And got back to one of her original goals in architecture: "Making one hundred percent solar homes." Her strategy, given the good quality of the home, was to let well enough alone and focus on the remaining parts: better air sealing, plug loads, mechanicals. "Don't overlook the mundane," she advises. "What's remarkable about our renovation is how unremarkable it is."

Right off, the team replaced the 16-year-old refrigerator. Then—in a move typical only of architects and other NESEA types crazy enough to do these experiments on their own houses—they removed and sold off their 5-year-old propane boiler. In its place, two air-source heat pumps warm and cool the space. After some targeted air sealing, the household also replaced an exhaust-only ventilation system with an HRV that captures heat as conditioned air is cycled through the system. Finally, they added 6 kW of PV.

Lessons Learned

"These high-performance homes from the last couple decades," Kraus notes, "can get very quickly to zero net energy." She adds that her state's SRECs for solar are a great boost. "At some point, you're done paying for all the installation costs, and all you're left with is these checks coming in. And having no energy bills has been great."

The Groton

Transformations Inc.

A passion for solar drives a developer

With this Townsend, MA, entry we see the results of a development path that Carter Scott of Transformations Inc. has pursued for nearly a decade, since catching the bug from an ASES article in 2002. Why net zero? "It seemed like a good idea, like a good goal," he says.

The Groton features a PV system that is integrated into the surface plane of the roof for a pleasing aesthetic. To achieve this, the roof under the system was recessed 8 inches.

"And solar has always been a passion."

Transformations is a developer and builder of custom homes. The homes produced on spec must ultimately sell themselves, so the restrictions on design are tight already. To this, Scott has added increasingly difficult energy parameters, resulting in 2009 in a zero energy building based on a design called the Groton.

Originally working toward Home Energy Rating System (HERS) targets, Transformations had tested a collection of strategies for both energy efficiency and cost-effectiveness. Continually tweaking the model, they moved from 50 percent better than code to 60 to more than 70, with HERS ratings in the 20s. In 2007, Scott built his own home (2x6 walls, 1-inch rigid outboard, ground-source heat pump, R-4 windows) and moved the design to a HERS 20, well within striking range of net zero with the addition of PV.

For the utility-sponsored Massachusetts Zero Energy Challenge in 2009, Transformations was selected as an entrant and pushed a HERS 34 plan from the books all the way to zero. In consultation with Mike Duclos at DEAP Energy Group, the design team chose an air-source heat pump for heating and cooling, 12-inch-thick double-stud walls, R-5 windows, airtight construction, and 5.7 kW of PV to cover the remaining load. The result: HERS -4 in a model called the Needham.

> Even in this shaky economy, the developer's June 2012 sales surpassed all of 2011's.

Transformations had found a cost-effective strategy for delivering net zero—with some owner buy-in—over and over again. Their version of a "5-10-20-40-60" strategy became codified: triple-glazed windows, sub-slab rigid foam, spray-applied foam at the basement walls (with intumescent paint); 12-inch double-stud walls filled with low-density foam, and attic flats piled high with loose-fill cellulose. Add air-source heat pumps (COP >2.5), aggressive air-sealing strategies, an energy recovery ventilator, and a thoughtful owner, and Transformations had another verifiable net zero building.

Photos from top: Mary Kraus and John Fabel; R. Carter Scott

Lessons Learned
Cost-effective strategies for net zero can be a business model. In this shaky economy, Transformations' June 2012 sales surpassed all of 2011's. Now Scott is working on net zero neighborhoods, consulting with other builders, and has his eye on buildings that overproduce—to power electric vehicles. "It's time to tackle the transportation sector," he suggests.

Putney School Field House

Maclay Architects

A model for Northeast institutions

Among the earliest net zero commercial/institutional buildings in the Northeast, this 17,500-square-foot building in Putney, VT, is a ZNEBA runner-up for the second year in a row (see the fall 2011 issue—it's on the cover). What's new—and important—is a second full year of documented net zero performance. Still, Bill Maclay of Maclay Architects hopes that the sustainability aspect will be overshadowed in the long term by the building itself. "Fifty years out," he says, "someone will care about the building because it's beautiful, not because it's net zero."

The Putney School field house presented real challenges, including siting on a north-facing slope, high-value views to the west, and day-lighting needs throughout the space.

Update
With evidence in hand of the feasibility of net zero buildings, Putney School subsequently engaged Maclay Architects for a campus master plan. It provides a blueprint for bringing their 40 remaining buildings to net zero or carbon neutral status.

Eliakim's Way

South Mountain Company

Lesson: net zero is a lifestyle

Number nine Eliakim's Way is one of two houses in a "zero energy possible" development in West Tisbury, on Martha's Vineyard, MA, to achieve net zero so far. Designed and built by South Mountain Company, the development's eight units of affordable housing were all built to similar specs and provide excellent insight into home energy usage and the challenges of net zero.

South Mountain's net zero goal was driven by the notion of true long-term affordability. Energy prices on the island are high, and the global energy future is uncertain: any notion of affordability that doesn't encompass the ability to heat a home is doomed to come up short. The challenge, of course, was cost, given South Mountain's commitment to high-quality materials. With grant support from Cape Light Compact, however, they delivered the houses for reasonable prices—and sold them to island residents based on a sliding income scale.

> The question was how to motivate the owners to adapt to the necessary mode of living.

The strategies at Eliakim's Way are customized for the island's climate: 9.5-inch walls dense-packed with cellulose, a roof with 14-inch I-joists filled with cellulose, foam at the band joists, and 3 inches of foil-faced polyiso with intumescent paint at the basement wall. A single heat pump head on the first floor heats and cools this 1,400-square-foot home, and a single-speed HRV provides ventilation with heat recovery. Electric radiant panels provide backup heat in the bedrooms, and a 50-gallon electric domestic hot water tank covers hot water.

With simple, elegant structures ready for net zero lifestyles in place, the question was how to motivate

All eight homes at Eliakim's Way, on Martha's Vineyard, MA, were designed and built by South Mountain Company to be "net-zero possible." After one year, two households achieved net zero, and two were very close.

Photos from left: Putney School; Derrill Bazzy, South Mountain Company

Well-thought-out details—like a place to set your stuff when you come in the door—make the homes at Eliakim's Way comfortable and appealing as well as sustainable.

the owners (who'd won spots in the community by lottery) to adapt to the necessary mode of living. The answer? Offer a prize. To any household that could reach the 12-month zero net energy target, South Mountain offered a one-year share at a local CSA farm or a $400 credit at a local fish market. Two of the eight houses achieved net zero status, proving what South Mountain knew from the start.

More important than any single net zero accomplishment, the PVs made 83 percent of the neighborhood's energy over the first two years.

Lessons Learned

These buildings were all submetered for hot water, heat pump, radiant panels, and PV production, and the meters were read monthly by one of the residents. Analyzing this data, Marc Rosenbaum, PE, calls out some salient facts. Among them: domestic hot water heating (in all but one house) consumes more energy than space heating. Future upgrades—at Eliakim's Way or in follow-on projects by South Mountain—might include heat-pump hot water tanks or solar hot water (they left space on the roof).

What South Mountain learned, and has the data to support, is that net zero performance is necessarily a combination of a good building and a willing owner. The differences in energy consumption across the eight houses is remarkable. Some use nearly twice as much as the net zero homes. The results are testimony to the impact of conscious consumption.

Andrew Webster is a designer and project manager at Coldham & Hartman Architects in Amherst, MA.

Green Buildings Open House 2012

A new and improved online presence means better ways to plan, learn, and share

By Sally Pick

NESEA's Green Buildings Open House (GBOH), on October 13, is the biggest sustainable energy event in the Northeast. Last year, nearly 11,000 people toured 500 homes, businesses, and public buildings showcasing energy-efficient design, systems, and products, as well as renewables. It should be no surprise that NESEA members are often behind what you see on the tour.

This year, NESEA is partnering with NESEA member Energy Sage (www.energysage.com) to host and enhance the tour's online listings. It will be easier than ever to research the technologies you're most interested in, plan your tour, and find practitioners who can help you with any project you're inspired to take on afterward. The new format will give GBOH hosts the opportunity to share online what motivated them to pursue sustainable energy and what advice they have for anyone considering similar investments. It will also allow hosts to provide case study data so that visitors can see their energy savings and the financial returns on their investments. Each case study includes information about the brands and vendors involved, with links to their websites. This will give visitors useful information and heighten the visibility of our members. Through these links, visitors can also view case studies for buildings that aren't on the tour.

We hope you'll check in with us often as we recruit more buildings for this new site, and as you plan your 2012 tour. Let us know what you think. We're always looking for ways to provide better, more relevant information!

Meanwhile, here's a preview of the tour: five buildings, from a 30-year-old passive solar home to a New York City apartment building, that are part of the solution.

—The editors

Claremont, NH

A Retrofit Revives a Downtown Landmark

Built in downtown Claremont, NH, in 1888–'89, the 36,000-square-foot Union Block building has a substantial presence in the historic district known as Opera Square. The owner wanted to preserve Union Block's historic integrity but needed to improve its energy efficiency and air and light quality in order to attract and retain tenants—there's retail space on the street level and 34 subsidized low-income rentals on the upper two floors. Given Bruss Construction's expertise in managing energy retrofits for historic buildings, the owner hired them to bring this enormous building up to today's energy standards.

Photo by Bruss Construction

After a retrofit, the historic Union Block in Claremont, NH, uses 60 percent less energy.

The Jordan Institute performed the initial energy audit, plus a financial analysis to see if the recommended changes were economically feasible. Regional Greenhouse Gas Initiative funds administered by New Hampshire's Public Utility Commission paid for the energy assessment.

Michael Bruss, who was Bruss Construction's project executive for Union Block, is deeply committed to historic preservation, having served as board chair for the New Hampshire Preservation Alliance. Yet he also has a long-standing passion for converting historic buildings into high-performance buildings. He recognizes that it takes a long time to replace the embodied energy that was used to produce old buildings, and build new.

Three Froling wood-pellet boilers heat Union Block's 36,000 square feet of space. The old oil boiler remains in place as backup.

A 30-ton silo in the back of the building feeds wood pellets to the boilers.

The New Hampshire Division of Historical Resources (DHR) oversaw the renovation process and had to review and approve all plans. As required for any federally funded undertaking, the project also had an architectural historian who reported on the historic characteristics of the building before and after the retrofit. The DHR made sure that the solar panels were not visible from the ground, reviewed the insulation plan, and reviewed designs for such safety features as new railings to see that they fit with Union Block's historic aesthetic. Bruss explored insulating the brick walls, but did not, due to concerns raised by the DHR about the potential impact on the brick.

Bruss Construction modeled and implemented energy efficiency measures, developed budgets, and managed the construction all while keeping the building safe and operational for tenants. Where possible, they insulated with cellulose and foam spray. The roof achieved an R-value of 60 with 2 inches of high-density spray foam and blown-in loose-fill cellulose. Bruss had the basement wall air-sealed with 3 inches of high-density spray foam, from the underside of the deck on down about 3 feet.

They adapted the heating system to move away from fossil fuel, installing three large Froling wood pellet boilers fed by a stand-alone 30-ton pellet silo in the back of the building. With improved heat delivery systems, air sealing, and insulation, the building has seen a 60 percent energy savings and a 75 percent cost savings; the cost savings above the energy savings were due largely to the switch from oil to pellets. The oil boiler remains in place as a backup, although the pellet boilers have the capacity to steam-heat the entire building. An energy recovery ventilator brings in fresh air for the tenants while recycling much of the heat from the exhausted stale air.

Construction managers: Bruss Construction Inc.

Architects: Stuart White and David Laurin

Project executive: Michael Bruss

Project manager: Ed Rimm

Building owner: Gary Trottier

Energy verification: Integrated Building Energy Associates

Solar hot water installer: HB Energy Solutions

Bruss also installed a solar hot water system. And, by reglazing a skylight and removing interior partitions, they brought natural light into the interior space. A centralized exhaust-only ventilation system vents the bathrooms.

Green Building Highlights

- Froling wood pellet boilers, fed by a 30-ton pellet silo, heat the building
- HTP solar hot water panels
- R-60 attic insulation: loose-fill cellulose and 2 inches high-density spray foam for air sealing
- 60% energy savings
- 75% energy cost savings

With the project completed, turnover among the retail storefronts and residential apartments is slowing, and all the apartments are now rented. The owner of the sister building across the street has hired Bruss to make similar improvements to that building, enhancing downtown Claremont.

The Union Block project was made possible by grants and loans from the Community Development Finance Authority under the Energy Enterprise Fund program of New Hampshire's Department of Energy and Planning. The American Recovery and Reinvestment Act of 2009 funded the Energy Enterprise Fund.

Photos by Bruss Construction

Portland, ME
Greening with an Eye to Retirement

In 2011, Paul Ledman and Colleen Myers designed and built their home—an apartment building in an urban neighborhood in Portland, ME—with the intention of making it not only energy efficient, but also an easy place in which to age. They live on the top floor and a half, and rental income from the two apartments on the lower floors covers the cost of running the building. It has an elevator, and they can walk to Portland resources.

Owners: Paul Ledman and Colleen Myers

General contractor: Paul Ledman

Architectural design: Kaplan Thompson

Energy modeling: Aaron Despres, Up-country Building Inspectors

Construction management: Island Carpentry

Design and installation of solar hot water and PV systems: Revision Energy

As a consultant in the energy efficiency field, Ledman was committed to making a building that sipped energy, so he designed a tight envelope. The building as a whole achieved a Home Energy Rating System (HERS) rating of 25, which is 75 percent more efficient than a standard new building. He reached this level of efficiency with R-43 walls, an R-60 roof, and an R-55 ceiling between the street-level garage and the apartment above. Air-source heat pumps provide efficient electric heat to each apartment, and he offsets his own 2,600-square-foot unit's electrical use with a 7.6 kW photovoltaic (PV) system. Since March of 2012, the PV has generated well over the amount of energy that he consumes. His energy bills "basically don't exist," he says. He expects energy modeling data that he is collecting for his unit to show net zero or very close to it.

This Portland, ME, apartment building is 75 percent more efficient than a standard new building. The owners' unit is expected to be net zero, or close to it.

An evacuated-tube solar hot-water system serves all three apartments, and PV generates enough electricity to more than cover the owners' needs.

Ledman decided not to provide PV to renters, believing that free electricity would give them a disincentive to be careful with their consumption. However, 90 solar hot water evacuated tubes heat water for everyone in the building. Because the backup hot water is electric, the renters have an incentive, in the form of their electric bill, to be sparing with their hot water use.

Green Building Highlights

- HERS rating of 25 for the entire building, including rental units
- 2x8 construction with 2x3 strapping allowing for 9 inches of dense-packed cellulose in walls and polyisocyanurate board on the outside, for an R-value of 43
- R-60 roof
- Ceiling between street-level garage and apartment above garage is R-55
- 4 Fujitsu air-source heat pumps, 1 for each rental unit and 2 for the owners' apartment
- ET Solar 7.6 kW PV panels
- An Apricus solar hot water system with 90 evacuated tubes

With all of these green bells and whistles, it would not be surprising if the building cost more than a conventional one, but it was the same.

Photos from top: Paul Ledman; Sandy Agrafiotis Photography

Newark, DE
A Passive Solar Home at Age 30

In 1981, when Marian Peleski could not find an energy-efficient house to buy in Delaware, she decided that her best option was to research and build her own green home. A professional meteorologist, Peleski had little carpentry experience. But she was undaunted. She was driven, she says, by a personal and professional "affinity ... with our earth, its atmosphere and environment." She hired a master carpenter and a carpenter's helper. She was the third person on the crew, the "nailer and hauler."

This 1981 double-walled passive solar home in Newark, DE, stays comfortable thanks to a convective loop. No fans necessary.

The interior and exterior walls each have their own set of windows and doors.

Photos by Marian Peleski

Peleski chose a passive solar design from a now out-of-print book called *The Double Shell Solar House,* by Community Builders in New Hampshire. On the north and south sides, double walls interconnect from the basement through the attic. The winter sun hits the south side and warms the air in the space between the walls, which then rises to the attic, pulling cooler basement air behind it. The air cools along the north wall and drops back into the basement, creating a convective warming loop that provides about 70 percent of winter heating needs. There are no fans or vents. Rather, the heated space between the double walls acts as a blanket, keeping the house a cozy 70 to 75 degrees. This kind of passive, convective loop is also referred to as a sun run, and that's the name Peleski gave to her home. The sun is the primary heat source, but on cloudy days she heats with a woodstove, using about one-and-a-half cords of wood a year.

The exterior walls are insulated with 6 to 8 inches of fiberglass, and the interior walls with 4 inches. The interior and exterior walls each have their own windows. The exterior ones are larger to allow more sun into the shell space. The smaller interior windows frame the view to the outdoors—giving the impression, from the inside, of a conventionally structured house. If Peleski wants extra heat in the winter, she opens the south-facing interior windows to let in warm air captured between the shells.

Green Building Highlights

- Double shell or convection loop passive solar design
- Passive solar provides 70% of heat
- AstroPower 4 kW PV covers all electric usage
- Thermomax solar hot water system
- White patio blocks reflect heat of sun into house
- 6- by 8-foot attic vents that can be opened to cool house in summer

In the summer, Peleski cools the house by opening the 6- by 8-foot vents in the east and west gables of the attic, allowing hot air to escape. If she opens her windows on a cool night, she can close the house down on a hot day, and it will hold the coolness as well as it holds the heat. While the design might seem likely to heat up like a greenhouse in the summer, the house never gets warmer than it is outdoors.

Planning ahead for PV, she built a south-facing roof with a slope close to the 40-degree angle that's best for her latitude. In 2000, with the State of Delaware offering a 35 percent rebate, she added PV. Solar hot water followed in 2007.

Peleski exclaims, "It amazes me how well this house works. Having lived here 30 years, there are only one or two things I'd do differently."

Owner and building designer: Marian Peleski

Master carpenter: Vince Panico

Solar hot water installer: Energy Alternatives

PV installer: Montana Contracting Inc.

Northampton, MA

Sustainable Arts and Crafts Style

Meg Kelsey Wright and Jonathan Wright had not planned to move from their Victorian home to Village Hill Northampton, the new development that Jonathan's company, Wright Builders, was designing and building. "We decided [to make a home here] two years ago," he says, "after the first three houses were built, in part because we realized, sitting in the model-house screened porch one summer evening, that we really liked the place. Also, fortuitously, we knew our decision would build confidence in the project."

The Wright home is equipped with a 6 kW PV system, which typically yields a credit on the electric bill, despite an air-source heat pump, an electric heat-pump hot water heater, and an ERV.

The development sits on what used to be a state mental hospital campus. MassDevelopment, the Massachusetts economic development agency, created a master plan that includes 50 percent affordable housing. The large property repurposed two of the brick hospital buildings as mixed-income housing. The Wright Builders design team was tasked with creating an efficient and replicable design for the houses. Village Hill now has 11 single-family houses, of which the Wrights' is one, and 11 townhouses, all built by Wright Builders.

Builders: Wright Builders

Designer: Nancy Schwartz Design

Landscape design: Berkshire Design Group

All of the homes in Village Hill are LEED certified; in fact, it is the only entire neighborhood of homes in New England with that designation. The houses in the Wrights's neighborhood, called Morningside, are Energy Star 3.0 Tier III compliant, with HERS ratings of 45 or lower. With their 6 kW photovoltaic system, the Wrights typically see a credit of $10 to $20 a month on their electric bill, even with an air-source heat pump for heating and cooling, an electric heat-pump hot water heater, and an energy recovery ventilator that runs year-round for fresh air. They especially like the heat-pump water heater in the summer, because it cools and dehumidifies the basement. It can cool the basement a few degrees in the winter, but that has not been a problem. A high-efficiency gas-fired system provides their primary heat, although it does not come on much because the house is so well insulated and air-sealed.

The home, which has a cozy Arts and Crafts aesthetic, is filled with natural light. For example, a glassed-in porch off the living room enhances the connection to the outdoors, and a window near ground level lets light into the basement stairway and hall. Boat prisms in the first-level flooring refract light into the basement and visually reference Jonathan's interest in boats. Meg, a pianist and teacher, got her dream music studio: it has room for two grand pianos and opens out into the living room for house concerts.

Photo by Sally Pick

Green Building Highlights

- Energy Star 3.0 Tier III compliant
- LEED Gold, in the only LEED-certified neighborhood in New England
- RenewAire Energy Recovery Ventilator (ERV)
- Stiebel Eltron heat-pump water heater
- Pella R-5 prototype triple-pane windows
- Air-sealed to 0.8 ACH
- American Standard air-source heat pump
- 6 kW SunPower PV installed by Pioneer Valley Photovoltaics Cooperative
- Double 2x4 wall construction with full thermal break and R-36 insulation
- R-64 ceiling insulation
- R-16.5 insulated basement floor with drainage and radon piping
- R-31 basement walls

The house also has many nooks for social gatherings, and the bedrooms are large enough for visits from their children and grandchildren. With the bedrooms upstairs, the Wrights planned the stairway to accommodate a chair lift, so they can age in place.

> The houses in the neighborhood are Energy Star 3.0 Tier III compliant, with HERS ratings of 45 or lower.

The exterior was designed for energy efficiency and water management. Jonathan made the tapered, square front columns and the decorative brackets for the deep overhangs that provide shade from summer sun and divert water away from the house. Working with Berkshire Design Group, they planned drought-tolerant native plantings throughout their neighborhood, with the exception of a low-grow grass for the front lawns. The landscape design keeps the storm water on-site.

New York, NY
Apartment Building Meets ICFs

Steve Bluestone of the Bluestone Organization, a New York City real estate developer, says he has "always had green on the mind." His new energy-efficient East Harlem apartment building at 1885 Lexington Avenue models most of the energy-saving features on another building that the Bluestone Organization developed several years ago: the Andrew. The Andrew was their first foray into their new green building model and was named a top energy performer in the city.

Steve Bluestone took a chance with the Andrew, the Bluestone Organization's first building constructed with insulated concrete forms (ICFs). They have pioneered the use of ICF walls for apartment buildings in New York City, according to Ryan Merkin of Steve Winter Associates, an energy consultant for the Lexington Ave. project. Fortunately, the Andrew was a success, so they used the same technique to build the Lexington apartments. Rebar-reinforced concrete is sandwiched between 2½-inch expanded polystyrene foam; with studs built into the form, anything can attach to the outside. According to Bluestone, it cost no more than their standard building of brick exteriors, cinderblocks, metal framing, and fiberglass insulation. But the

Each Lexington Ave. apartment has a rooftop garden plot with automatic trickle irrigation.

The pioneering Bluestone Organization's Lexington Ave. co-op is among the first in New York City to be constructed with insulated concrete forms.

ICF walls have a continuous R-value of 21. The building also has triple-glazed windows—required by a funding agency as a sound barrier, in addition to being energy efficient.

Typically, the Bluestone Organization sees annual heating costs of around $600 per apartment in its buildings. But with the new ICF walls, which not only insulate but also are airtight, the annual heating costs for the Andrew are less than $200 per apartment. For the Lexington Ave. building, they project heating costs to be as low or lower. It's a co-op, and apartment owners pay a maintenance fee that in cludes the cost of heat. By keeping the heating costs low, the developer is able to offer lower management fees, making the apartments more marketable.

Developer: The Bluestone Organization

General contractor: Banta Homes Corp.

Architect: Curtis and Ginsberg Architects

Energy testing: Steven Winter Associates

Energy modeling: Community Environmental Center Inc.

Nonprofit development partner: Hope Community

Rooftop gardens are a unique feature of the building—New York City zoning law requires recreational space when developers increase the size of a building. The elevator goes to the rooftop, allowing tenants easy access. Typically, green roofs consist of 4 to 6 inches of soil with drought-resistant sedum plants covering at least 50 percent of the roof. At the Lexington Ave. site, the tenants have their own garden plots. Automatic trickle irrigation prevents the gardens from shriveling up in the heat of the summer sun.

For meeting Energy Star and LEED (Leadership in Energy and Environmental Design) certification performance levels, the New York State Energy Research and Development Authority will award the developers incentives on a per-square-foot basis. The green features add up to a profitable development that also matches Steve Bluestone's commitment to sustainable building practices. "Building energy efficient buildings has always been a passion for me," Bluestone says. "Now that it is more in vogue than it has ever been, I'm actually having fun at work."

> With the new ICF walls, annual heating costs are less than $200.

Green Building Highlights

- Insulated concrete form (ICF) walls with a continuous R-value of 21
- R-31 roof assembly with 4 inches of iso board
- Quaker triple-glazed windows required for sound muffling
- LEED for Homes Multifamily Mid-rise Silver certification anticipated
- Energy Star rating for Multifamily High Rise buildings anticipated
- Average air leakage per apartment is 4.7 ACH50
- Rigid polyethylene air conditioner covers by AM Conservation Group help reduce air leakage

Sally Pick's consulting firm, SJP Environmental Consulting, LLC, offers a range of services for environmental nonprofits, businesses, and associations, including writing, managing projects and collaborations, and directing community-based public education initiatives. Sally's western Massachusetts home, built in 1856, will be on the GBOH tour, featuring an energy retrofit and new PV panels. Over the summer, she oversaw outreach for Solarize Mass Montague, a reduced-cost solar program for her town.

Pages 21-22: photos by Steve Bluestone

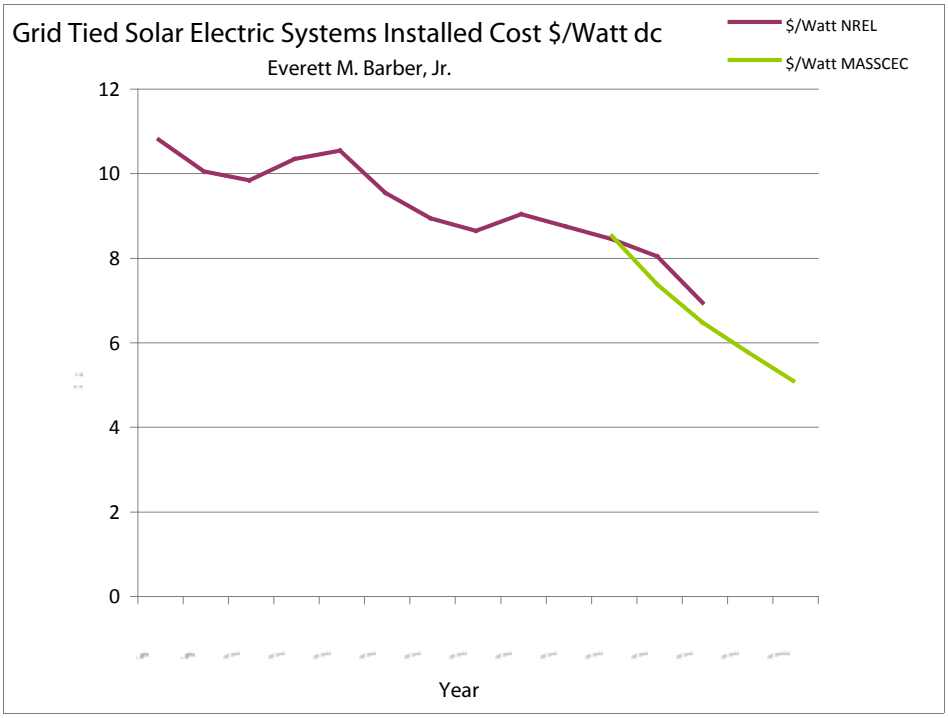
Solar's Role in Domestic Water Heating

Solar thermal versus solar electric: Is thermal still better for hot water?

By Everett M. Barber Jr.

As the installed price for grid-tied solar electric systems drops and the reliability of heat-pump water heaters improves, the question arises as to when, or if, the cost of solar electric systems for heating domestic water will drop below that of solar thermal systems (SDHW) used for the same purpose. This two-part peer-reviewed article examines SDHW systems versus grid-tied solar electric systems serving air-source heat-pump water heaters (PV/ASHPWHs). Part one, below, attempts to quantify the first costs of the two systems. Part two, which will appear in the next issue (spring 2013) with comments from the peer reviewer, attempts to quantify cost of ownership. —The editors

Figure 1



In the late 1970s and early 1980s, there was keen interest in air-source heat-pump water heaters (ASHPWHs). Due mostly to durability issues and a scarcity of competent maintenance, they did not survive in the marketplace. Recently, they've reappeared. And with prices for grid-tied solar electric dropping, PV/ASHPWHs are worth considering. Martin Holladay, senior editor at *Green Building Advisor*, even titled a recent blog post "Solar Thermal Is Dead." But do ASHPWHs paired with grid-tied solar electric systems in fact make more economic sense than SDHW for domestic hot water*?

For most consumers (not all), the first cost is a major determinant in buying decisions: they compare the first cost of some new system with that of conventional systems. If this were not the case, many more home owners would be buying more energy-efficient but more costly appliances. Consumer preference for low first cost over lower cost of ownership is borne out by the overwhelming number of storage-type

Table 1 - Approximate Installed Prices for SDHW Systems | July, 2012

Sized for family of 3.2; 64 gal/day;	High sys. $	High $/ft²	Avg. sys. $	Avg. $/ft²	Low sys. $	Low $/ft²
A. North East 80 ft2/120 gal/indirect; complete sys. w/up to 220 ft insulated Cu tube >0.8 solar fraction	$10,000	$125	$8,500	$106	$7,000	$88
B. North Florida 64 ft2/80 gal/indirect; Cu tube, insulated, up to 120 ft Cu tube to/from collectors; >0.8 solar fraction			$7,775	$122		

* Note that domestic water is defined here as potable water used for personal hygiene and for washing dishes and clothes—not water used for swimming pools or for space heating. Such large hot-water loads are more likely to be met with large SDHW systems used in conjunction with other types of domestic water heaters—oil- or gas-fired, for example. Very small loads (5 to 10 gallons a day) are most likely to be met with small electric-resistance water heaters. Solar installations for commercial water heating—apartment buildings, laundries, athletic centers, industrial processes, pool heating—are not considered here.

natural gas and electric domestic water heaters sold in the United States compared to more efficient types of heaters, such as the instantaneous gas-fired water heater or the HPWH, both of which have a higher first cost but lower total cost of ownership.

On the basis of first cost alone, without incentives for either type of system, the outcome of the comparison varies with the installed system costs. While the PV/ASHPWH system cost seems about the same countrywide, the cost of SDHW systems varies much more. A SDHW system with a solar fraction of 0.8 or better can have an installed cost as high as $10,000 in affluent localities of the Northeast, and $8,500 in somewhat less affluent localities nearby. The lowest price for systems of this size that I found for the Northeast was about $7,000. Using figure 5 (page 26) and $10,000 for a SDHW system, the two systems are comparable in first cost at PV/ASHPWH cost of about $4.50/watt dc; using $8,500, they are comparable at about $3.75/watt dc; using the low figure for the Northeast, $7,000, they are comparable at PV/ASHPWH costs closer to $2.00/watt dc. Note that an average for installed SDHW systems for North Florida is given for comparison. That figure is probably closer to the norm for the rest of the United States. The data is presented below.

Installed prices

Figure 1 (facing page) indicates the trend in the installed price for grid-tied solar electric systems since 1998. Both commercial and residential systems are included in the data. Sources for the data are given.

Table 1 (facing page) shows the maximum installed prices for residential SDHW systems in selected US locations. The systems are sized to provide a solar fraction of approximately 0.8 or higher in their locality. The SDHW system size required to reach a solar fraction of approximately 0.8 was calculated using the computer model F-Chart. The hot-water load used was 64 gallons of 120-degree water per day, typical for a US household of 3.2 persons.

Energy: grid-tied

The annual output of 24 residential and commercial grid-tied solar electric systems in the Northeast can be seen in **figure 2** (below). The average output of all systems shown, excluding "n2," which is a sun-tracking system, is 1,082 kWh/sq. ft./yr. per kW dc. That can also be expressed as 16 kWh/sq. ft./yr.

Figure 3 (below) shows the annual output of grid-tied solar electric systems in selected US localities, as predicted by the computer model PVWATTS v.1. As a generalization, mostly due to local shade the actual output of solar electric systems is often 15% to 25% lower than the model prediction. PVWATTS accounts for shade, but only in a broad-brush manner. Many designers and installers seem unaware of the consequence of shade, particularly of shade from tree branches after leaves have fallen.

Energy: thermal

Figure 4 shows the annual energy delivered by 21 solar thermal systems with flat plate collectors, which were used for domestic water heating and, in some cases, for space heating. This data came from an Internet survey of third-party test results of solar thermal systems conducted by Emaan (Amy) Ammar and the author. The results were presented at NESEA's BuildingEnergy10 and BuildingEnergy12 track sessions. Parasitic and standby losses are included in the output of the systems. The average output for the 21 systems is 58.7 kWh/sq. ft./yr.

As the basis for his "Solar Thermal

Figure 2

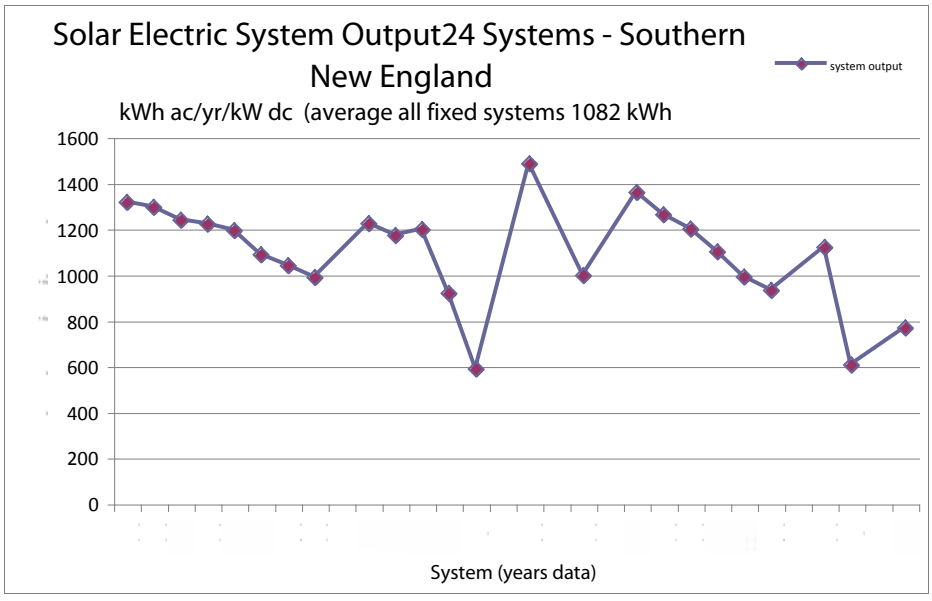


Figure 3

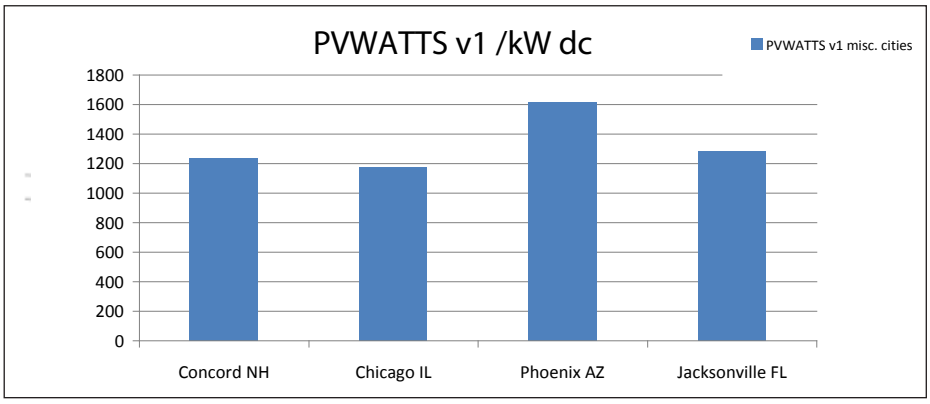


Figure 4

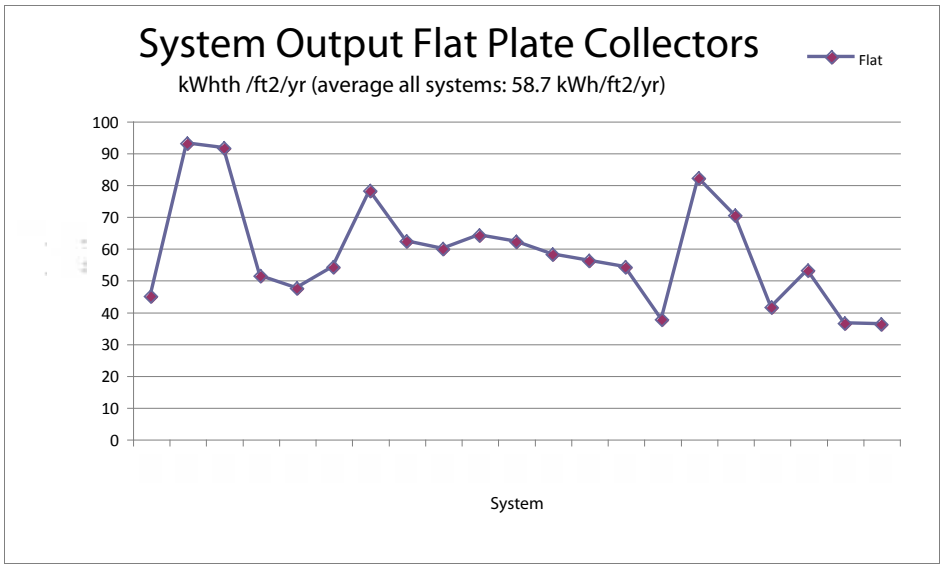
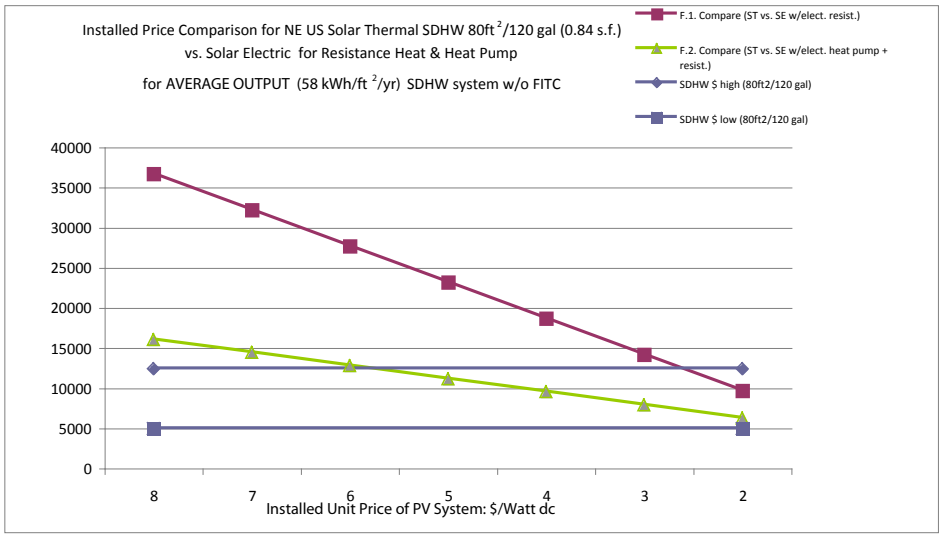


Figure 5



Is Dead" post, Martin Holladay used a SDHW system performance figure from a study by Steven Winter Associates (SWA) of two SDHW systems. The SWA study is also included in the data reported by Ammar and the author. The two lowest system outputs on the graph are those from the SWA study.

The performance of the two systems was low because of their non-optimal configuration. SDWH systems perform best when the solar system is sized to provide the entire hot-water load for as many months of the year as possible and the supplemental heater is bypassed, and shut off. This configuration minimizes standby losses. Two systems were studied in the referenced report: one in Hadley, MA, and the other in Madison, WI.

The Hadley system was configured so that when there was a hot water draw, the water leaving the solar preheat tank flowed into a separate tank heated indirectly by a fuel-fired boiler. The indirectly heated tank was always maintained at a minimum temperature by the boiler, thereby reducing the portion of the total water-heating load carried by the SDHW system. The Madison system was configured so that when there was a hot-water draw, the water leaving the solar preheat tank flowed through a thermostatic mixing valve and into an instantaneous, natural-gas-fired water heater. The mixing valve was used to limit the temperature entering the gas-fired water heater so the water heater would always fire when there was a hot water draw. Neither configuration would result in maximum solar system performance. It should be noted that SWA monitored the system performance, and in that capacity they do excellent work; they were not the system designers.

Comparison

The majority of ASHPWH sold now are integral units that include all components required to heat and store hot water. Since the heat pump is a more efficient way to heat water than an electric element, but heats the water more slowly, the tanks are larger than the typical 40-gallon residential storage-type electric water heater with resistance heating element—typically, 65 or 80 gallons. For a given hot-water demand, the larger the ASHPWH tank size, the higher the percentage of water heated by the ASHPWH. Test data indicates that if properly sized for the load, the ASHPWH can operate with an annual energy factor of 2.3.

In **figure 5** (left), the output of the SDHW system was based on the average output of the 21 systems in figure 4. The output of the PV system was based on the average output of the 24 systems in figure 2. Domestic water heating with (solar) electricity is examined in two ways: by an ASHPWH that includes an electric resistance element in the storage tank, and by a standard storage-type electric resistance water heater. The solar electric system was sized to produce the same amount of energy as the SDHW system and excludes the supplemental water heating needed by the SDHW system. The annual EF used here for the ASHPWH was 2.3

A solar electric system that installs for $5.00/watt, supplies electricity to an ASHPWH, and includes the installed cost of the ASHPWH ($3,000) would cost about $11,000 installed, before incentives. To find that, enter the chart at $5.00 on the horizontal axis; go up to the green line and across to the vertical axis to $11,000. An SDHW system that supplies approximately the

same amount of heated water in the Northeast might cost $8,500 installed. SDHW system prices are read from the vertical axis. Their likely maximum and minimum prices lie between the two horizontal lines on the chart. Find $8,500 on the vertical axis and draw a horizontal line across the chart. The intersection of the $8,500 line and the green line occurs at about $3.75/watt dc. Thus at about $3.75/watt dc, the two systems are about equal in first cost.

In the next issue of BuildingEnergy: *part two, cost of ownership.*

Everett M. Barber recently coauthored Convert Your Home to Solar Energy: A Consumer's Guide to Solar Applications *(Taunton Press). He is now working on a design guide for commercial and industrial solar thermal systems. He was founder and past president of Sunsearch Inc., a solar thermal/solar electric design, build, and service firm in southern New England (1975–2007), as well as an associate professor (adjunct/retired) of building environmental technologies at Yale School of Architecture (1972–1998).*

Peer reviewer *David White has been practicing building energy efficiency since 1998. Through his office, Right Environments, he designs enclosures and mechanical systems for state-of-the-art residential buildings in the Northeast. He is an assistant professor at Parsons the New School for Design, where he teaches environmental technology to architecture students. He has taught the Passive House Planning Package (PHPP) and THERM software to professional trainees since 2009 and is collaborating with the German Passive House Institute on adaptation of the PHPP for humid climates.*

Acknowledgments: *Thanks to David White; Marc Rosenbaum, PE; David Madigan, PE; Gene DeJoannis, PE; Paul Popinchalk, PE; and Tom Lane.*

Residential Solar: Own or Lease?

New leasing options bring new considerations for home owners

"I'm seriously considering solar. What makes more sense: owning or leasing?"

Whether you are an architect, a builder, an energy consultant, or an installer, you probably hear this question on a regular basis. After decades as a niche product, solar is becoming part of the mainstream conversation.

Since the 1970s, people have been attracted to solar for off-grid living or a reduced carbon footprint. The decreasing cost of equipment and the advent of state and federal incentive programs have made it more affordable and accessible. In 2007, the solar lease model offered by California companies such as Sunrun and Solar City changed the residential solar landscape. With third-party-owned solar, home owners can install solar for nothing and "rent their roof" in exchange for discounted electricity. In Massachusetts, for example, third-party-owned solar accounted for approximately 75 percent of all installed residential solar in the first several months of 2012.

In light of these changes, what does makes more sense? Below, Chris Foley Pilsner, vice president of marketing at Sungage Inc., makes the case for ownership, while Amy Bowman, East Coast residential marketing director for Real Goods Solar, explores leasing. But no matter how you choose to go solar, you are making a smart investment. Says Ed Ziedins of Waterbury, VT, of his system, "Watching the meter run backwards gives my kids a sense of pride that we're doing our part to preserve our climate and environment for future generations."

The Case for Ownership

Home owners and communities should reap solar's economic benefits

By Chris Foley Pilsner

Third-party ownership has introduced solar to a new audience. However, we need to do more to maximize the benefits of our growing clean energy sector within our local communities. We need to support ownership in residential solar because it offers two excellent benefits.

First, greater access to ownership will increase the number of people who install solar on their roofs. Despite the attractive hook of a no-money-down option, many home owners are unwilling to allow a third party to own equipment installed on their home. Financial options that don't require

"The more research I did, I realized there were more advantages to owning," says Jim Picardi of Shelburne Falls, MA, shown here with Cooper.

1. E. Lantz and S. Tegen, "Economic Development Impacts of Community Wind Projects: A Review and Empirical Evaluation" (National Renewable Energy Laboratory Conference Paper, April 2009).
2. Governor Deval Patrick, speech entitled "Shaping Our Energy Future" at FastCap Systems in the Innovation District in Boston.

home owners to forfeit ownership will serve a substantial number who remain on the sidelines right now.

Second, ownership of solar resources confers substantial economic benefits. With third-party-owned projects, those economic benefits accrue to out-of-state companies. Research by the National Renewable Energy Laboratory indicates that locally owned renewable energy projects generate 1.5 to 3.4 times the economic impact of third-party-owned projects.

Because of its favorable regulatory environment, Massachusetts is illustrative of what communities stand to gain—or lose.

Local ownership means local gains

As Massachusetts Governor Deval Patrick recently stated, "Our businesses and residents spend $20 billion annually on energy costs—and $18 billion of that leaves the Commonwealth. That is nearly $8,000 that each and every Massachusetts household sends to other states and countries to meet our energy needs." Solar represents a strategic opportunity for Massachusetts or any state to keep its energy spending local.

MA Tax Credits	7 kW system installed for $5/watt Total system cost: $35,000
State tax credit	$1,000
Federal tax credit	$9,900
Total value tax credits	$10,900

Graph by Chris Besett

Policy makers in the Commonwealth and in Washington have worked to create incentives that make solar installations financially attractive, including rebates, tax credits, and solar renewable energy certificates (SRECs). To understand the magnitude of the economic value at stake, consider a typical residential PV system in Massachusetts. With current prices and rebates, the total value of the tax credits generated by the system is $10,900 (see table below left).

All tax credits are captured by the owner of the PV system. In the case of a third-party-owned project, those dollars accrue to out-of-state entities. When a home owner owns the system, those dollars are delivered to a Massachusetts resident.

> In the first several months of 2012, 81 percent of solar installed on residential rooftops in Massachusetts took up the third-party model. And about 90 percent of all leased systems are owned by out-of-state companies.

In the first several months of 2012, according to the Massachusetts Clean Energy Center, 81 percent of solar installed on residential rooftops in Massachusetts took up the third-party model—in 2008, only 2 percent did. And about 90 percent of all leased systems are owned by out-of-state companies. If the next 100 MW of residential solar are installed with the same rate of third-party ownership, the Commonwealth will forfeit over $100 million in federal and state tax credits to out-of-state entities. (This does not factor in the sizable value of SRECs, which may or not be captured by home owners in the third-party model.) The full economic impact of that forfeiture in terms of job creation and economic multipliers makes local ownership even more urgent.

Locally owned solar offers a unique opportunity for us to meet our energy needs and enrich our communities. So while each third-party-owned project moves Massachusetts closer to meeting its governor's goal of 400 MW, it also represents a lost opportunity to capture economic value for the state.

Solar panels are not a car

Whether it's their home or their car, some people are inclined to rent or lease, while others prefer to own. The same applies to solar. With the right information and support, home owners can quickly come around to the fact that when they lease their solar panels, they lose access to valuable incentives such as SRECs and tax credits. Moreover, at the right site, solar is a great investment opportunity. Jim Picardi of Shelburne Falls, MA, did extensive research on solar. "I considered leasing my panels at first," he says, "but the more research I did, I realized there were more advantages to owning." Matt Russo of South Deerfield, MA, leased his car, but not his solar panels: "I know there are companies that would put a system on my roof for a lot less if I leased. I leased my last car. But this isn't a car. This is attached to my house and it's going to last more than a car, more than three to five years."

There are more home owners out there like Matt and Jim. To keep the conversation around solar positive, we must deliver products and services that support local ownership of renewable energy resources. Greater access to local ownership will broaden solar appeal, grow the industry, and enrich our communities.

Chris Foley Pilsner is the vice president of marketing at Sungage Inc., based in Amherst, MA. Chris has managed brands and developed successful communication strategies for blue-chip companies such as Kraft Foods, Unilever, Diageo, Merrill

Lynch, and Novartis. Since she joined the Sungage team in 2011, she has talked to many home owners and installers about the benefits of owning solar. Her primary responsibility at Sungage is to spread the word that solar makes good financial sense.

The Case for Leasing

Power purchase agreements expand access and affordability

By Amy Bowman

With a power purchase agreement (PPA), a third-party company develops, owns, installs, and maintains a renewable energy system on your roof. The company sells the energy back to you at a fixed rate that is lower than that of conventional utility-supplied power. Home owners can realize significant savings.

While purchasing a solar system is the best option for people who can afford a large up-front payment and plan to stay in their home a long time, a PPA

> Net metering works the same as it does if you own the system.

requires a low or no up-front payment and provides monthly savings from the beginning. And since cost is often cited as a key reason why consumers resist renewable energy, PPAs have become popular among home owners looking to reduce their monthly utility bills and their carbon footprint.

According to Nat Kreamer, CEO of Clean Power Finance, thanks to PPAs there has been tremendous market growth in the number of solar companies and the amount of solar they're selling. "The amount of solar sold, installed, and financed in 2011 was up one hundred percent from 2010," he says, "and we've seen companies grow their businesses by three hundred percent selling finance products such as leases and PPAs."

As for the popularity of PPAs, Kreamer says, "Consumers are not investors. They want to pay for a utility when they get the utility, to pay for it as they need it. They don't want to own and care for equipment and hardware. Trying to sell consumers solar systems without financing is like trying to sell someone a cell phone plan but saying they'd have to have a cell tower installed in their backyard. You wouldn't sell a lot of cell phone plans that way. Many consumer goods and services are sold as leases or PPAs, and now we're bringing this type of financing to the residential solar market."

Simple, affordable, and hassle-free

Many PPAs require no money out of pocket to get started. Others require just a few hundred dollars—as opposed to the thousands it takes to purchase a system. The solar provider retains ownership of the system and takes care of maintenance, insurance, and warranties. It also insures the panels and the portion of the roof they occupy and monitors your system to make sure it is operating as expected. They are investing in your roof's ability to produce power, so they have a vested interest in making sure it is operating at peak performance at all times.

For Ruth Gemperlein of Greenfield, MA, a PPA helped make solar a reality. "The zero-down option was everything for me," she says. "I am in the process of renovating my home to make it as sustainable and efficient as possible. Solar power was an obvious choice, but the out-of-pocket costs of purchasing put it out of reach. Thanks to a power purchase agreement, I am now paying less per month for electricity and minimizing my carbon footprint."

Thanks to rebates, improved technology, and the fact that sunlight is free, most PPAs will pay for themselves in the first year. Some even pay for

For Ruth Gemperlein of Greenfield, MA, a PPA helped make solar a reality.

themselves in the first month. Purchased systems usually pay for themselves in five to eight years.

Five misconceptions, explained

Jim Oliva, New England sales manager for Real Goods Solar, has heard a lot of misconceptions about PPAs. He shared some insights from the field.

1. *A PPA is the same as a solar lease.* Not exactly, says Oliva. A solar PPA is an agreement to buy power from a utility company at a fixed rate, regardless of the amount of power you consume each month. A solar lease, on the other hand, offers a fixed monthly payment for having solar panels on your roof, regardless of the amount of power they generate each month.

2. *A 20-year PPA locks you into your home.* Many people sell their homes with solar. In fact, says Oliva, it tends to help your home sell faster. Depending on your agreement, you can either buy out the system when you move and roll the cost into your selling price, or follow this three-step procedure: First, have a notice of sale sent to the solar company in advance. Then get a one-page document explaining the transfer signed by all parties. Lastly, ensure that the new home owner passes a credit check. Both options are very simple.

3. *PPAs are the perfect solution for everyone looking to go solar.* Unfortunately, this is not the case. Because the PPA provider is depending on the home owners to pay for the energy they use (albeit at a discounted rate), they must have good credit to qualify for a PPA.

4. *If you have a PPA, you don't get the benefit of net metering.* Actually, net metering works the same as it does if you own the system. You have an electricity "bank account," and any electricity your system produces that you don't use goes back to the grid (a "deposit" into your account), and your meter rolls backward.

5. *PPAs only make sense in states that don't have SRECs.* Oliva says PPAs actually make *more* sense in markets that have SRECs. The PPA company builds the potential value of the SREC into the net cost of the PPA, allowing you to go solar with little to no up-front investment. You get the benefits of the SREC's value, without any of the risk.

Amy Bowman is Real Goods Solar's East Coast residential marketing director. During her more than 10 years in the marketing and communications field, she has managed marketing and communications efforts covering a wide range of environmental topics, from promoting energy efficiency to helping cities invest in clean water technology to making renewable energy accessible to home owners.

Fixing the Pretty Good House

How a "shallow energy retrofit" achieved net zero for $26,000

By Marc Rosenbaum

For many years, I lived in a home I'd designed and built in New Hampshire. It got most of its heat and hot water from renewable energy (sun and wood), was drenched in sunlight, and could coast with no heat input for a considerable time. Then my household moved to Martha's Vineyard, MA, and into a far more typical building.

One of 16 homes in the Island Cohousing community, the 1,589-square-foot house is well designed and beautiful, with wonderful finishes inside and out. It was built in 1999-2000, when oil was 85 cents a gallon even on the island, where everything is more expensive. A couple of years' worth of energy consumption records showed an annual usage of 435 gallons of fuel oil for heat and hot water, plus 129 gallons of propane for cooking, clothes drying, and supplemental heat. I didn't have electrical usage data, but if I guess at 400–500 kWh per month, the total energy usage would be in the range of 56–58 kBtu per square foot, per year, slightly higher than the Massachusetts average of 52.7. Energy costs would have been around $3,300 per year—a third higher than for the average Massachusetts household. We hoped to effect significant reductions.

The 4.76 kW PV system far exceeded expectations; the surplus for the year could be used to run an electric car over 10,000 miles.

What's the right target?

I've helped people achieve net zero energy, do deep energy retrofits (DERs), work toward Passive House certification, qualify for the Thousand Home Challenge, and even nail LEED Platinum a few times. But when I set out to alter this house, I didn't have a clear endpoint in mind.

I knew I wanted to get rid of the oil boiler. I think storing liquid hydrocarbons inside our homes is one of the all-star dumb ideas. One significant leak or overfilling, and your house is a toxic waste site. So we agreed that one goal was to end up free of fossil fuels. Next, I thought about a DER. The best DER candidates are simple houses in need of new cladding and roofing. My house has cypress trim in and out, cedar shingle cladding, and an 11-year-old roof in great shape. It also has 16 corners and 7 roofs—hardly a simple shape. I did some modeling and figured a DER could cut heating energy demand by a factor of three. The cost benefit didn't feel right, given where we were starting—with a pretty good house.

So I put our house into the Thousand Home Challenge (THC) calculator. I'm enthusiastic about the THC. Its goal is the transformation of America's housing stock via a demonstration project of 1,000 homes that reduce site energy use by 70 to 90 percent. What differentiates the THC from other programs is that it is based on 12 months of actual, not modeled, energy usage, and that it allows—indeed encourages—multiple paths to success. It is the only initiative that recognizes that the principal barrier to deep energy reductions is not a lack of technology or insurmountable cost, but rather the choices that people make in how they use energy. The calculator sets a maximum allowed energy

consumption based on house size, location, and number of occupants. Our budget, assuming an all-electric house, was a maximum of 5,375 kWh a year. On Martha's Vineyard, this would cost $1,000 a year. From a site energy perspective, this is under 12 kBtu per square foot, per year … I guess that's why they called it a challenge! We are allowed to use more if it's offset with renewables, yet I wanted to see if we could hit the target as if we had none, because there are many houses without good solar access. Our house was intentionally designed with a clear roof facing 11 degrees east of south, albeit with some shading from deciduous trees. My neighbor to the south kindly permitted me to do some cutting to reduce the shading significantly. So we added another goal: achieve zero annual net energy.

There was one more goal I wanted to add. The Passive House standard has a primary energy limit of 11.1 kWh per square foot, per year. Primary energy is the energy consumed to get energy to the building site. With electricity, there are generation inefficiencies, as well as transmission and distribution losses. In round numbers, it takes three units of primary energy to make one unit of electrical energy delivered to the site. So our Passive House primary energy limit would be about 17,000–18,000 kWh/year, translating into 5,000–6,000 kWh site energy use annually. (I'm giving ranges because the Passive House standard calculates area differently than we do in the United States, and there are variations in the primary energy factor depending on where one's electricity comes from.) Perhaps coincidentally, the THC target and the primary energy target were close.

Going for net zero

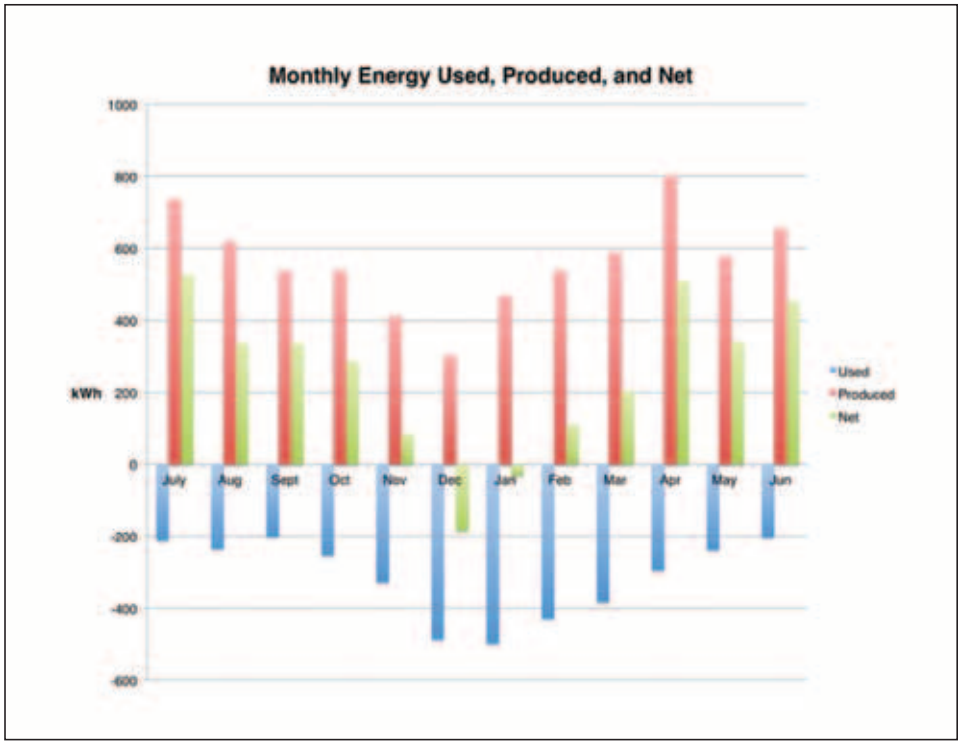
I divided our approach into envelope, mechanical, appliance, and renewable strategies. I wanted to keep the investment as low as possible, spending money where the cost/benefit ratio made sense.

Envelope

We began with a house with 1 inch of foam beneath the basement slab, R-19 batts in the basement ceiling, 2x6 walls with cellulose insulation, 2x10 rafters with cellulose insulation plus some open attic with 14 inches of cellulose, and double-glazed low-e argon-filled fiberglass windows. The blower door reading was 919 CFM50.

We first targeted air sealing. Using zonal pressure diagnostics, it was clear that there were more leaks from the basement to the outdoors than from the house to the attic. I sealed the obvious holes in the basement—both the door to the bulkhead and the window rough openings were leaky. I added sweeps to the exterior doors and weather stripping and insulation to the attic hatch (why is this always in the most inaccessible closet?). I did some work in the attic, sealing around electrical box penetrations. The first round got down to 650 CFM50. When the sidewall-vented propane heater and the oil boiler went away, it got down to 400 CFM50. This works out to about 0.10 CFM50 per square foot of shell area, perhaps triple what I'd like to see in a new house.

I had noticed some settling of the cellulose in the open attic, and I got the insulator back for a couple of hours to repair this.



Post-retrofit, Marc Rosenbaum's Martha's Vineyard home was net zero every month except December and January. A balmy winter helped.

Next, I turned my attention to the basement. Given that there was already a thermal boundary between the house and the basement, I knew basement insulation wasn't a great energy investment. However, it's humid on the island in the warm season, and insulating the basement walls reduces moisture transport from the soil and warms up the exposed surfaces such that condensation ceases—no mold. I installed two 1-inch layers of polyisocyanurate foam, with offset joints, the second of which is Thermax because it is rated to be left exposed. It also has a thicker, more rugged aluminum facer, and it's white, which really brightens up the basement. I

used the Hilti IDP plastic fasteners in conjunction with a hammer drill to make the $^{5}/_{16}$-inch holes in the concrete walls. It's a great system. First we had to move stuff away from the basement walls so I could install the foam continuously. A chunk of the PVC waste line, the water pressure tank, part of the stairway, and a number of electrical items had to be moved inward 3 inches so I could slip the foam behind them. Once the rigid foam was installed and the joints taped with foil tape, I used a two-component polyurethane foam pack to spray the rim joist, completing the thermal barrier and air-sealing the sill and rim.

We already had pretty good windows, yet in cold weather the larger glass areas felt cold to us due to radiant transfer from us to the glass. I've been trying Ecosmart double-honeycomb cellular shades on the larger window openings. The most effective ones have foil on the inside faces to block both light and radiant heat transfer. In addition, these shades have side tracks and weather stripping top and bottom. Their effectiveness vs. more typical cellular shades is evident in the reduced temperature between the glass and the shade compared with a conventional cellular shade. There is increased condensation on the glass with these shades, yet it doesn't seem to be enough to pool and cause damage.

Mechanicals

To heat the house, we installed a Fujitsu 12RLS single-zone mini-split air-source heat pump rated at over 16,000 Btu/hour. The wall cassette is in the open first floor. Warm air rises to the bedrooms and bath on the upper floor, and they tend to run two degrees cooler in typical winter weather, and as much as four degrees cooler when it gets down to 10 degrees outdoors. The third bedroom is an ell off the living area, and we keep that door closed, letting the temperature float as low as 50, since we aren't using it. This is an example of a THC strategy: don't heat all areas fully if it isn't necessary.

Next we installed an 85-gallon Marathon electric water heater. Adjacent to it is a Nyle Geyser heat-pump water heater (HPWH) that's piped to heat the tank. I turned off the electric elements in the Marathon, so all the water is heated by the HPWH. In January I switched back to the electric element and found that the HPWH used about 75 percent of the energy that the electric element did. In the summer, with higher basement and incoming well-water temperatures, performance was better. HPWHs do better as hot-

water usage increases, and the two of us use only about 14 gallons a day, so we're a tough test for this technology.

The oil boiler in typical January weather was using about 2.5 gallons of oil daily. The Fujitsu and the HPWH together used about 16 kWh per day in the same conditions. From a cost perspective, we've gone from about $11 a day to $3 for winter heat and hot water!

I haven't added a ventilation system yet. The house has a Clivus composting toilet, so it is under a continuous exhaust flow.

Appliances and lighting

We sold the gas dryer and gave away the gas range. We use drying racks in winter and a clothesline in the summer. The new range is a Frigidaire with two induction burners and two regular electric burners—we love the speed and responsiveness of induction. A rough comparison shows that this range uses perhaps one-third the site energy of the gas range. We gave away the 11-year-old refrigerator and replaced it with an inexpensive new one that uses 300 kWh per year instead of 650 kWh. It's quieter too. The house has mostly compact fluorescent lighting, and we replaced the high-use kitchen recessed lamps with an LED retrofit product made by Cree for Home Depot.

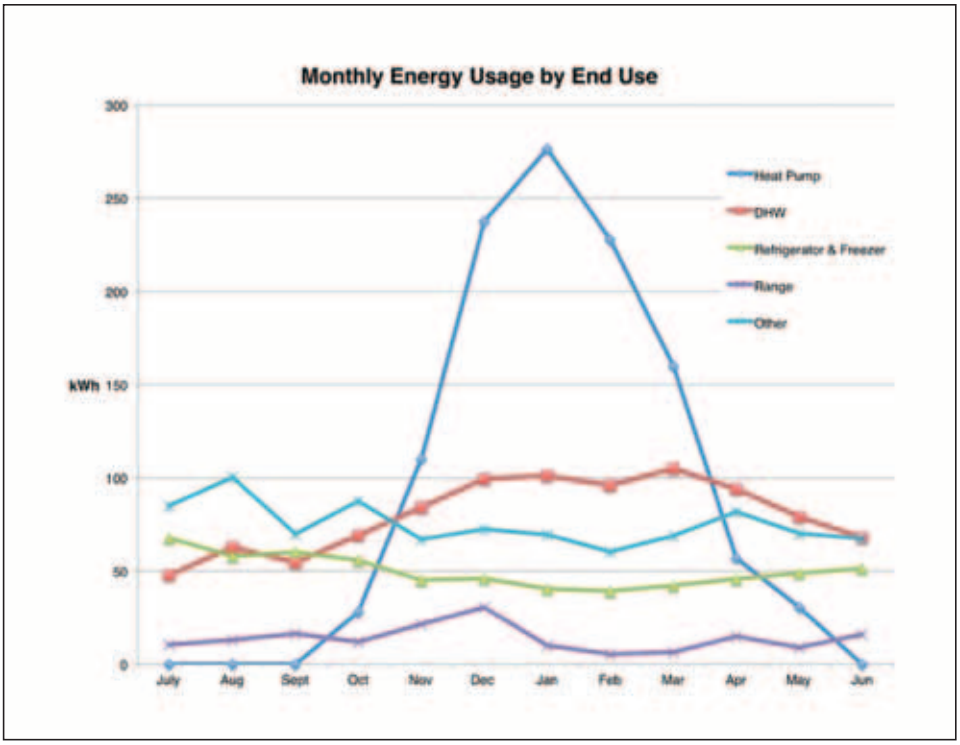
Renewables

South Mountain Company, whom I work for, is a Sunpower solar electric dealer, so it was an easy choice to install a 4.76 kW 20-panel system to try to achieve the net zero goal. The system has performed flawlessly and over the past year of operation has produced a tad over 1,400 kWh/kW, far exceeding expectations.

Mission accomplished

From July 1, 2011, through June 30, 2012, we used 3,755 kWh, which would have cost about $700. This is below the THC target and likely meets the Passive House primary energy limit as well. During that period the solar electric system produced 6,779 kWh, meaning that we had a net export of 3,024 kWh—handily achieving zero annual net energy. The surplus could be used to run an electric car over 10,000 miles. It's important to note that we had an uncommonly warm winter, and I'd expect to use 600–700 kWh more in an average year. Also, we are a household of two. Add a couple of teens, and the energy balance would be different. Yet I believe we could still be net zero and meet THC under those circumstances. With the balmy winter, we were actually net zero every month except December and January.

We spent about $26,000 after subsidies to get here. Some of this work was subcontracted, and some I did myself. I got some good deals too. I think another person might have spent $40,000 to have the same work performed. The energy bill of this house when we got it would be in the neighborhood of $3,300 annually, so the simple payback of this effort seems well within the range of reasonable. And we got a more comfortable house with better air quality.



The energy profile reflects an efficient new range and refrigerator, a clothesline, and a mix of CFL and LED lighting.

Marc Rosenbaum, PE, director of engineering at the Vineyard-based South Mountain Company, is a longtime student of making great buildings. Much of his recent work has consisted of deep energy retrofits, Passive Houses, and zero net energy buildings. His work has been recognized nationally by ASHRAE, AIA, EEBA, and NESEA—but they didn't see all the mistakes along the way. To read more about the "pretty good house" and other sustainability topics, visit his blog: www.thrivingonlowcarbon.typepad.com.

Peer reviewer *Jesse Thompson is an architect at Kaplan Thompson Architects in Portland, ME. He hasn't let that stop him from attempting to become technically competent.*

One Man's Path to Success with NESEA

Longtime member Bob Chew reflects on the business value of NESEA

By Bob Chew

I have a passion for renewable energy. We need to free ourselves from our dangerous dependence on fossil fuels and nuclear energy. It was this passion that drove me to blindly start a solar company in 1977, although I did not even know how to sweat a pipe. In NESEA, I found a group of similarly passionate people. Generous too: over the years, many NESEA members have offered their help, and through them I gained the knowledge needed to run a successful solar energy company. Today, several mergers and companies later, I find that NESEA remains a critical source of the passion and knowledge that are prerequisites for success. In honor of NESEA, then, here's a NESEA-centric time line of my career so far.

1977

In the beginning ...

Ah, that fateful year: I moved back to Rhode Island from Mystic Seaport, CT, where I was a shipwright, and started R. W. Chew Co. Inc., a solar contracting company. I had learned about **Everett Barber**, founder of Sunworks and Sunsearch, while I was still at Mystic Seaport. Now I started using Sunworks' solar hot water collectors. Our relationship would prove to be a lasting one.

1979

Best decision ever

I joined NESEA this year (or thereabouts ... it was a long time ago!).

1980s-1990s

Learning PV from Leigh

In 1986, President Ronald Reagan suddenly repealed the 40 percent federal solar tax credits, which caused the solar industry to collapse. In 1998, **Leigh Seddon**, (1) the founder and president of Solar Works, received a grant from the Rhode Island Renewable Energy Fund to restart the state's solar industry. Leigh got my name from **Domenic Bucci** (a longtime NESEA member and the director of Rhode Islanders Saving Energy, the state's NESEA chapter) and hired me to run the Rhode Island satellite office of Solar Works. My experience was in solar hot-water systems and passive solar sun spaces. Leigh taught me how to design, install, and service photovoltaic (PV) systems.

1990s
Leigh Seddon (1)

2003
Fred Unger and me (2)

2004
Jeff Wolfe and Gene Plunkett (3)

2000
SolarWrights ss launched

I left Solar Works in early 2000 to start SolarWrights.

2003
Focus, says Fred!

A friendly tip from longtime NESEA member **Fred Unger** (2) helped me see that I was going in too many directions and needed to focus my energies. At the time, I was running RemodelWrights, SolarWrights, and Earth Friendly Homes, and Fred sent me an article titled "Less Is More." After reading this article, I sold RemodelWrights, closed down Earth Friendly Homes, and focused all my energies on SolarWrights. This was a key decision, and I owe a lot to Fred for his help. Fred recently commented, "My one regret regarding that advice I gave you is that I didn't follow up with an investment in SolarWrights after you took the advice."

2004
First commercial PVs

SolarWrights' first commercial PV project was in 2004, for the South Providence (RI) Development Corporation. We installed a 10 kW Powerguard system on the roof, or "light monitor," of a newly renovated green business incubator at 17 Gordon Avenue. Among the crew were **Gene Plunkett**, SolarWrights' master electrician, and **Jeff Wolfe** (3). I met Jeff, founder of groSolar, at a Building Energy conference in Boston. He came down to train our crew on how to install the Powerguard system.

Karina Lutz (4) worked for People's Power and Light, which rented spaced at 17 Gordon Ave. She's a long-term advocate and lobbyist for renewable energy in Rhode Island. I've always looked forward to seeing her at monthly NESEA meetings in Providence to get her insight on legislation and incentives that often are too complicated for me to follow. Karina also became a customer: SolarWrights installed PV and solar hot-water systems on her house.

Also in 2004, I moved into a **100-year-old home** (5) in Bristol, RI, and installed a 4.4 kW PV system and a 30-tube Viessmann evacuated-tube solar hot-water system.

2007
Getting into wind

I had read lifetime NESEA member **John Abrams**'s book *The Company We Keep* and had met him through NESEA. He was nice enough to invite me and my daughter Tory Reiff, who was SolarWrights' vice president of sales and marketing, out to South Mountain Company on Martha's Vineyard, MA. John was very helpful in explaining how he had made South Mountain Company employee-owned. Shortly thereafter, I decided to make SolarWrights employee-owned.

2004
Karina Lutz (4)

2004
My own house goes solar (5)

2007
SolarWrights goes employee-owned (6)

The SolarWrights team (6) was pretty happy about it, as you can see in photo taken at a 2007 employee meeting in Westerly, RI.

South Mountain Company had recently installed two 10 kW wind turbines on the island, and John was equally helpful in showing me the installations and answering my questions—I was just starting WindWrights, the wind division of SolarWrights. Later, I repaid the favor by helping South Mountain Company's **Phil Forest** to expand their solar energy division by sharing SolarWrights' knowledge about grid-connected PV systems.

Another highlight of 2007 was SolarWrights' first power purchase agreement (PPA). We installed, and owned the PPA for, a 72.6 kW PV system on the **Pine Point School** (7) in Stonington, CT. It was the first PV project in the state to use the PPA model.

2008

Mergers and acquisitions

When my wife, Beth, and I went out to SolarPower 2007 in Long Beach, CA, we sat in on a discussion about investing in solar energy companies. We realized that the venture capital and private equity companies were looking to invest in solar integrators. Beth and I determined that it was time to sell SolarWrights, and we set out to not only bring attention to SolarWrights but also ready it to be sold.

Part of our strategy was to start acquiring smaller solar companies. We acquired Kosmo Solar in late 2007 and **Everett Barber's** Sunsearch in early 2008. We often used the drainback system that Everett developed while running Sunsearch, which solved the stagnation problems often seen in closed-loop solar hot-water systems. As a consultant to SolarWrights, Everett continued to share his expertise in solar thermal systems.

We also exhibited at **NESEA's 2008 BuildingEnergy conference** and trade show, inviting the many private equity firms and venture capital firms that had contacted us to visit us there. After interviewing a few companies, we decided to enter into a letter of intent with a Boston-based private equity firm that we had met at the show. On September 8, 2008, we sold controlling interest of SolarWrights to this company.

After the financial collapse that occurred the next week, I figured it would be a good time to approach Solar Works to see if they would want to merge with SolarWrights. We covered the same region, but SolarWrights was 80 percent residential, and Solar Works was 80 percent commercial. It seemed like a deal made in heaven. In October, the two companies merged, and it was great to be

2007
SolarWrights does a PPA (7)

2009
CT's first community-scale wind turbine (8)

working with **Leigh Seddon** once again. In December, we changed the name of the new company to Alteris Renewables.

2009-2010
Wind, wind, wind

The SolarWrights–Solar Works merger won the 2009 M&A Advisors Green/Environmental Deal of the Year. Alteris Renewables also made the 2009 and 2010 Inc. 500 list of the fastest-growing private companies in the country.

Alteris went on to install **Connecticut's first community-scale wind turbine** (8): a Northern Power 100 kW at Phoenix Press. It's next to the Q Bridge on Route 95 in New Haven. And in another memorable project, we installed a wind turbine, PV system, and solar hot water system at the Heritage Flight Aviation Campus in South Burlington, VT. This project was unique: besides using three renewable energy technologies, its wind turbine was the first in the country to be located next to a runway. We also did our first vertical axis wind turbine (VAWT) project, a real challenge. The **42 VAWTs** (9) were installed on the York Hill Campus at Quinnipiac University in Connecticut. We put up yet another turbine at the New England Institute of Technology, alongside Route 95 in Warwick, RI.

In 2010, we installed a wind turbine at **Nantucket High School** (10), a Northern Power 100 kW turbine. The big challenge here was that while we were trying to get approvals from the town and the school committee, the only turbine on Nantucket (Bartlett Farm) threw a blade. You can imagine the questions we were asked about safety!

2011
Enter Real Goods Solar

Alteris Renewables merged with Real Goods Solar, and I started looking for my next opportunity.

2012
Latest venture: Redberry

As a longtime solar thermal contractor, I became frustrated by the fact that many of the larger solar companies had stopped selling, installing, and servicing solar thermal systems to focus on photovoltaics. I was also frustrated by seeing so many new buildings getting awards for being green even though they often did not include *any* solar energy technologies.

Just before going to Solar Works in 1998, I had worked at Acorn Homes, and there I gained valuable knowledge of the manufactured home industry. Why not start a modular solar home company? At Alteris, we installed a 275 kW wind turbine at Sandywoods Farm Eco-Development, where Union Studio was the architect. As I learned more about Union Studio, I became intrigued by their efforts in

continued on page 43

Page 37, photo 4 by Johannes Kroemer/photon-pictures.com; this page, photo 9 by Katie Kaizer

2009
Alteris's first vertical axis wind turbines (9)

2010
Wind at Nantucket High School (10)

Future Babble: Why Expert Predictions Are Next to Worthless, and You Can Do Better

Dan Gardner
Dutton, 2011

By Joel Gordes

Every once in a while you begin a book and then have the strong urge to stop reading it. This is one such book. You will love to hate it as it skewers people we have idolized, including Amory Lovins and James Howard Kunstler (both former BuildingEnergy speakers), Paul Ehrlich (*The Population Bomb, The End of Affluence*), Dennis Meadows (and by implication, Donella Meadows in *The Limits to Growth*), Charles Reich, and many others who have influenced NESEA thought. Only M. King Hubbert, the originator of the peak oil theory for the United States, comes out looking good.

Future Babble is about predictions: their methodologies, history, and biases; the people who make them; the people who study those who make them; and the general public's fascination with and need for them. Whether predictions are made on the macro topic of peak oil or the micro topic of determining individual buildings' energy loads (which has recently elicited great debate in NESEA nerd circles), this essential book provides a degree of critical thinking sometimes lost in the groupthink that is all too common. As a noted theologian once preached, being a believer does not mean not questioning the religion but in fact questioning it, to come to sounder belief.

Gardner begins this book by explaining that people who make predictions fall into two general categories. The first is the "hedgehog." Hedgehogs know great deal about one big idea; that is their specialty. They can be characterized as sometimes ideologically extreme, always confident, and always correct in their own estimation. As it turns out, they tend to be poor forecasters, particularly within their own specialty. Due to their overwhelming certainty and the confidence with which they present their information, they are the people the media prefer to interview. The second is the "fox." They know about many things and are not so invested in any one idea that it interferes with their objectivity. They are more likely to present predictions in terms of modest clarity than certainty. Scientists who maintain their professionalism give probabilities—often seen as complex and ambiguous—and are characterized as wishy-washy. The media rarely interview them.

To explain these differences, the author goes on to discuss the many biases and heuristics that affect not just the experts, but all of us. By understanding these factors, we can more easily discern the nature and accuracy of predictions. Here are just a few of the biases/heuristics he explains:

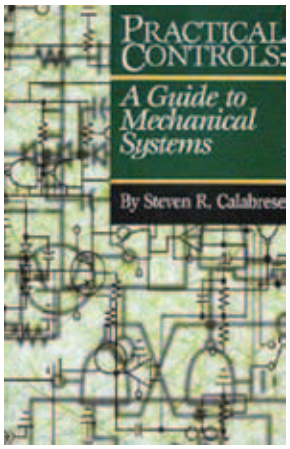
• *Overconfidence bias*: A human trait that makes us feel good about the accuracy of our judgment. We tend to want to believe people who are confident in their forecasts.
• *Confirmation bias*: The closer a futurist is tied to one overarching concept, the more likely they will find support for and confirmation of that view.
• *Status quo bias*: This is the tendency to stick with the status quo unless something compels us otherwise. We use current trends as starting points for predictions. While trends often tend to continue, that is not always the case.
• *Anchoring and adjustment heuristic*: Experiments have shown that when people are asked to come up with a number, they do not simply look at the facts available but instead unconsciously grab onto the nearest available number, dubbed the "anchor," and adjust to a reasonable level but in the direction of the anchor.
• *Availability heuristic:* This refers to the rule that whatever is freshest in memory becomes the basis for decision making.

Gardner also provides the three key elements for thinking like a fox. The first is *aggregation*: combining multiple sources of information is more likely to provide good results compared to using a single source. The second is *metacognition*: "thinking about thinking" in a conscious way, questioning your own conclusions and biases and attaching actual numbers to probability statements. The third is *humility*: knowing and admitting that you do not have absolute certainty, and not going too far out in time with your predictions in a complex, nonlinear world.

Like this book or not, it is worth reading—and finishing. You'll take away a different perspective, one that is useful at all levels of sustainable energy endeavors. As newsman Dan Rather once observed, "He who lives by the crystal ball eats a lot of broken glass." Something for all of us to keep in mind.

Joel Gordes has been a NESEA member since 1976 and served on its board from 1987 to 1994. For 37 years he has been involved in such energy issues as efficiency, renewables, and security, as well as climate change and its poten-

tial impact on the insurance industry and national security. He has authored a number of professional and popular articles pertaining to energy, including distributive generation and grid resiliency in particular. From 1987 to 1991 he took time out to serve as a Connecticut state legislator and was vice chairman of the Energy and Public Utilities Committee.



Practical Controls: A Guide to Mechanical Systems

Steven R. Calabrese
The Fairmont Press, 2003

By Bart Bales

Many an energy engineering consultant can attest that in large commercial and institutional buildings, control of mechanical systems is critical to optimal building performance. That is, to minimizing energy use and ensuring occupants' comfort.

In today's data-rich environment, developing a pragmatic sense of a given technology can be challenging. With *Practical Controls: A Guide to Mechanical Systems*, Steven Calabrese fills this gap with regard to control of mechanical systems. Although nearly a decade old, it remains the single best book I have ever encountered on the topic. It's a fine reference for contractors, engineers, architects, HVAC technicians, and others.

In a very readable style, Calabrese discusses the nature of various mechanical systems and the controls that serve them. He addresses such common control schemes as outdoor resetting of water temperatures, night set-back and morning warm-up, and outside air economizer operation for "free cooling." He also discusses methods and strategies of control, sensors and controllers, end devices, dampers, actuators and control valves, and variable-speed drives.

> This remains the single best book I have ever encountered on this topic.

Equipment covered includes air handlers and rooftop units, variable air volume (VAV) and fan-powered boxes, exhaust fans and systems, pumps and pumping systems, boilers, chillers, heat exchangers, and more.

I have found *Practical Controls* to be a very useful, one-of-a-kind reference that gives building professionals a unique understanding of and valuable insights into the practical application and operation of modern controls.

Bart Bales, PE, MSME, of Bales Energy Associates provides energy analysis, design, and implementation of high-performance mechanical, electrical, and renewable energy systems for buildings and facilities. His approach emphasizes whole systems and building science. He is a registered professional mechanical engineer in Massachusetts, Connecticut, New York, Rhode Island, and Vermont. He is a past member of the NESEA board of directors and a regular speaker at the BuildingEnergy conference.

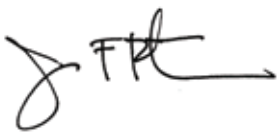
Agreed: It's (Almost) All About BuildingEnergy
from page 7

our mission. What members get in return is a strong organization that helps to advance the professional and business goals of contributors. NESEA members understand that the whole is greater than the sum of its parts. One does not receive a T-shirt and a coffee mug for supporting NESEA. Rather, one does good and gets business.

Directive 7: Make the BuildingEnergy conference the defining program

It is acknowledged that the BuildingEnergy conference, of all NESEA programs, is the most successful at serving the mission and providing the financial stability that supports our operations. In this new model, other programs will be derivatives of the conference or will strengthen it, and will make its benefits year-round.

I invite your feedback on these positions: james@petersenengineering.com.



James Petersen
Chair, NESEA Board of Directors
james@petersenengineering.com

James Petersen is a mechanical engineer and the founder of Petersen Engineering (www.petersenengineering.com). All of his firm's projects reflect his commitment to integrated design with a goal of significantly elevating building performance. For the past five years, James has also been a BE educational session track chair.

One Man's Path to Success with NESEA
from page 39

sustainable development and the New Urbanism movement. Founder **Donald Powers** had worked for my design-build company in the summer of 1984, while he was going to architectural school. Last fall, I approached him about starting a company that would design a new generation of modular solar homes that would be attractive, green, and fit into the traditional New England architectural style that Union Studio is known for. This new company is Redberry LLC (www.redberryliving.com). I'm working with **Everett Barber** again. These days, he's a consultant, and he's is helping me with some technical questions regarding the passive-solar batch hot-water heaters we are using in the Redberry homes.

With John Haley, I've also started a new company called Opechee Innovations, which is inventing new renewable energy systems and green products. The Chew Solar Loft, for example, uses passive solar energy for space heating along with an innovative passive solar hot water heating system. Many of the Redberry designs incorporate the Chew Solar Loft. At Opechee Innovations we are also working on a new type of wall-mounted solar hot-air collector and a new type of solar hot air heating system that is mounted on flat roofs. We expect to build our prototypes this fall and test them this winter.

My current goal at Redberry is to develop the necessary systems for rapid, glitch-free growth in early 2013. We'll need more talented, passionate professionals—and NESEA is the first place I'll go looking for them.

NESEA member Bob Chew is currently chief energy consultant for R. W. Chew Consultants, president of Redberry, and managing partner at Opechee Innovations.

Get Involved!

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The Sustainable Green Pages (SGP) has two parts: 1) A listing of green businesses by specialty and state, followed by 2) an alphabetical listing of all companies listed in the directory. If you already know the name of the company you want to find, go directly to the alphabetical listing for contact information. Or, to find a company that provides a particular service (e.g. solar), look for companies in your area under the specialty "photovoltaics" They are organized by state. Then find out more about the company by locating it in the alphabetical section. This information is also available online at nesea.org/sgp. Businesses are joining or renewing all the time, so be sure to check in!

ON THE GREEN PAGES COVER

(L) South Mountain Company Martha's Vineyard, MA: Driftwood entry to zero energy house designed and built by South Mountain Company. Photo credit: Brian VandenBrink

(C) The Community Preservation Corporation Coeymans, NY: 1873 engineering school turned elementary school turned senior housing. Airsealing, insulation, and new boilers reduced building energy usage by 20%. Photo credit: Andrew Padian

(R) DEAP Energy Group Falmouth, MA: This is the 2nd certified Passive House in MA & one of the first 15 certified in the US. Passive House Consultant: Mike Duclos, DEAP Energy Group; Architect: Steven Baczek Architect; Builder: The Valle Group

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Solar Frontier Americas, Inc.
Trina Solar, Inc. (US)

CT
Aegis Solar Energy
Burrington's Solar Edge

DE
Motech-Americas, LLC

MA
Ai3 Architects, LLC
Alternative Energy Store
Bales Energy Associates
Blue Selenium Solar, Inc.
BPVS, Berkshire Photovoltaic Services
Brightstar Solar
Community Energy Inc.
Cotuit Solar
GridWerks Consulting, a US Clean Power Company
Higgins Energy Alternatives
Mark Allen Electric
MyGenerationEnergy
New England Clean Energy
NorthEast Solar Design Associates
PowerDash
Precision Decisions, LLC
PV Squared
Renewable Sales, LLC
S&H Construction
Second Generation Energy
Solar Design Associates, Inc.
Solar Store of Greenfield
SolarFlair Energy, Inc.
Solectria Renewables
South Mountain Company
SouthPoint, LLC
Spire Solar Systems
Sungage
The Boston Solar Company
Transformations, Inc.
Turn Key Builders, Inc.
Wagner Solar, Inc.
Walden Street Web Services

NH
Froling Energy

NJ
1st Light Energy
ABSOLUTELY ENERGIZED Solar Electric, Inc.
Advanced Solar Products
Applied Energy Technologies - East Coast Office
Bergen County Solar
Genmounts Solar Racking Systems
Lightway Solar America
Krannich Solar
SunDurance Energy
Zensky Electrical Contracting, Inc

NY
EnterSolar

OH
Ecolibrium Solar
RBI Solar, Inc.

PA
Energy Systems & Installation, Inc.
Solar Electric Power Systems, Inc.

RI
Gabor Photovoltaics Consulting
Heartwood Group, Inc.
Newport Solar
R.W. Chew Consultants

TX
ONTILITY

Public Relations

RI
Green Machine PR

Public Policy

MA
Mass Audubon

NY
Enterprise Community Partners

Radiant Heating

CT
A&B Cooling and Heating Corp.

MA
CalorIQue LLC
NorthEast Solar Design Associates
Renewable Energy Systems, LLC

NH
Optimal Energy Solutions, LLC

Real Estate

MA
EcoRealty
Maple Hurst Builders, Inc.
Urban Habitat Initiatives, Inc.
WinnCompanies

NY
Harlem Greenfit Management & Urban Greenfit, LLC

RI
Truth Box, Inc.

Remodeling

CT
Picton Brothers, LLC
Wolfworks, Inc.

MA
Austin Design, Inc.
Bourke Builders
Byggmeister
Cape Painting & Carpentry, Inc.
Capizzi Home Improvement
Coldham & Hartman Architects
David Whitney Architect
DEAP Energy Group
Feinmann, Inc.
Geoffrey H. Richon Company, Inc.
Innovative Building & Design
INTEGRATA Architecture, LLC
John Fülöp Associates, Architects & Planners
Karen Carter Carpentry
Kuhn Riddle Architects, Inc.
Littlewolf Architecture
Paul Huijing, Inc. Construction and Engineering
Polanik Architects
Sage Builders, LLP
The Valle Group, Inc.
Timeless Architecture
Tom Harden and Associates
Turn Key Builders, Inc.
Water House Pools
Wright Builders, Inc.

ME
Artisan Builders
Kolbert Building
Maine Passive House

NH
Brooks Post & Beam, Inc.
Mulberry Tree Builders, LLC

NY
Alfandre Architecture, PC
Phinney Design Group
Scarano Architect, PLLC

PA
Bakker & Lewis Architects

RI
distill studio

VT
Michael Beattie Architect

Research

CA
Solar Frontier Americas, Inc.

CT
New Tapestry, LLC

MA
Greener Every Day
Noble Home, LLC

ME
Kaplan Thompson Architects

NY
New York State Energy Research and Development Authority (NYSERDA)
Phinney Design Group

VT
Robert L. Spencer, AICP - Environmental Planning Consultant

Roofing

MA
Capizzi Home Improvement
CBI Consulting, Inc.
Coppinger Builders, LLC

Social Services

MA
Boston Community Capital

NY
Enterprise Community Partners

Solar Hot Water

CT
Aegis Solar Energy
Alternative Energy Outlet, LLC

MA
Blue Selenium Solar, Inc.
Higgins Energy Alternatives
New England Clean Energy
NorthEast Solar Design Associates
PV Squared
Renewable Energy Systems, LLC
S&H Construction
Solar Store of Greenfield
SolarFlair Energy, Inc.
Spirit Solar
Stiebel Eltron, Inc

NJ
Be Solar Energy
Bergen County Solar

NY
Solar Plumbing Design

RI
R.W. Chew Consultants

TX
ONTILITY

Solar Pools

CT
Aegis Solar Energy
Alternative Energy Outlet, LLC

Space Heating/Cooling

Canada
Matrix Energy, Inc.

CT
BBT Mechanical Services, LLC
High Performance Energy Solutions
Redberry, LLC

MA
Caluwe Inc. - Hydro-to-Heat-Convertor
Co-op Power
Higgins Energy Alternatives
Innovative Building & Design
Mitsubishi Electric Cooling & Heating
Redberry, LLC
Renewable Energy Systems, LLC
RST Thermal
Wagner Solar, Inc.

NH
Key Heating & Air Conditioning
Optimal Energy Solutions, LLC
Water Energy Distributors, Inc.
Zehnder America, Inc

NY
ACT Bioenergy
Bright Power

RI
Redberry, LLC

Translation

MA
Petra Schweitzer Translations

Wind

MA
Ai3 Architects, LLC
Alternative Energy Store
Blue Selenium Solar, Inc.
Cotuit Solar
MyGenerationEnergy
New Energy Opportunities, Inc.
PV Squared

RI
Heartwood Group, Inc.
R.W. Chew Consultants

Windows

Canada
Thermotech Fiberglass Fenestration

CO
Zola European Windows

CT
A.W. Hastings Co. - Integrity Windows and Doors

MA
European Architectural Supply, LLC

NY
Bieber Architectural Windows

VT
Loewen Window Center of Vermont & New Hampshire

Workforce Development

MA
Massachusetts Clean Energy Center
Mitch Anthony
Transatlantic Climate Bridge

1ST LIGHT ENERGY 475 HIGH PERFORMANCE BUILDING SUPPLY A.W. HASTINGS CO. – INTEGRITY DOORS & WINDOWS A&B COOLING AND HEATING CORP. ABSOLUTELY ENERGIZED SOLAR ACI (AFFORDABLE COMFORT, INC.) ACT BIOENERGY ACUITY POWER GROUP, INC. ADVANCED SOLAR PRODUCTS AEGIS SOLAR ENERGY AI3 ARCHITECTS, LLC ALFANDRE ARCHITECTURE, PC ALTERNATIVE ENERGY OUTLET, LLC ALTERNATIVE ENERGY STORE AMERICAN EARTH ANCHORS AMERICAN PUBLIC UNIVERSITY ANDREW PADIAN ANTHONY J. MUSSO, ARCHITECT APPLIED ENERGY TECHNOLOGIES – EAST COAST OFFICE ARTISAN BUILDERS AUSTIN DESIGN, INC. BAKKER & LEWIS ARCHITECTS BALES ENERGY ASSOCIATES BBT MECHANICAL SERVICES, LLC BE SOLAR ENERGY BERGEN COUNTY SOLAR BEYOND GREEN CONSTRUCTION BIEBER ARCHITECTURAL WINDOWS BLUE SEA DEVELOPMENT COMPANY BLUE SELENIUM SOLAR, INC. BOSTON COMMUNITY CAPITAL BOURKE BUILDERS BPC GREEN BUILDERS, LLC BPVS, BERKSHIRE PHOTOVOLTAIC SERVICES BRIGHT POWER BRIGHTSTAR SOLAR BROOKS POST & BEAM, INC. BUILDING-GREEN, INC. BURRINGTON'S SOLAR EDGE BYGGMEISTER CALORIQUE, LLC CALUWE INC. – HYDRO-TO-HEAT-CONVERTOR CAPE PAINTING & CARPENTRY, INC. CAPIZZI HOME IMPROVEMENT CBI CONSULTING, INC. CENTER FOR ECOTECHNOLOGY CHRIS BENEDICT, R.A. CLEAN ENERGY FINANCE AND INVESTMENT AUTHORITY CO-OP POWER COLDHAM & HARTMAN ARCHITECTS COMMUNITY ENERGY, INC. CONEDISON SOLUTIONS CONSERVATION SERVICES GROUP CONSERVATION SOLUTIONS CORPORATION COPPINGER BUILDERS, LLC COREFOCUSED, LLC CORNERSTONE ARCHITECTURE COTUIT SOLAR CUSHMAN DESIGN GROUP DARTMOUTH COLLEGE DAVID PANICH ARCHITECT DAVID WHITNEY ARCHITECT DEAP ENERGY GROUP DENNIS K. BURKE, INC. DIETZ & COMPANY ARCHITECTS, INC. DIMENSIONAL ARCHITECTURE PC DISTILL STUDIO DMI DOUCET AND ASSOCIATES, INC. DR. ENERGY SAVER, LLC ECO SOUND BUILDERS, LLC ECOLIBRIUM SOLAR ECOREALTY EKOTROPE ENERGY & SUSTAINABILITY PARTNERS ENERGY BALANCE, INC. ENERGY OPPORTUNITIES, INC. ENERGY SYSTEMS & INSTALLATION, INC. ENERGYSAGE ENERGYWISE PARTNERS, LLC ENGINEERED SOLUTIONS, INC. ENOVATIVE GROUP ENTERPRISE COMMUNITY PARTNERS ENTERSOLAR ENVIRO ENERGY CONNECTIONS EUROPEAN ARCHITECTURAL SUPPLY, LLC FEINMANN, INC. FORTRESS GREEN BUILDING SUPPLY FOUR WINDS DESIGN FROLING ENERGY GABOR PHOTOVOLTAICS CONSULTING, LLC GAIA HOST COLLECTIVE GENMOUNTS SOLAR RACKING SYSTEMS GEOFFREY H. RICHON COMPANY, INC. GLEASON GEOTHERMAL GOODY CLANCY GREENCENTS SOLUTIONS, LLC GREENE ENERGY CONSULTANTS, LLC GREENER EVERY DAY GREEN MACHINE PR GREENFIELD COMMUNITY COLLEGE GREENLEAF ARCHITECTURAL DESIGN GRIDWERKS CONSULTING, A US CLEAN POWER COMPANY HARLEM GREENFIT MANAGEMENT & URBAN GREENFIT, LLC HEARTWOOD GROUP, INC. HIGGINS ENERGY ALTERNATIVES HIGH PERFORMANCE ENERGY SOLUTIONS HOME ENERGY TECHNOLOGIES HUDSON VALLEY COMMUNITY COLLEGE-TEC-SMART IN SITE: ARCHITECTURE INFRARED DIAGNOSTIC, LLC INNOVATIVE BUILDING & DESIGN INTEGRATA ARCHITECTURE, LLC INTERSOLAR NORTH AMERICA IVES ARCHITECTS JOHN FÜLÖP ASSOCIATES, ARCHITECTS & PLANNERS JOHN MATEYKO ARCHITECT KAPLAN THOMPSON ARCHITECTS KAREN CARTER CARPENTRY KEENE STATE COLLEGE ARCHITECTURE KEY HEATING & AIR CONDITIONING, INC. KEYCEPT SUSTAINABLE ENERGY VENTURES KOLBERT BUILDING KRANNICH SOLAR, INC. KRAUS-FITCH ARCHITECTS, INC. KUHN RIDDLE ARCHITECTS, INC. LEWIS CREEK BUILDERS LIGHTWAY SOLAR AMERICA LITTLEWOLF ARCHITECTURE LOEWEN WINDOW CENTER OF VERMONT & NEW HAMPSHIRE MAINE PASSIVE HOUSE MAPLE HURST BUILDERS, INC. MARK ALLEN ELECTRIC MARK R. FITZSIMMONS, ARCHITECT MARYANN THOMPSON ARCHITECTS MASS AUDUBON MASSACHUSETTS CLEAN ENERGY CENTER MATRIX ENERGY, INC. MCCAULEY LYMAN, LLC MICHAEL BEATTIE ARCHITECT MILBANK MANUFACTURING MITCH ANTHONY MITSUBISHI ELECTRIC COOLING & HEATING MOTECH AMERICAS, LLC MULBERRY TREE BUILDERS, LLC MYGENERATIONENERGY NATIONAL FIBER NATIONAL GRID NEW COMMONS NEW ENERGY OPPORTUNITIES

NEW ENGLAND CLEAN ENERGY NEW FRAMEWORKS NATURAL BUILDING NEW TAPESTRY, LLC NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY (NYSERDA) NEWPORT SOLAR NOBLE HOME, LLC NORTHEAST ELECTRICAL DISTRIBUTORS NORTHEAST SOLAR DESIGN ASSOCIATES NOVUS ENGINEERING, PC OCTOBER ENGINEERING ASSOCIATES, LLC ONTILITY OPTIMAL ENERGY SOLUTIONS, LLC PARTNERS FOR ARCHITECTURE PAUL HUIJING, INC. CONSTRUCTION AND ENGINEERING PAUL ST. AMAND DESIGNER & BUILDER PAVERS BY IDEAL PERIHELION RENEWABLES PETERSEN ENGINEERING PETRA SCHWEITZER TRANSLATIONS PHINNEY DESIGN GROUP PICTON BROTHERS, LLC PILL – MAHARAM ARCHITECTS POLANIK ARCHITECTS POWERDASH PRECISION DECISIONS, LLC PROJECT PLANNING AND MANAGEMENT PUBLIC SERVICE OF NEW HAMPSHIRE PV SQUARED QUIGLEY BUILDERS, INC. R.L. BENTON – BUILDER R.W. CHEW CONSULTANTS RA SOLAR COMPANY RBI SOLAR, INC. RE:VISION ARCHITECTURE REDBERRY, LLC RENEWABLE ENERGY SYSTEMS, LLC RENEWABLE SALES RENO ENGINEERING LIGHT AND DESIGN RICHARD RENNER ARCHITECTS RIGHT ENVIRONMENTS ROBERT L. SPENCER, AICP – ENVIRONMENTAL PLANNING CONSULTANT RODMAN & RODMAN CPAS RST THERMAL S&H CONSTRUCTION SAGE BUILDERS, LLP SALTONSTALL ARCHITECTS, INC. SCARANO ARCHITECT PLLC SCHÖCK USA, INC. SECOND GENERATION ENERGY SELLARS LATHROP ARCHITECTS, LLC SIEMENS INDUSTRY – BUILDING TECHNOLOGIES DIVISION SJP ENVIRONMENTAL CONSULTING, LLC SOLAIRE GENERATION SOLAR DESIGN ASSOCIATES, INC. SOLAR ELECTRIC POWER SYSTEMS, INC. SOLAR ENGINEERS SOLAR FRONTIER AMERICAS, INC. SOLAR PLUMBING DESIGN SOLAR STORE OF GREENFIELD SOLARFLAIR ENERGY, INC. SOLECTRIA RENEWABLES SOUTH MOUNTAIN COMPANY SOUTHPOINT, LLC SPARHAWK GROUP SPIRE SOLAR SYSTEMS SPIRIT SOLAR STEELE KELLOGG STEPHEN TURNER, INC. STERLING COLLEGE STEWART HOYT DESIGN AND BUILD STIEBEL ELTRON, INC. SUNDURANCE ENERGY SUNGAGE SUSTAINABLE RETROFITS SYMMES MAINI & MCKEE ASSOCIATES SYNERGY CONSTRUCTION TCF EQUIPMENT FINANCE – SOLAR CAPITAL THE BOSTON SOLAR COMPANY THE COMMUNITY PRESERVATION CORPORATION THE ENERGY CONSERVATORY THE GREEN ENGINEER, LLP THE UNITED ILLUMINATING COMPANY & CT ENERGY EFFICIENCY FUND THE VALLE GROUP, INC. THERMOTECH FIBERGLASS FENESTRATION THORTON TOMASETTI FORE SOLUTIONS THOUGHTFUL BALANCE TIMELESS ARCHITECTURE TOM HARDEN AND ASSOCIATES TRANSATLANTIC CLIMATE BRIDGE TRANSFORMATIONS, INC. TRANSOPTIONS TRILLIUM ARCHITECTS TRINA SOLAR (US) TRUTH BOX, INC. TURN KEY BUILDERS, INC. URBAN HABITAT INITIATIVES, INC. US SOLAR WORKS, LLC VANTEM PANELS VIESSMANN MFG. WAGNER SOLAR, INC. WALDEN STREET WEB SERVICES WARREN DESIGN BUILD WATER ENERGY DISTRIBUTORS, INC. WATER HOUSE POOLS WINN COMPANIES WESTERN MASSACHUSETTS ELECTRIC COMPANY (WMECO) WOLFWORKS, INC. WRIGHT BUILDERS, INC. ZEHNDER AMERICA, INC. ZENSKY ELECTRICAL CONTRACTING, INC. ZEROENERGY DESIGN ZOLA EUROPEAN WINDOWS

1st Light Energy
Peck, Barrett
1253 New Market Ave.,Ste. F
South Plainfield, NJ 07080
Tel: 732-595-6218
bpeck@1stlightenergy.com
1stlightenergy.com
Specialties: *Photovoltaics*

1st Light Energy
Peck, Barrett
3224 McHenry St.
Modesto, CA 95350
Tel: 732-595-6218
bpeck@1stlightenergy.com
1stlightenergy.com
Specialties: *Photovoltaics*

475 High Performance Building Supply
Levenson, Ken
131 Union St.
Brooklyn, NY 11231
Tel: 718-622-1600
ken@foursevenfive.com
foursevenfive.com
Specialties: *Building Design/Construction*

A.W. Hastings Co. – Integrity Windows and Doors
Jackson, Bill
2 Pearson Way
Enfield, CT 06082
Tel: 860-394-3428
bjackson@awhastings.com
www.awhastings.com
Description: *For over twenty five years A.W. Hastings & Co. has been a distributor for Marvin Windows & Doors, supplying quality window & door products to the industry throughout the Northeast.*
Specialties: *Windows*

A&B Cooling and Heating Corp.
Wanegar, Guy
P.O. Box 1356
660 Nutmeg Rd. North
South Windsor, CT 06074
Tel: 860-528-4436
Fax: 860-290-8406
guy@abcoolingandheating.com
www.abcoolingandheating.com
Description: *Geothermal specialists since 1995, LEED Gold and Silver designer and installer, custom fabricated duct systems, radiant floor systems, heat and energy recovery ventilation systems.*
Specialties: *Geothermal, Indoor Air Quality Radiant Heating*

ABSOLUTELY ENERGIZED Solar
Customer Service
974 Rt. 33 East
Monroe, NJ 08831
Tel: 732-792-0700
info@aesolar.com
www.AESolar.com
Description: *The most experienced solar installer in NJ, Absolutely Energized Solar has been dedicated to installing high-performing renewable energy systems since 2002. Since our inception, solar has been our only focus. Over the years, our team has been constantly learning and improving, making every installation even better than the last. Customers leverage this experience to ensure that their solar project will be finished on-time and on-budget. Our projects generate revenue quickly and without any the last minute financial surprises so often associated with projects of this size.*
Specialties: *Photovoltaics, Energy Conservation, Lighting Design*

ACI (Affordable Comfort, Inc.)
Fazio, Amy
32 Church St., Ste. 204
Waynesburg, PA 15370
Tel: 800-344-4866
Fax: 724-627-5226
afazio@affordablecomfort.org
www.affordablecomfort.org
Description: *ACI Home Performance Conferences teach building science principles and provide networking to create energy efficient, comfortable, healthy, safe, durable homes. Visit our website.*
Specialties: *Environmental Education*

ACT Bioenergy
Dungate, David
30 Commerce Park Dr.
Schenectady, NY 12309
Tel: 518-377-2349
Fax: 518-631-5811
info@actbioenergy.com
www.actbioenergy.com
Description: *Manufacturer of biomass (wood pellet/wood chip) boiler systems for commercial and institutional buildings. These gasification type boilers are high-efficiency, fully-automated and have exceptionally low emissions. Burning renewable biomass reduces greenhouse gas emissions, saves money and creates local renewable energy jobs.*
Specialties: *Alternative Technologies, Biomass, Space Heating/Cooling*

Acuity Power Group, Inc.
Lockhart, Robert
37 Walnut St., Ste. 300
Wellesley Hills, MA 02481-2107
Tel: 857-453-2457
Fax: 857-453-2451
rob.lockhart@acuitypower.com
acuitypower.com
Specialties: *Alternative Technologies*

Advanced Solar Products
Rawlings, Lyle
270 South Main St., Ste. 203
Flemington, NJ 08822
Tel: 908-751-5818
Fax: 908-751-5819
sales@advancedsolar products.com
Description: *As one of the largest solar integrators on the East Coast, we have installed over 40 megawatts of ground and roof-mounted PV systems ranging in size from under 10 kilowatts to over 14 megawatts.*
We have been contracted for some of the highest profile solar jobs in the region including the installation of "the largest privately-owned, net-metered solar system in the Western Hemisphere," on the McGraw-Hill campus in East Windsor, NJ.
Specialties: *Building Design/Construction, Engineering Services, Photovoltaics*

Aegis Solar Energy
Lenda, Chris
81 School Ground Rd., Ste. 1
Branford, CT 06405
Tel: 203-481-2187
info@aegis-solar.com
www.aegis-solar.com
Description: *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 Hot Water, Solar Pools*

Ai3 Architects, LLC
Jordan, James
286 Boston Post Rd.
Boston, MA 01778
Tel: 508-358-0790
Fax: 508-358-0791
jordan@ai3architects.com
www.ai3architects.com
Description: *Designers of educational facilities.*
Specialties: *Building Design/Construction, Photovoltaics, Wind*

Alfandre Architecture, PC
Alfandre, Rick
7 Innis Ave.
New Paltz, NY 12561
Tel: 845-255-4774
Fax: 845-255-3440
ralfandre@alfandre.com
www.alfandre.com
Description: *Alfandre Architecture specializes in the design of energy, resource-efficient, healthy buildings.*
Specialties: *Building Design/Construction, Consumer Information, Remodeling*

Alternative Energy Outlet, LLC
Koch, Carl
350 Sackett Point Rd.
North Haven, CT 06473
Tel: 203-213-8151
Fax: 203-281-5816
carl@alternativeenergy outlet.com
alternativenergyoutlet.com
Specialties: *Solar Pools, Solar Hot Water, Alternative Technologies*

Alternative Energy Store
Deri, Sascha
43 Broad St., Ste. A400
Hudson, MA 01749
Tel: 877-242-6718
Fax: 877-242-6718
sascha.deri@altestore.com
www.altenergystore.com
Description: *Founded in 1999, AltE, Inc. has catered to customers on every continent of the globe. A 2006 Inc. 500 awarded company, AltE aims to continue to fulfill its motto, "Making Renewable Do-able," by offering cost competitive, high-quality renewable energy related products and educational opportunities to a broad spectrum of the public.*
Specialties: *Domestic Water Heating, Photovoltaics, Wind*

American Earth Anchors
Henry, Cy
20 Grove St. #6
Franklin, MA 02038
Tel: 508-520-8511
Fax: 508-520-1252
cy@americanea.com
www.americanea.com
Specialties: *Other*

American Public University
Sehring, Tatiana
10110 Battleview Pkwy., Ste. 114
Bristow, VA 20110
Tel: 703-965-0016
Fax: 703-367-9180
tsehring@apus.edu
www.apu.apus.edu
Specialties: *College/University*

Andrew Padian
Padian, Andrew
28 E. 28th St., 9th Flr.
New York, NY 10016
Tel: 212-869-5300 x544
apadian@gmail.com
www.communityp.com
Specialties: *Energy Conservation, Building Design/Construction, Consultant*

Anthony J. Musso, Architect
Musso, Anthony
181 Main St.
Cold Spring Harbor, NY 11724
Tel: 631-367-8626
Fax: 631-367-4276
ajmusso@aol.com
Description: *An architectural firm practicing architecture, interior architecture, landscape design and sustainable design, "The architecture for today, respects the past; while solving our contemporary needs in a responsible, sensible, design."*
Specialties: *Architecture, Consultant, Interior Design*

Applied Energy Technologies – East Coast Office
Piniaha, Stephen
14 White Deer Plaza
Sparta, NJ 07871
stephen.piniaha@aetenergy.com
Description: *Applied Energy Technologies (AET) is a leading global provider of solar mounting solutions. AET's racks fit all major solar modules and offer industry-leading installation time. A full layout and loading analysis is provided for every project. With manufacturing located in Ohio and Canada, AET has the shortest lead-time in the industry.*
Specialties: *Green Electricity, Other Renewable Energy Generation, Photovoltaics*

Artisan Builders
Fulford, Jonathan
127 Stovepipe Alley
Monroe, ME 04951
Tel: 207-525-7740
Specialties: *Building Design/Construction, Remodeling*

Austin Design, Inc.
Austin, Bill
16 Call Rd.
Colrain, MA 01340
Tel: 413-624-9669
Fax: 413-624-9635
office@austindesign.biz
www.austindesign.biz
Description: *Austin Design, Inc. provides architectural design services for homes, businesses and communities. We advocate a team approach among client, builder and architect that encourages the sharing of expertise and a passion for good design.*
Specialties: *Building Design/Construction, Landscape Design/Construction, Remodeling*

Bakker & Lewis Architects
Bakker, Margaret
243 Jackson Rd.
Shavertown, PA 18708
Tel: 570-675-8843
mbakker@bakker-lewis.com
www.bakker-lewis.com
Description: *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*

Bales Energy Associates
Bales, Bart
100 River Rd.
Gill, MA 01354
Tel: 413-863-5020
bart.balesenergy@gmail.com
Description: *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 Audit Services, Photovoltaics*

BBT Mechanical Services, LLC
Miller, Chris
22 Wapping Wood Rd.
Ellington, CT 06029-3917
Tel: 860-209-9917
Fax: 860-896-5830
bbtmechanical@snet.net
Specialties: *Space Heating/Cooling*

Be Solar Energy
Behmoaras, Mike
263 Veterans Blvd.
Carlstadt, NJ 07072
Tel: 201-933-7200
Fax: 201-933-2700
mike@besolarenergy.com
www.besolarenergy.com
Description: *OE and private label Manufacturer of SolarThermal FlatPlate Collectors and systems of hot water, space, and pool heating in homes, hotels, schools, and wherever hot water is used.*
Specialties: *Domestic Water Heating, Manufacturing, Solar Hot Water*

Bergen County Solar
Wellington, Mark
P.O. Box 115
Alpine, NJ 07620
Tel: 201-767-0800
bergensolar@aol.com
bergencountysolar.com
Description: *BCS handles everything from consultation, installation, maintenance and repair of solar electric, water heating, and monitoring systems. BCS is a licensed contractor.*
Specialties: *Energy Conservation, Photovoltaics, Solar Hot Water*

Beyond Green Construction
Sean Jeffords
13 Terrace View
Easthampton, MA 01027
Tel: 413-529-3947
info@beyondgreen.biz
www.beyondgreen.biz
Description: *A green building collaborative working toward zero energy homes and businesses. Specializing in deep energy retrofits, comprehensive audits and various high performance techniques.*
Specialties: *Building Design/Construction*

Bieber Architectural Windows
LUYS, Ben
817 Broadway, 5th Flr.
New York, NY 10003
Tel: 646-884-1019
www.bieberusa.com
Description: *Bieber passive house windows are certified by the PassivHaus Institut in Darmstadt, Germany. We manufacture wood windows as well as aluminum-clad. Our European design Bieber creates custom made windows and doors utilizing its state of the art modern production equipped with the latest computerized machinery. Using cutting-edge technology such as triple pane glass and eco-insulator materials, Bieber manufactures windows for your most demanding challenges. Please inquire about:*
-Custom made wood windows.
-Tilt and turn windows.
-Passive house French door.
-Lift and slide.
-Tilt and slide.
-True French casement.
-Passive house alu-clad windows
Specialties: *Building Design/Construction, Windows, Manufacturing*

Blue Sea Development Company
Bluestone, Les
164 Main St.
Huntington, NY 11743
Tel: 631-923-0081 x2
Fax: 631-923-0083
les.bluestone@blueseadev.com
Description: *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*

Blue Selenium Solar, Inc.
Cole, Wally
17 Jan Sebastian Dr., Ste. 6
Sandwich, MA 02563
Tel: 774-368-0019
wcole@bluesel.com
www.bluesel.com
Description: *Blue Selenium Solar provides solar electric, solar hot water, and wind energy systems to homeowners and businesses in Massachusetts and New Hampshire.*
Specialties: *Photovoltaics, Solar Hot Water, Wind*

Boston Community Capital
Jones, DeWitt (Dick)
56 Warren St.
Boston, MA 02119
Tel: 617-427-3580
Fax: 617-427-9300
djones@bostoncommunitycapital.org
www.bostoncommunitycapital.org
Specialties: *Finance/CPA, Social Services*

Bourke Builders
Bourke, Paul
77 Long Hill Rd.
Leverett, MA 01054
Tel: 413-548-9214
Fax: 413-548-9214
paul@bourkebuilders.net
www.bourkebuilders.net
Description: *Passionate in our dedication to energy efficient, green building for over 25 years, Bourke Builders offers design-build services for Hampshire and Franklin counties of Western MA.*
Specialties: *Building Design/Construction, Remodeling*

BPC Green Builders, LLC
Trolle, Michael
523 Danbury Rd.
Wilton, CT 06897-2233
Tel: 203-563-9909
Fax: 203-563-9912
info@bpcgreenbuilders.com
www.bpcgreenbuilders.com
Description: *Green building for new and existing homes based on performance and sustainability. Award-winning builder with fourteen years of experience. 100% Energy Star. Multiple LEED homes, including two at Platinum. Certified Passive House Consultant services available.*
Specialties: *Building Design/Construction*

BPVS, Berkshire Photovoltaic Services
Kilfoyle, Christopher Derby
46 Howland Ave.
Adams, MA 01220
Tel: 413-743-0152
Fax: 413-743-4827
info@bpvs.com
www.bpvs.com
Description: *Since 1985, the highest quality design and installation of efficient and durable photovoltaic systems featuring Schott solar modules.*
Specialties: *Green Electricity, Photovoltaics*

Bright Power
Perlman, Jeffrey
11 Hanover Sq., 21st Flr.
New York, NY 10005
Tel: 212-803-5868
info@brightpower.com
brightpower.com
Specialties: *Energy Audit Services, Space Heating & Cooling, Consultant*

Brightstar Solar
Reese, Mona
611 Hosmer St.
Marlborough, MA 01752
Tel: 617-564-0050
mreese@brightstarsolar.net
www.brightstarsolar.net
Description: *Brightstar Solar is a Massachusetts-based company that markets, designs, and installs solar photovoltaic systems which provide measurable and meaningful benefits to our customers, our country, and our environment.*
Specialties: *Consultant, Green Electricity, Photovoltaics*

Brooks Post & Beam, Inc.
Freeman, Paul
208 Pettingill Hill Rd.
Lyndeborough, NH 03082
Tel: 603-654-3210
Fax: 530-654-7376
paul@spbrooks.com
www.brookspostandbeam.com
Description: *Brooks Post & Beam has been building energy efficient, sustainable homes throughout New England for over 40 years. We have been building homes, barns and commercial buildings sustainably for decades.*
We are a small company focused on improving our quality and efficiency year after year. We operate a sustainable business model by returning profits to our employees through medical benefits, bonuses, paid time off, and profit sharing. Maintaining an experienced professional workforce has been our key to success. Limiting growth by focusing on a select number of projects per year maintains our quality control and prevents us from over extending our resources in lean times.
Please visit our website to see how our unique joinery system facilitates the use of smaller timbers for a more elegant framing style without sacrificing joinery strength or littering the frame with steel brackets. We use 1" oak pegged, mortise and tenon joinery and locally harvested timbers. Our enclosure system consists of an uninterrupted layer of foam insulation detailed to eliminate thermal bridging and minimize air infiltration.
Specialties: *Building Design/Construction, Insulation, Remodeling*

BuildingGreen, Inc.
Wilson, Jerelyn
122 Birge St., Ste. 30
Brattleboro, VT 05301
Tel: 802-257-0019 x102
Fax: 802-257-7304
jerelyn@buildinggreen.com
www.buildinggreen.com
Description: *BuildingGreen provides building industry professionals with well-researched information on environmentally sound building practices and green products. Online resources include BuildingGreen Suite, Environmental Building News, GreenSpec and LEEDuser.*
Specialties: *Alternative Technologies, Energy Conservation, Environmental Education*

Burrington's Solar Edge
Burrington, Gail Ann
6 Reed Cir.
Windsor Locks, CT 06096-1214
Tel: 860-623-0159
Fax: 413-683-2871
solaredge@yahoo.com
www.solaredge.biz
Description: *Solar electric and efficient appliance sales and service; site evaluations;workshops;and consulting. Gail is NABCEP certified "Solar PV Installer"; CT Elec#0195608-PV1*
Specialties: *Building Design/Construction, Environmental Education, Photovoltaics*

Byggmeister
Eldrenkamp, Paul
667 Sawmill Brook Pkwy.
Newton, MA 02459
Tel: 617-527-7871
paul@byggmeister.com
www.byggmeister.com
Description: *Byggmeister 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, Energy Conservation, Remodeling*

CalorIQue, LLC
Paliwoda, Irena
2380 Cranberry Hwy.
West Wareham, MA 02576
Tel: 508-291-4224
Fax: 508-291-2299
i.paliwoda@calorique.com
www.calorique.com
Description: *Calorique is the global leader in manufacturing low cost, energy efficient radiant heat elements for a wide range of uses. As the technology developed globally for alternative renewable energy and efficient use of that energy, Calorique developed a flexible electric radiant heating film that maximizes the efficient conductive properties of our carbon elements. Today, the Calorique flexible electric radiant heat system continues to be a superior, energy efficient, low cost alternative for eco friendly homes and facilities in the US as well as for use in countries around the world where renewable energy targets are being implemented.*
Specialties: *Radiant Heating*

Caluwe Inc. – Hydro-to-Heat-Convertor
Caluwe, Marc
9 Wheatland St.
Burlington, MA 01803
Tel: 781-306-8583
marc@hydro-to-heat-convertor.com
hydro-to-heat-convertor.com
Description: *Heat your whole house and more with a Hydro-to-Heat-Convertor an energy efficient and heat recovery hydronic wood stove or fireplace insert. The Hydro-to-Heat-Convertor is basically a hydronic wood stove which generates cosy radiant and convection heat. Most of the valuable energy is recovered via the internal heat recovery system that allows water to be circulated to a central heating system. The Hydro-to-Heat-Convertor can work stand-alone or in combination with an existing central heating system, warm water boiler or solar hot water system. The Hydro-to-Heat-Convertor has a 4-staged combustion system with catalytic combuster afterburn what results in ultra clean combustion of cord wood. The Hydro-to-Heat-Combustor uses a thermostatic firing control device or aquastat to adjust combustion air-supply in relation to the desired, pre-set, water outlet temperature, and as such automatically adapts to the type of fuel being used and*

the varying heat consumption of the home's central hating system.
Specialties: *Biomass, Domestic Water Heating, Space Heating/ Cooling*

Cape Painting & Carpentry, Inc.
Kroll, Peter
24 Bay Rd.
P.O. Box 39
North Falmouth, MA 02556
Tel: 508-563-9393
Fax: 508-563-9399
pmarshallk@aol.com
www.capecarpentry.com
Description: *An established renovation, restoration and custom home building contractor that has incorporated sustainable and green practices for over 30 years. Employee owned.*
Specialties: *Building Design/ Construction, Energy Conservation, Remodeling*

Capizzi Home Improvement
Capizzi, Thomas
1645 Newtown Rd.
Cotuit, MA 02635
Tel: 508-428-9518
Fax: 508-428-1547
chi@capecod.net
www.capizzihome.com
Description: *A remodeling and restoration company specializing in energy efficient room additions, 2nd stories, sunrooms, kitchens, bathrooms, siding, roofing, insulation and full-service home improvements.*
Specialties: *Building Design/Construction, Remodeling, Roofing*

CBI Consulting, Inc.
Teller, Michael S.
250 Dorchester Ave.
Boston, MA 02127
Tel: 617-268-8977
Fax: 617-464-2971
mteller@cbi1984.com
www.cbiconsultinginc.com
Description: *Sustainable design of building repair technologies. Building envelope evaluation and design. Historical renovation. Green roofs, plaza decks, masonry, concrete, windows, natural stone restoration and repair.*
Specialties: *Building Design/ Construction, College/University, Roofing*

Center for EcoTechnology
Hanley, Kathryn
320 Riverside Dr.
Northampton, MA 01062
Tel: 413-586-7350
greenhome@cetonline.org
www.cetonline.org
Description: *Since 1976, the Center for EcoTechnology (CET), a non-profit organization, engages in work that demonstrates and promotes practical, affordable solutions to the environmental challenges encountered in our daily activities. We provide Home Energy Ratings for new construction, MassSave Energy Assessments, high performance construction and retrofit training, greening your business assistance, and more.*
Specialties: *Energy Conservation, Energy Audit Services, Energy Education*

Chris Benedict, R.A.
Benedict, Chris
323 East Ninth St.
New York, NY 10003
Tel: 917-405-5433
benedictra@aol.com
Specialties: *Architecture*

Clean Energy Finance and Investment Authority
Rivera, Gladys
845 Brook St.
Rocky Hill, CT 06067
Tel: 860-257-2351
Fax: 860-563-4877
gladys.rivera@ctinnovations.com
www.ctcleanenergy.com
Specialties: *Energy Education, Finance/CPA*

Co-op Power
Benander, Lynn
324 Wells St.
Greenfield, MA 01301
Tel: 413-772-8898
Fax: 413-517-0300
info@cooppower.coop
www.cooppower.coop
Description: *Co-op Power is a decentralized network of community organizations and businesses building a sustainable and just energy future.*
Specialties: *Consumer Information, Space Heating/Cooling, Alternative Technologies*

Coldham & Hartman Architects
Hartman, Thomas
155 Pine St.
Amherst, MA 01002
Tel: 413-549-3616
Fax: 413-549-6802
tom@coldhamandhartman.com
www.coldhamandhartman.com
Description: *Coldham & Hartman Architects provides full service professional design for institutional, commercial and residential clients committed to making green buildings throughout the Northeast. C&H is dedicated to upgrading the existing structures of the Northeast for a changing energy climate by providing Deep Energy Retrofit design and master plan services. www.coldhamandhartman.com/DER*
Specialties: *Building Design/ Construction, Energy Conservation, Remodeling*

Community Energy Inc.
Woodman, Byron
150 Strafford Ave., Ste. 210
Concord, MA 01742
Tel: 484-640-9266
Fax: 610-254-9781
byron.woodman@
communityenergyinc.com
www.communityenergyinc.com
Specialties: *Electric & Hybrid Electric Vehicles, Green Electricity, Photovoltaics*

ConEdison Solutions
Nathanson, Ken
2 Burlington Woods
Burlington, MA 01803
Tel: 781-264-1925
Fax: 781-229-9613
nathansonk@coned
solutions.com
conedsolutions.com
Specialties: *Green Electricity, Energy Conservation*

Conservation Services Group
Stanton, Patricia Deese
40 Washington St.
Westborough, MA 01581
Tel: 508-836-9500 x13297
Fax: 508-836-3181
pat.stanton@csgrp.com
www.csgrp.com
Specialties: *Energy Conservation, Consumer Information*

Conservation Solutions Corporation
Cook, Dan
162 Great Rd.
Acton, MA 01720
Tel: 978-266-1900
Fax: 978-266-1976
dcook@conservation
solutions.com
www.conservationsolutions.com
Description: *Conservation Solutions Corporation is an energy and water efficiency company. We provided detailed studies of steam, water and energy using systems in buildings. We are also a manufacturer's representative representing SteamLoc Steam Traps, Velan Bi-Metallic Steam Traps ISTEC Radiator Valves, BTU Meters & Water Meters, ZeroFlush Urinals, Toto water products, Clearwater Dolphin Chemical-Free Water Treatment for Boilers and Cooling Towers, Sunda Solar water Heating systems and OzoneSolutions Laundry Ozone Systems.*
Specialties: *Domestic Water Heating, Energy Audit Services, Energy Conservation,*

Coppinger Builders, LLC
Coppinger, Lise & Tim
151B North Leverett Rd.
Leverett, MA 01054
Tel: 413-367-9137
lcopp@crocker.com
Description: *We are a local, worker owned manufacturer/installer of standing seam metal roofing - an energy efficient, sustainable, recycled/recyclable, 80+ years roofing system. We also consult on roof insulation/ventilation as well as design.*
Specialties: *Roofing, Consultant*

CoreFocused, LLC
Secules, Jody
136 Wheeler Rd.
Hollis, NH 03049
Tel: 603-554-7522
Fax: 603-465-7522
jody@corefocused.com
www.corefocused.com
Description: *CoreFocused is an eco-friendly fitness studio located in Hollis, NH specializing in Pilates & Cycling, duet & personal training w/Geothermal, solar hot water, passive solar*
Specialties: *Educator, Other*

Cornerstone Architecture

Hammond, Richard
700 Richmond St.
Unit 110
London, ON N6A5C7
Canada
Tel: 519-943-6644
rhammond@cornerstone architecture.ca
www.cornerstonearchitecture.ca
Description: *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. These projects include new facilities as well as additions and renovations to existing buildings. Our clients include both public and private sector organizations, as well as not-for-profit groups and private individuals. In each case, we seek to build strong working relationships that enable us to understand each client's unique needs and expectations for the project. We emphasize a collaborative working method, which directly involves the client in each phase of the design process. Our goal is for clients to feel that they have been co-creators, with us and the other members of the consulting team, of the final design. As the leading firm in our region in the area of sustainable building design, we encourage all of our clients to consider opportunities for reducing the impact of their buildings on the environment. Our services include an exploration of these opportunities, an evaluation of their costs and benefits, and consideration of the merits of certification, if desired, under the applicable standards.*
Specialties: *Architecture*

Cotuit Solar

Geyser, Conrad
P.O. Box 89
64 Old Shore Rd.
Cotuit, MA 02635
Tel: 508-428-8442
Fax: 508-428-8441
conradg@cape.com
www.cotuitsolar.com
Description: *Solar thermal, photovoltaics, wind and wastewater alternative engineering, installation and serivce. In business since 1988.*
Specialties: *Domestic Water Heating, Photovoltaics, Wind*

Cushman Design Group, Inc.

Cushman, Milford
P.O. Box 655
100 Mountain Rd.
Stowe, VT 05672
Tel: 802-253-2169
Fax: 802-253-2160
inquiry@cushmandesign.com
www.cushmandesign.com
Description: *Personalized full service architectural and interior design services for those who value elegant design, natural materials and green building practices in their home or business.*
Specialties: *Building Design/Construction, Interior Design*

Dartmouth College

Baker-Berry Library
6025 Baker-Berry Library
Hanover, NH 03755-3560
Tel: 603-646-2236
Specialties: *Library, College/University*

David Panich Architect

Panich, David
1153 Grove St.
Framingham, MA 01701
Tel: 740-591-9901
davidpanich@yahoo.com
Description: *David Panich, AIA, LEED AP is a architect specializing in sustainable, solar and energy efficient designs as well as complete residential/light-commercial architectural services.*
Specialties: *Building Design/Construction, Consultant, Energy Conservation*

David Whitney Architect

Whitney, David
49 Linden St.
Arlington, MA 02476
Tel: 781-643-0759
Fax: 413-832-8052
mail@davidwhitney.com
www.davidwhitney.com
Description: *I am a residential architect concerned about energy use and environmental impact. My projects range from additions and renovations to new home construction. You can see images and descriptions and more information at my website.*
Specialties: *Building Design/Construction, Remodeling*

DEAP Energy Group

Eldrenkamp, Paul
667 Sawmill Brook Pkwy.
Newton, MA 02459
Tel: 617-775-4716
peldrenkamp@deapgroup.com
www.deapgroup.com
Description: *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. Our full range of consulting services is available in eastern New England: we are available for a more limited range of services throughout the US in climate zones, 4, 5 and 6.*
Specialties: *Building Design/Construction, Energy Conservation, Remodeling*

Dennis K. Burke, Inc.

Burke, Ed
P.O. Box 6069
284 Eastern Ave.
Chelsea, MA 02150
Tel: 617-884-7800
Fax: 617-884-7638
ed.burke@burkeoil.com
www.burkeoil.com
Description: *One of New England's largest suppliers of diesel fuels, gasoline and motor oil products. DKB was the state's first supplier to offer biodiesel and E85 at the pump.*
Specialties: *Other Renewable Energy Generation, Other Transportation Technologies/Services*

Dietz & Company Architects, Inc.

Sternick, Marc
17 Hampden St.
Springfield, MA 01103
Tel: 413-733-6798
Fax: 413-732-4385
marcs@dietzarch.com
www.dietzandcompany architects.com
Description: *Planning and design of beautiful, energy efficient buildings for educational institutions, affordable housing developers, commercial projects and healthcare facilities.*
Specialties: *Architecture, College/University, Building Design/Construction*

Dimensional Architecture PC

Deye, Sylvia
P.O. Box 18
Geigertown, PA 19523-0018
Tel: 610-775-7105
Fax: 610-775-4015
sylvia@dimensional architecture.com
Description: *Architecture - variety of design genres - from the East to the West, Large - Small, Public - Private, Retail, Resorts, Schools, Homes, New Construction, Renovations and Preservation.*
Specialties: *Building Design/Construction*

distill studio

Haskett, Joe
460 Harris Ave., Unit 104
Providence, RI 02909
Tel: 401-331-2811
Fax: 401-273-9559
jhaskett@distillstudio.com
www.distillstudio.com
Description: *distill studio is an Architecture and Design office that approaches the built environment from a new and innovative perspective. By committing to a process which integrates a team of skilled professionals and practitioners from the outset of each project, the potential to weave both quality design and energy independence is very much achievable.*

To us, buildings are not static accumulations of bricks and mortar, but active participants in a larger ecosystem. Clients value our ability to simultaneously balance budgetary realities with the rigorous demands of quality construction documents and the important of design.

We incorporate Big Idea Architecture with Small Energy Footprints.
Specialties: *Building Design/Construction, Consultant, Remodeling*

DMI

Stevens, Alec
300 Chestnut St., Ste. 150
Needham, MA 02492
Tel: 781-449-5700
astevens@dmiinc.com
www.dmiinc.com
Description: *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 Audit Services, Energy Conservation, Energy Monitoring*

Doucet and Associates, Inc.
Hogan, Thomas
136 West St., Ste. 103
Northampton, MA 01060
Tel: 413-517-0133
thomas.hogan@doucet-mass.com
www.doucetandassociates.com
Specialties: *Engineering Services*

Dr. Energy Saver, LLC
Iannone, Dave
28 Progress Ave.
Seymour, CT 06483
Tel: 877-479-3637
Fax: 203-881-5530
pattyf@drenergysaver.com
www.drenergysaver.com
Description: *Dr. Energy Saver performs home energy-saving services such as adding home insulation, installing and upgrading furnaces and water heaters, replacing windows and doors, and more. We also perform a free home-energy evaluation with every free estimate to help you discover where your home is using, losing, and wasting energy.*
Specialties: *Alternative Technologies, Consultant, Consumer Information*

Eco Sound Builders, LLC
Korpi, Ethan
P.O. Box 55
Portsmouth, NH 03802
Tel: 603-986-8467
ekorpi.ecosound@gmail.com
www.ecosoundbuilders.com
Description: *We are driven to build homes with individuality and environmental responsibility. We seek to create high performance homes for the next generation of efficient energy use.*
Specialties: *Building Design/Construction, Consultant, Energy Conservation*

Ecolibrium Solar
Young, Jonathan
340 W. State St., Unit 22
Athens, OH 45701
Tel: 740-249-1877
jyoung@ecolibriumsolar.com
Description: *Ecolibrium Solar is the leading supplier of simple, fast, and cost effective mounting systems. Our solution saves installers countless hours from planning and installing more complicated systems. Our research and development has created a smart solution, at an industry leading cost. Not wavering on quality, our revolutionary design will stand up nature's wrath. ECOFOOT will hold a ton—Literally!*
Specialties: *Manufacturing, Photovoltaics*

EcoRealty
Hopkins, Dave
P.O. Box 3007
Amherst, MA 01004
Tel: 413-259-9800
Fax: 413-625-6638
dave@ecorealty.org
www.ecorealty.org
Description: *EcoRealty is an environmentally friendly buyer brokerage with a special interest in green building, farming, and living local economies.*
Specialties: *Real Estate*

Ekotrope
Bisson, Blake
One Broadway, 5th Flr.
Cambridge, MA 02142
Tel: 617-901-8573
blake@ekotrope.com
ekotrope.com
Description: *Ekotrope Inc. is a Cambridge-MA-based company that offers unique software solutions for designing energy-efficient buildings to maximize owners' investments as well as ensuring energy code compliance in today's changing construction environment. Our HomeSEED software product has multiple benefits for architects, builders and clients alike. HomeSEED finds the best set of building components to meet client energy and cost goals. Best set - finds energy investment "sweet spots", where the energy-efficient design lowers out-of-pocket costs. Trade-off analysis to identify the environmental and financial impact of design changes; Easy to use - intuitive and interactive interface; Code compliance - ensure house design meets environmental building codes; Saves time and money; Reduces costly corrections needed to meet energy codes; Test design changes on the fly; Available anywhere - accessible from any web browser. Installations or upgrades are not required.*
Specialties: *Building Design/Construction, Energy Conservation, I.T.*

Energy & Sustainability Partners
Braman, James
19 Upland Rd.
Arlington, MA 02474
Tel: 617-584-4288
jamie.braman@espgreen.com
Specialties: *Alternative Technologies*

Energy Balance, Inc.
Shapiro, Andrew
160 White Rock Dr., #1
Montpelier, VT 05602-9455
Tel: 802-229-5676
andy@energybalance.us
Description: *Energy Balance, Inc., consults on conceiving, designing and realizing high performance buildings. I work in the areas of building enclosure design for durability, efficiency and daylighting, mechanical systems selection, indoor air quality, energy modeling, and monitoring and verification. I also provide on-site verification of systems installations, including training of contractors, as needed to achieve energy goals. EB also provides overall building enclosure commissioning, including review at design stage, meeting with contractors, observing and verifying construction and enclosure testing.*
Specialties: *Building Design/Construction, Energy Conservation, Consultant*

Energy Opportunities, Inc.
Sheffer, Marcus
1200 East Camping Area Rd.
Wellsville, PA 17365-9783
Tel: 717-292-2636
sheffer@sevengroup.com
www.sevengroup.com
Description: *Energy Opportunities provides services focused on energy issues and the interface of nature and human enterprises. Founded in 1993, EO is also a part of 7group, LLC.*
Specialties: *Building Design/Construction, Energy Conservation, Environmental Education*

Energy Systems & Installation, Inc.
Drei, Mike
451 Jonestown Rd.
Jonestown, PA 17038
Tel: 717-861-4012
Fax: 717-861-4015
mike.drei@esipowercorp.com
www.esipowercorp.com
Description: *ESI Inc.'s mission is to provide alternative energy solutions to the commercial, agricultural and residential sectors. We utilize turnkey designed systems which eliminate the risk of higher utility costs as energy prices continue to rise. We offer services for Solar PV, Solar Thermal, Electric Vehicle Charging Stations, Energy Advisory Services, Power Purchase Agreements, Operating Leases, and Geothermal.*
Specialties: *Photovoltaics, Geothermal, Energy Audit Services*

EnergySage
Aggarwal, Vikram
12 Berkeley Ct.
Brookline, MA 02445
Tel: 617-794-6655
vikram@energysage.com
www.energysage.com
Description: *EnergySage.com was created to show potential clean energy consumers that financial and environmental goals are not mutually exclusive. The site's mission is to make consumers aware of the fact that clean energy technologies have developed to the point where almost any building-residential or commercial-can reap economic benefits from installing a clean energy system. The EnergySage.com portal provides users with objective, comprehensive information and actionable advice to assist them in finding appropriate, cost-effective clean energy solutions specific to their individual needs. The site approaches the decision process from a financial point of view, rather than a purely environmental one, emphasizing the returns on investment and the economic benefits of choosing clean energy systems.*
Specialties: *Alternative Technologies, Consultant, Energy Education*

EnergyWise Partners, LLC
125 Tech Park Dr.
Rochester, NY 14623
Tel: 585-420-8998
connect@ewpllc.com
www.ewpllc.com
Description: *EnergyWise Partners (EWP) provides remote energy metering and online billing services that enable the creation of locally owned renewable energy utilities, disrupting the highly fragmented Heating Oil and Propane delivery markets. We focus on clean, renewable thermal energy either stored in the ground (geothermal) or direct conversion (solar thermal).*
Specialties: *Energy Monitoring, Geothermal*

Engineered Solutions, Inc.
Quinlan, Ed
6 Union St.
Natick, MA 01760
Tel: 508-647-9200
equinlan@engsolutions.com
www.engsolutions.com
Description: *Engineered Solutions Inc. is a Mechanical/Electrical consulting engineering firm that specializes in building infrastructure analysis and design with heavy emphasis on Energy Efficiency and Green Design. Our experienced hands-on team offers high quality, customized engineering services to clients in the Greater Boston area. ESI's successful approach is client focused, with direct personal involvement by its two founding principals (Rick Dirienzo and Ed Quinlan), who are supported by a dedicated, experienced staff of senior level project engineers and support staff. Over the past 20 years, ESI has relied on repeat clients and word of mouth references for a vast majority of our work. Maintaining the highest level of service to our clients has been the key to our success.*
Specialties: *Engineering Services, Building Design/Construction, Alternative Technologies*

Enovative Group
Oaks, Kevin
242 Hampton Dr.
Venice, CA 90291
Tel: 310-967-9545
kevin@enovativegroup.com
www.enovativegroup.com
Specialties: *Energy Conservation, Domestic Water Heating*

Enterprise Community Partners
Jung, Bomee
1 Whitehall St., 11th Flr.
New York, NY 10004
Tel: 212-284-7195
bjung@
enterprisecommunity.org
www.enterprisecommunity.org
Description: *Since 1982, Enterprise has raised and invested more than $11 billion to help finance nearly 300,000 affordable homes across the United States. Our award-winning Enterprise Green Communities initiative offers the first national framework for green affordable housing and inspires us to achieve sustainability across all of our activities and operations. Enterprise's recently launched PartnerPREP service (Partner Portfolio Retrofit Engagement Platform), helps owners of multifamily affordable housing developments to retrofit their buildings.*
Specialties: *Social Services, Finance/CPA, Public Policy*

EnterSolar
Ahern, Paul
600 Third Ave., 2nd Flr.
New York, NY 10016
Tel: 201-293-0680 x101
pahern@entersolar.com
www.entersolar.com
Description: *EnterSolar specializes in commercial Solar Photovoltaic applications for businesses of all kinds. Whether public or private, regional or global; EnterSolar has the experience and resources to optimize your corporate renewable energy investment.*
Specialties: *Consultant, Green Electricity, Photovoltaics*

Enviro Energy Connections
Link, Henry
45 Mountain St.
Hartford, CT 06106
Tel: 860-953-7611
hlinkage@alum.mit.edu
Description: *Enviro Energy Connections advocates for energy conservation, and renewable energies, promotes design of green buildings, overall sustainable strategies, proper waste management, and testifies at utility and legislative hearings.*
Specialties: *Consumer Information, Energy Conservation, Environmental Education*

European Architectural Supply, LLC
Muzila, Patrik
109 Todd Pond Rd.
Lincoln, MA 01773
Tel: 617-335-9424
Fax: 781-207-0788
pmuzila@eas-usa.com
www.eas-usa.com
Description: *Supplier of high-quality Passive House certified windows, doors and curtain wall from Schuco and Makrowin. Products include entry doors, tilt-turn windows, lift-slide doors, tilt-slide doors and are available in PVC, wood, aluminum and commercial PH curtain wall.*
Specialties: *Windows*

Feinmann, Inc.
Feinmann, Peter
27 Muzzey St.
Lexington, MA 02421
Tel: 781-860-9800
peter@feinmann.com
www.feinmann.com
Description: *Feinmann Inc. is known for its thoughtful and sustainable design, a well-articulated process, superb craftsmanship, responsive service, and the best value for the cost.*
Specialties: *Building Design/Construction, Energy Conservation, Remodeling*

Fortress Green Building Supply
Lyden, Tim
38 Faunce Corner Rd.
Dartmouth, MA 02747
Tel: 508-971-1004
fortressgreenbuildingsupply@
comcast.net
fortressgreenbuilding
supply.com
Description: *Very Cost Effective "High Efficiency" Green Building Materials. For 60% to 80% Energy Savings just from the T-Envelope. Products and services include: "IntegraSpec" Insulated Concrete Forms, Insul-Deck Concrete Floor/Roof System, R-Control Sips Rep, Solar Heat, Radiant-Solar systems, Passive Solar, Sips, HVRs, Windpower, PV, Green Build Project Management, Contractor/Builder EZ-Green Program, Contractors ICF Hands on Training/Certification Program, Homeowner-DIY-Building (ICFs Solar, SIPs) Programs, Co-Build Programs, Non-Profit Habitat & Municipal Building Barn-Raising & Volunteer Programs, Green Building Optimum Options Analysis, Green Design & Building Consulting, Teaching Green Building at U-Mass Dartmouth, +GBClasses. Remember,, Minimum Code Green is like Minimum Wage. ,,Go for the Best,, you & the Environment can't afford not to.*
Specialties: *Alternative Technologies, Building Design/Construction, Energy Conservation*

Four Winds Design
Randolph, Meredith
126 Oak Hill Rd.
Mt. Desert, ME 04660
Tel: 207-244-7976
meredith@four-winds.me
four-winds.me
Specialties: *Consultant, Building Design/Construction*

Froling Energy
Van Valkenburgh, Jim
19 Grove St.
P.O. Box 178
Peterborough, NH 03458
Tel: 603-801-7860
Fax: 888-847-9368
jim@frolingenergy.com
www.frolingenergy.com
Specialties: *Biomass, Photovoltaics*

Gabor Photovoltaics Consulting, LLC
Gabor, Andrew
54 Holly St.
Providence, RI 02906
Tel: 401-621-7806
andrew@gaborpv.com
www.gaborpv.com
Specialties: *Photovoltaics, Consultant, Engineering Services*

GAIA Host Collective
Strader, Charles
P.O. Box 622
Greenfield, MA 01302
Tel: 800-672-8060 x803
sales@gaiahost.coop
www.gaiahost.coop
Description: *GAIA Host provides secure and reliable Internet Hosting services as a worker-owned cooperative. We focus on efficient IT infrastructure and open source applications.*
Specialties: *Communications, Energy Conservation, I.T.*

Genmounts Solar Racking Systems
Snyder, Jason
97 River Rd., 2nd Flr.
Flemington, NJ 08822
Tel: 908-788-7750
Fax: 908-837-9021
jason@genmounts.com
www.genmounts.com
Description: *Genmounts provides customers with the highest quality solar mounting system at the lowest installed cost. Our products are, and will always be, 100% American made. We are proud to provide products and services to the renewable industry, while restoring this nations technology and manufacturing jobs.*
Specialties: *Alternative Technologies, Engineering Services, Photovoltaics*

Geoffrey H. Richon Company, Inc.
Richon, Tobias
19 Duncan St.
Gloucester, MA 01930
Tel: 978-283-6063
tsrichon@ghrichon.com
www.ghrichon.com
Description: *The Geoffrey H. Richon Company specializes in delivering high quality construction, remodeling and consulting services to Cape Ann and Essex County. Our experience is based on over 35 years in residential construction and remodeling. Through a whole-system approach to design and construction, we provide our clients with a high level of energy efficiency, comfort and durability for their projects.*
Specialties: *Building Design/Construction, Consultant, Remodeling*

Gleason Geothermal
Gleason, Matt
3994 Pardee Hollow Rd.
Wayland, NY 14572
Tel: 585-534-9029
matt@gleasonheating.com
Specialties: *Geothermal*

Goody Clancy
420 Boylston St.
Boston, MA 02116
Tel: 617-850-6651
Fax: 617-285-5936
arch@goodyclancy.com
www.goodyclancy.com
Specialties: *Building Design/Construction*

GreenCents Solutions, LLC
Bourbeau, Mark
334 Third Ave.
Pelham, NY 10803
Tel: 914-943-8281
mark@greencentsnow.com
greencentsnow.com
Specialties: *Lighting Design, Energy Conservation*

Greene Energy Consultants, LLC
Greenbaum, Scott
40 Damon Rd.
Scituate, MA 02066
Fax: 781-545-1843
sgreenbaum@earthlink.net
www.greeneenergy
consultants.com
Description: *Sustainable energy project development and implementation specialist (ie Commissioning) for commercial, institutional, hospital, multi-family, and co-generation projects.*
Specialties: *Consultant, Energy Audit Services, Energy Conservation*

Greener Every Day
White, Rachel
124 Hagen Rd.
Newton, MA 02459
Tel: 617-905-6925
rachel@
greenereverydayconsulting.com
www.greenereveryday
consulting.com
Description: *Greener Every Day provides sustainability consulting and education services to help individuals and organizations make choices and adopt practices that promote occupant personal health and well-being, resource efficiency, and environmental stewardship. We focus on the residential design/build sector, helping small firms integrate and align sustainability principles with core business practices, and build capacity to consistently deliver healthy, resource efficient, and durable projects.*
Specialties: *Consultant, Educator, Research*

Green Machine PR
Lee, Jo
Providence, RI 02906
Tel: 401-338-5445
info@greenmachinepr.com
www.greenmachinepr.com
Specialties: *Communications, Public Relations, Marketing*

Greenfield Community College
1 College Dr.
Greenfield, MA 01301
Tel: 413-775-1000
Specialties: *College/University*

Greenleaf Architectural Design
Greenleaf, Stephen
P.O. Box 16612
Rumford, RI 02916
Tel: 401-434-8200
Fax: 815-572-0498
stephen@sgreenleaf.com
www.sgreenleaf.com
Description: *We are a full service Architectural Firm with an interest in small projects. We assist our clients in integrating sustainable elements into their new or existing projects.*
Specialties: *Building Design/Construction, Energy Conservation, Other Renewable Energy Generation*

GridWerks Consulting, a US Clean Power Company
Thompson, Thomas
306 Amherst Rd.
Pelham, MA 01002-9753
Tel: 917-886-4793
Fax: NA
tom@gridwerkspv.com
www.gridwerkspv.com
Description: *GridWerks Consulting, Inc. is dedicated to making alternative energy an economic reality. GridWerksPV advances distributed power systems & renewable power markets in the US and globally.*
Specialties: *Consultant, Energy Audit Services, Photovoltaics*

Harlem Greenfit Management & Urban Greenfit, LLC
Davenport, David
142 West 121st St.
New York, NY 10027
Tel: 201-537-5195
ddavenport142@verizon.net
urbangreenfit.com
Description: *Harlem Greenfit Management (HGM) is a sole proprietorship MBE providing project management, financial advisory, sustainability plan development and public policy & outreach services for owners of residential and commercial real estate engaged in deep energy retrofits and renewable energy strategies.*

Urban Greenfit, LLC (UGF) is an energy services company. UGF works with building owners to develop customized strategies to reduce common area and residential energy use by developing onsite power capabilities and installing and managing energy conservation measures enabling management to exercise granular control of building systems and provide residents with education and tools to monitor and conserve energy use. Over time - UGF helps owners reduce maintenance and overhead costs to directly impact and increase net profit and improve building asset value.

UGF achieves these objectives through a combination of: Investment grade energy audits; Energy-efficiency retrofits; Purchase and installation of all materials; Project management; Project development through subcontractors; Providing off balance sheet project finance options; Management and verification of energy cost savings; Water conservation services; Onsite power generation
Specialties: *Energy Conservation, Finance/CPA, Real Estate*

Heartwood Group, Inc.
Unger, Fred
165 Evergreen St.
Providence, RI 02906
Tel: 401-861-1650
unger@hrtwd.com
www.heartwoodsolutions.com
Description: *Our company was founded in 1983 to create environmentally responsible buildings. Today we provide consulting and development services in the renewable energy and building industries.*

We have managed the development and operations for one of the largest owners of solar electric systems in New England, coordinated the design and federal permitting of a 3.3 MW wind project, and developed numerous innovative real estate projects.

In 2004, we founded an information technology company in the energy industry that was merged with a competitor to create the nation's leading provider of remote monitoring of renewable energy projects.

As consultants, we have helped leading firms grow their businesses and have teamed with some of the best architectural, design, engineering, construction, contracting, environmental, legal, permitting, financial and other specialists in the country on previous successful efforts and view our role as team builders and project managers as a critical part of the service we provide.
Specialties: *Energy Conservation, Photovoltaics, Wind*

Higgins Energy Alternatives
Higgins, Susan
7 Worcester Rd.
Barre, MA 01005
Tel: 978-355-6343
sue@higginsenergy.com
higginsenergy.com
Specialties: *Space Heating & Cooling, Photovoltaics, Solar Hot Water*

High Performance Energy Solutions
Demague, Dean
21 Cedar Vale Dr.
New Milford, CT 06776
Tel: 203-501-8937
Fax: 860-355-4818
dean@hphvac.com
hphvac.com
Specialties: *Space Heating & Cooling, Geothermal, Indoor Air Quality*

Home Energy Technologies
Harding, Peter
PO Box 364
Chester, CT 06412
Tel: 877-800-6440
peter@homeenergytechnologies.com
www.homeenergytechnologies.com
Description: *Home Energy Technologies offers HERS ratings, ENERGY STAR & NGBS certification, home energy audits and other energy diagnostic services throughout Connecticut and adjoining areas.*
Specialties: *Consultant, Energy Audit Services, Energy Conservation*

Hudson Valley Community College –TEC–SMART
345 Hermes Rd.
Malta, NY 12020
Tel: 518-629-7075
tecsmart@hvcc.edu
Specialties: *College/University*

In Site: Architecture
Yapicioglu, Ali, Hauser, Rick
Rochester - Perry - Geneva
Ste, 202
Perry, NY 14530
Tel: 585-237-2614
Fax: 585-237-3679
rick@insitearch.com
www.insitearch.com
Description: *WNY/Finger Lakes region. We create innovative, site-specific solutions to every project, marrying our interest in sustainable principles to clients' own priorities.*
Specialties: *Building Design/Construction, Green Electricity, Landscape Design/Construction*

Infrared Diagnostic, LLC
Lund, Flemming
9 Elaine Rd.
Sudbury, MA 01776
Tel: 978-440-9900
Fax: 978-440-9902
info@infrareddiagnostic.com
www.infrareddiagnostic.com
Description: *Infrared energy audit, Duct Blaster and Blower Door testing. Certified Infrared Thermographer, RESNET/HERS Rater. Provide consulting to builders, home owners to reduce energy.*
Specialties: *Consumer Information, Energy Audit Services, Energy Conservation*

Innovative Building & Design
Clement, Henry
54 Porter St.
Granby, MA 01033
Tel: 413-552-9771
Fax: 413-467-3162
henry@gogtt.net
Description: *We are a residential general contracting firm which has been designing and building energy efficient homes for 25 years utilizing a wide range of sustainable technologies.*
Specialties: *Building Design/Construction, Remodeling, Space Heating/Cooling*

INTEGRATA Architecture, LLC
Borgese, Andrew
419 Palmer Ave.
Falmouth, MA 02540
Tel: 508-495-6575
Fax: 508-457-7743
aborgese@integrata architecture.com
www.integrataarchitecture.com
Description: *We are Architects & Construction Managers providing energy efficient, high performance buildings that are less expensive to own and operate & provide maximum value to owners & occupants. Specialties: Building Design/Construction, Energy Conservation, Remodeling*

Intersolar North America
Wutzler, Mirko
One Embarcadero Ctr., Ste. 1060
San Francisco, CA 94111
Tel: 415-248-1257
wutzler@intersolar.us
intersolar.us
Specialties: *Photovoltaics*

Ives Architects
Ives, Gerard
1 Dartmouth Pl.
Boston, MA 02116
Tel: 617-266-1899
ivesarch@verizon.net
Description: *NEW New England Design Homes, Visitor Centers, Educational Facilities Awards For Sustainable Design, Renewables Planning, Feasibility, 3D Design and Construction Phase Services*
Specialties: *Building Design/Construction, Environmental Education*

John Fülöp Associates, Architects & Planners
Fülöp, John
103 East Alford Rd.
West Stockbridge, MA 01266
Tel: 413-232-7122, 212-219-2121
john@fulopassociates.com
www.fulopassociates.com
Description: *John Fülöp Associates, Architects provides design services for all building types, creating aesthetically pleasing, economic "green" architecture throughout the Northeast.*
Specialties: *Building Design/Construction, Energy Conservation, Remodeling*

John Mateyko Architect
Mateyko, AIA, John
304 Pilottown Rd.
Lewes, DE 19958-1230
Tel: 302-645-2657
Fax: 302-645-0224
johnmateyko@verizon.net
www.johnmateykoarchitect.com
Description: *JMA has been dedicated since 1974 to Whole System Sustainability thinking for place-based, ecologically-driven architecture, native landscaping for Natural Climate Stability and other points of intervention in the built environment. We vision Green Architecture, Green Energy, Green Streets, Green Cities, Green Economics, Historic Preservation and Ecological Preservation, the movement for healthy, vibrant and active living as all part of a historic shift toward a sustainable paradigm for justice and well-being for all life on the planet--about who we want to be, what we are living for, who we are.*
Specialties: *Architecture, Energy Conservation, Landscape Design/Construction*

Kaplan Thompson Architects
424 Fore St.
Portland, ME 04101
Tel: 207-842-2888
Fax: 207-842-2828
info@kaplanthompson.com
www.kaplanthompson.com
Description: *Our mission is to bring beautiful, sustainable and attainable buildings to the world. From your home to your business, we can design the sustainable building you have been looking for.*
Specialties: *Building Design/Construction, Energy Conservation, Research*

Karen Carter Carpentry
Carter, Karen
223 Main St.
Leeds, MA 01053
Tel: 413-221-7419
arbetkar@crocker.com
Specialties: *Building Design/Construction, Remodeling*

Keene State College Architecture
Sapeta, Bart
Keene State College-TDS Dept
229 Main St.
Keene, NH 03435
Tel: 603-358-2847
bsapeta@keene.edu
Specialties: *College/University*

Key Heating & Air Conditioning, Inc.
Sherrill, Jon
170 West Rd., Ste. 8
Portsmouth, NH 03801-6010
Tel: 603-436-8811
Fax: 603-436-8111
jon@keyhvac.com
www.keyhvac.com
Specialties: *Space Heating & Cooling, Geothermal, Indoor Air Quality*

Keycept Sustainable Energy Ventures
Karra, Kiren
116 Village Blvd., Ste. 200
Princeton, NJ 08540
Tel: 609-610-5862
kskarra@keycept.com
Specialties: *Finance/CPA, Consultant*

Kolbert Building
Kolbert, Dan
90 Gray St.
Portland, ME 04102
Tel: 207-799-8799
dan@kolbertbuilding.com
www.kolbertbuilding.com
Description: *Our team's decades in home construction & renovation include a strong focus on energy efficiency & sustainable design. We have significant experience with LEED for Homes.*
Specialties: *Building Design/Construction, Consultant, Remodeling*

Krannich Solar, Inc.
7000 Commerce Pkwy., Ste. A
Mt. Laurel, NJ 08054
Tel: 856-802-0991
Fax: 856-380-0739
info@usa.krannich-solar.com
www.krannich-solar.com
Specialties: *Photovoltaics*

Kraus-Fitch Architects, Inc.
Kraus, Mary
110 Pulpit Hill Rd.
Amherst, MA 01002
Tel: 413-549-5799
Fax: 413-549-7918
mkraus@krausfitch.com
www.krausfitch.com
Description: *Integrating architecture with community, environment, and life quality, 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. Principals Mary Kraus and Laura Fitch are LEED AP BD+C accredited. We focus on sustainability throughout our projects, from initial programming and master planning to construction details. Our structures are well insulated and carefully detailed, engineered, and sited to reduce energy use for the life of the building. We emphasize quality and durability while meeting budget constraints. All this within a process that is enjoyable and supportive.*
Specialties: *Building Design/Construction, Energy Conservation, Architecture*

Kuhn Riddle Architects, Inc.
Kuhn, AIA, LEED AP, John
28 Amity St., Ste. 2B
Amherst, MA 01002
Tel: 413-259-1630
Fax: 413-259-1621
jkuhn@kuhnriddle.com
www.kuhnriddle.com
Description: *Architectural and Interior Design - LEED Accredited Professionals*
Specialties: *Building Design/Construction, Lighting Design, Remodeling*

Lewis Creek Builders
Boudreau, Mark
771 Long Point Rd.
N. Ferrisburgh, VT 05473
Tel: 802-999-6942
mark@lewiscreekbuilders.com
www.lewiscreekbuilders.com
Specialties: *Building Design/Construction, Energy Audit Services*

Lightway Solar America
Sien, William
555 US-1 South, Ste. 340
Iselin, NJ 08830
Tel: 732-602-1930
w.sien@lightwaysolarusa.com
www.lightwaysolaramerica.com
Description: *Lightway is a vertically integrated solar panel manufacturer with local offices in Iselin, New Jersey. With 600 MW of manufacturing capacity, we are able to pass along our economies of scale cost savings to our customers. We offer quality, high powered UL/CEC certified panels through our local warehouse in New Jersey. Lightway also has developed partnerships within the financing sector that can help our customers get their projects off the ground through PPA providers/owners. Call us to learn more.*
Specialties: *Manufacturing, Photovoltaics, Finance/CPA*

Littlewolf Architecture
Vlcek, Christopher
10 Highland Dr.
Great Barrington, MA 01230
Tel: 413-528-5571
chris@littlewolfarch.com
littlewolfarch.com
Description: *Certified Passive House Consultant, designing energy resilient homes that find a natural place in the landscape. Licensed in MA, CT, NY.*
Specialties: *Architecture, Remodeling, Energy Conservation*

Loewen Window Center of Vermont & New Hampshire
52 Bridge St.
White River Junction, VT 05001
Tel: 800-505-1892
info@loewenvtnh.com
loewenvtnh.com
Description: *We are a state-of-the-art window & door showroom located in the historic railroad village of White River Junction, Vermont. We service all of VT and Western NH. We offer exceptional service beginning with the blueprint take-off, technical & design assistance, factory direct jobsite or warehouse delivery and after installation walk-through and warranty support.*
Specialties: *Windows*

Maine Passive House
Kruse, Jesper
278 Rowe Hill Rd.
Greenwood, ME 04255
Tel: 207-890-3874
jesper@mainepassive house.com
www.mainepassivehouse.com
Description: *We build and design extremely energy efficient buildings. As a Certified Passive House Consultant we do energy calculations using the PHPP software.*
Specialties: *Building Design/Construction, Energy Conservation, Remodeling*

Maple Hurst Builders, Inc.
DeSisto, Chris
103 Terrace St.
Roxbury Crossing, MA 02120
Tel: 617-549-0793
Fax: 617-344-0411
chris@maplehurstbldrs.com
www.maplehurstbldrs.com
Description: *Construction, design, and development of small residential condominium projects. Blending traditional and modern architecture with a focus on craftsmanship and resource conservation.*
Specialties: *Building Design/Construction, Real Estate*

Mark Allen Electric

Allen, Mark
P.O. Box 1395
Arlington, MA 02474-0022
Tel: 617-852-6056
info@markallenelectric.com
www.markallenelectric.com
Description: *A NABCEP Certified Solar PV Installer and Electrical Contractor, Mark Allen offers solar PV site evaluation, design, installation, and repair in the Greater Boston area. MA Master Electrician License #A20495.*
Specialties: *Green Electricity, Photovoltaics*

Mark R. Fitzsimmons, Architect

Fitzsimmons, Mark
234 River Rd.
Red Bank, NJ 07701
Tel: 732-747-6481
fitzmr@gmail.com
Specialties: *Architecture*

Maryann Thompson Architects

Thompson, Maryann
14 Hillside Ave.
Cambridge, MA 02140
Tel: 617-491-4144
maryann@maryann
thompson.com
www.maryannthompson.com
Description: *Maryann Thompson Architects is an award-winning firm committed to employing a sustainable approach. Issues of sustainability are woven into our architectural ideas- from site planning to architectural systems.*
Specialties: *Building Design/Construction, Educator, Interior Design*

Mass Audubon

Poor, Bancroft
208 South Great Rd.
Lincoln, MA 01773
Tel: 781-259-2110
Fax: 781-259-8899
bpoor@massaudubon.org
Specialties: *Environmental Education, Public Policy, Consumer Information*

Massachusetts Clean Energy Center

Natella, Arthur
55 Summer St., 9th Flr.
Boston, MA 02110
Tel: 617-315-9347
anatella@masscec.com
www.masscec.com
Description: *Massachusetts is leading the way in innovative and comprehensive energy reform that will make clean energy a centerpiece of the Commonwealth's economic future. The Green Jobs Act of 2008 created the Massachusetts Clean Energy Center (MassCEC) to accelerate job growth and economic development in the stateís clean energy industry. This new quasi-public agency serves as a clearinghouse and support center for the clean energy sector, making direct investments in new and existing companies, providing assistance to enable companies to access capital and other vital resources for growth, and promoting training programs to build a strong clean energy workforce that capitalizes on the job opportunities created by a vital new industry.*

MassCEC is committed to leveraging Mass outstanding resources in academic research, technology entrepreneurship, and workforce skills to accelerate growth of the clean energy industry. The result of these efforts will be new technologies, new companies, and a workforce ready to roll up its sleeves to ensure MA's place as a national clean energy hub.
Specialties: *Alternative Technologies, Energy Education, Workforce Development*

Matrix Energy, Inc.

Wilkinson, Brian
296 Labrosse Ave.
Pointe-Claire, QC H9R-5L8
Canada
Tel: 514-630-5630
Fax: 514-426-9123
bwilkinson@matrixenergy.com
www.matrixenergy.com
Description: *With over 125 solar air heating projects to its credit, Matrix Energy has supplied over 400,000 ft2 of solar fresh air heating collector area since 1990. These systems provided 2,331,000 CFM of ventilation air saving over 28,748 mWh in energy costs while reducing total CO2 emissions by over 7608 tonnes annually.*

MatrixAir™; TR
Designed for new construction or retrofits this patent-pending, unglazed transpired solar air heating collector resembles conventional exterior metal siding. Recommended for solar air heating systems with total fresh air flow needs of at least 3000 CFM. The transpired solar air collectors require the use of an air outlet below the mid point of the collector.

MatrixAir™; BP
Ideally suited for new construction with collector heights ranging from 12 - 24 ft, this backpass solar air collector performs to within 99% of the performance of our transpired solar air heating collector thanks to our unique, modular, patent-pending design. Backpass (BP) solar air heating systems are well suited to upper wall-mounted fresh air inlets prescribed by ASHRAE 62.1

MatrixAir™; DT, Roof Mounted Solar Air Collector
With operating efficiency of up to 89%, this modular transpired collector will deliver up to 250 CFM per module and may be connected in a combination of series and parallel configurations to address a wide variety of roof layouts or CFM requirements.
Specialties: *Alternative Technologies, Photovoltaics, Space Heating/Cooling*

McCauley Lyman, LLC

Winans, Jill
10 Speen St., 3rd Flr.
Framingham, MA 01701
Tel: 508-665-5802
Fax: 508-665-5858
jillwinans@mccauleylyman.com
www.mccauleylyman.com
Description: *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.*

We also welcome assignments as arbitrators and mediators.

McCauley Lyman lawyers stay focused on achieving our clients' goals. We understand the need for timeliness, cost control, and practicality. We make very sure that we are always part of the solution (and not otherwise). We keep perspective on each task as it relates to the client's overall objectives.

We are sensitive to our responsibilities as law counselors as well as advocates. We take great care to ensure that our advice is clear and that our clients understand our reasons in giving it. Clients don't always want to follow our advice and, when they make a different decision, we accept it and follow through on it. (Our clients don't make illegal or unethical decisions.)

As outside counsel, our clients expect us to perform at the highest level, and we do.
Specialties: *Legal*

Michael Beattie Architect

Beattie, Michael
P.O. Box 1010
Middletown Springs, VT 05757
Tel: 802-235-2468
mbeattie@vermontel.net
sites.google.com/site/
vermontgreenhome/
Description: *MBA uses a personalized and collaborative process for new and renovated design projects, using energy+materials conservation, renewables, responsive siting and healthy interiors.*
Specialties: *Building Design/Construction, Energy Conservation, Remodeling*

Milbank Manufacturing

Buelow, Chris
4801 Deramus Ave.
P.O. Box 419028
Kansas City, MO 64120
Tel: 816-483-5314
cbuelow@milbankpower
gen.com
www.milbankpowergen.com
Description: *Milbank provides the tools that empower life. We enable the amazing in countless everyday ways through our thoughtfully designed products and collaborative ingenuity. More than a manufacturing company, we are an active and engaged contributor in the movement and utility of energy.*
Specialties: *Manufacturing, Other Renewable Energy Generation*

Mitch Anthony

Anthony, Mitch
23 Chestnut Hill
Greenfield, MA 01301
Tel: 413-530-6978
mitch@mitchanthony.us
mitchanthony.us
Description: *Organizational cat herder and brand guy. My sweet*

spot is positioning, brand strategy, communications design and ideation/concept development. I work where mission meets message to get organizations moving in harmony.
Specialties: *Communications, Marketing, Workforce Development*

Mitsubishi Electric Cooling & Heating

Pickett, Susan
150 Cordaville Rd.
Southborough, MA 01772
Tel: 978-988-5571
spickett@hvac.mea.com
Specialties: *Space Heating/Cooling, Energy Conservation*

Motech Americas, LLC

Hayes, Brian
231 Lake Dr.
Newark, DE 19711
Tel: 781-572-8049
Fax: 302-451-7502
brian_hayes@
motech-americas.com
motech-americas.com
Specialties: *Photovoltaics*

Mulberry Tree Builders, LLC

Liscord, Paul
24 Old Amherst Rd.
Mont Vernon, NH 03057
Tel: 603-673-2603
Fax: 603-673-2603 (call first)
pliscord@aol.com
Description: *The heart of our product offerings is our high performance building envelope. We are currently employing our third generation of Canadian Double Wall building technique enabling us to minimize auxiliary fuel use (oil, gas, wood or electric), while maximizing solar fractions and retention of heat from intrinsic sources. In short, our ultimate goal is to reduce the heating demand in your home, while maintaining living space comfort. All buildings are equipped w/ heat recovery ventilation systems thus assuring excellent indoor air quality at all times. This technique also demonstrates a great of pleasing architectural flexibility, and can employed in both contemporary and traditional designs.*

We also offer Deep Energy Retrofits of existing homes, both from the inside and the outside depending upon which is the more cost effective and aesthetically appealing approach. One such recent project involved the exterior upgrade of an antique home in Mont Vernon, with very good aesthetic and energy results.

We enjoy cordial professional relationships with other firms in Southern New Hampshire who have demonstrated proficiency in other areas of energy concern such as: energy audits and modeling, solar thermal design and installation, solar electric design and installation, LEED inspired architectural design, and certified Eco-broker real estate services.
Specialties: *Building Design/Construction, Consultant, Remodeling*

MyGenerationEnergy

Hinkle, Luke
326 Yankee Dr.
Brewster, MA 02631
Tel: 508-237-4650
luke@mygenerationenergy.com
www.mygenerationenergy.com
Description: *Full-service, grid-tie solar generation for residential and commercial installations in MA. Our focus is on providing systems with high reliability and low burden of ownership.*
Specialties: *Green Electricity, Photovoltaics, Wind*

National Fiber

Hoch, Chris
50 Depot St.
Belchertown, MA 01007-9619
Tel: 800-282-7711
chris@nationalfiber.com
www.nationalfiber.com
Description: *NF's Cel-Pak cellulose is the only sustainable insulation product made in the Northeast. Real world R-values, 83% recycled content & superior fire resistance makes Cel-Pak ideal for new construction & retrofit.*
Specialties: *Energy Conservation, Insulation*

National Grid

Cantello, Paul
1 Metrotech Ctr., 13th Flr.
Brooklyn, NY 11201
Tel: 718-403-6963
Fax: 315-424-2166
paul.cantello@us.ngrid.com
www.nationalgridus.com
Description: *National Grid (LSE: NG.; NYSE:NGG) is an international electricity and gas company and one of the largest investor-owned energy companies in the world. Our core business is the delivery of electricity and natural gas. We are committed to serving customers well, delivering energy safely and reliably, and keeping costs low.*

Our vision is the long term aspiration for National Grid - what we want to be in the future: "We, at National Grid, will be the foremost international electricity and gas company, delivering unparalleled safety, reliability and efficiency, vital to the wellbeing of our customers and communities." We are committed to being an innovative leader in energy management and to safeguarding our global environment for future generations."
Specialties: *Green Electricity, Consumer Information, Energy Audit Services*

New Commons

Leaver, Robert
545 Pawtucket Ave., Ste. 106A
Pawtucket, RI 02860
Tel: 401-475-6762
Fax: 401-475-6742
rleaver@newcommons.com
Description: *New Commons is a whole new kind of think tank which helps clients move from thought to action by helping them build a network and then mobilize that network to get the job done.*
Specialties: *Consultant*

New Energy Opportunities, Inc.

Sheingold, Barry
125 Powers Rd.
Sudbury, MA 01776
Tel: 978-440-7575
Fax: 978-440-7654
bjs@newenergyopps.com
www.newenergyopps.com
Description: *New Energy Opportunities assist clients in structuring innovative electric power transactions to help bring to fruition new energy technologies and to optimize existing assets.*
Specialties: *Green Electricity, Wind*

New England Clean Energy

Durrenberger, Mark
43 Broad St., Ste. B407
Hudson, MA 01749
Tel: 978-56-SOLAR
mark@newenglandcleanenergy.com
newenglandcleanenergy.com
Description: *New England Clean Energy (formerly New England Breeze Solar) designs and installs solar electric, hot water, attic fan and parking lot lighting systems, for Central Mass homes and businesses.*
Specialties: *Photovoltaics, Solar Hot Water, Green Electricity*

New Frameworks Natural Building

Deva Racusin, Jacob
P.O. Box 15
Montgomery, VT 05470
Tel: 802-782-7783
info@newframeworks.com
http://newframeworks.com
Specialties: *Building Design/Construction*

New Tapestry, LLC

Anway, Randall
P.O. Box 4066
Old Lyme, CT 06371-1815
Tel: 203-623-3156
randy@new-tapestry.com
www.new-tapestry.com
Description: *New Tapestry, LLC offers design-oriented support for ecologically and community-minded clients. Principal Randall Anway is a Registered Architect (CT and NY, NCARB).*
Specialties: *Building Design/Construction, Consultant, Research*

New York State Energy Research and Development Authority (NYSERDA)

17 Columbia Cir.
Albany, NY 12203-6399
Tel: 1-866-NYSERDA
Fax: 518-862-1091
info@nyserda.org
www.nyserda.org
Description: *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. NYSERDA professionals work to protect our environment and create clean-energy jobs. A public benefit corporation, NYSERDA has been developing partnerships to advance innovative energy solutions in New York since 1975.*

NYSERDA strives to facilitate change through the widespread development & use of innovative technologies to improve the State's energy, economic, & environmental well-being. NYSERDA is committed to public service, striving to be a model of efficiency and effectiveness, while remaining flexible & responsive to its customers' needs. NYSERDA's programs & services provide a vehicle for the State to work collaboratively with businesses, academia, industry, the federal government, environmental community, public interest groups, and energy market participants. Through these collaborations, NYSERDA seeks to develop a diversified energy supply portfolio, improve market mechanisms, & facilitate the introduction & adoption of advanced technologies that will help New Yorkers plan for & respond to uncertainties in the energy markets.

To learn more about NYSERDA programs and funding opportunities visit nyserda.org
Specialties: *Alternative Technologies, Consumer Information, Research*

Newport Solar

Sabetti, Doug
14 Vernon Ave.
Newport, RI 02840
Tel: 401-787-5682
doug@newportsolarri.com
www.newportsolarri.com
Description: *Newport Solar is a full service provider of solar energy systems specializing in the design and installation of solar electric systems.*
Specialties: *Photovoltaics*

Noble Home, LLC

Grunberg, Noah
P.O. Box 476
Shelburne Falls, MA 01370
Tel: 617-694-7253
Fax: 617-629-4669
info@noble-home.net
www.noble-home.net
Description: *The modern, all natural, affordable home. The Noble Home is a house kit designed for each building site, easily assembled by an owner-builder.*
Specialties: *Alternative Technologies, Building Design/Construction, Research*

NorthEast Electrical Distributors

Pedro, Nate
560 Oak St.
Brockton, MA 02301
Tel: 781-401-8500
nate.pedro@needco.com
needco.com
Specialties: *Other, Lighting Supply*

NorthEast Solar Design Associates

Bronner, Ann
136 Elm St.
Hatfield, MA 01038
Tel: 413-247-6045
info@northeastsolar.biz
www.northeastsolar.biz
Description: *NorthEast Solar - formerly Green in Green Inc. - provides professional design and turnkey installation of commercial, municipal, residential and "village" solar electric and solar hot water 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.*

Our design wisdom and installation experience stems from over 28 years serving homeowners, businesses, non-profits & NGOs, government agencies, and sustainability projects all over the world. Our long term relationships with several suppliers in the industry ensure us a steady supply of solar modules and allows us to choose the very best components to match the needs of the project. And our site survey crew, design crew and installation crew work closely together so that our design savvy is carried through every stage of the installation. Our primary design driver is the customer. We look forward to working with you!
Specialties: *Photovoltaics, Radiant Heating, Solar Hot Water*

Novus Engineering, PC

Dana, Dawn
25 Delaware Ave.
Delmar, NY 12054-1504-1504
Tel: 518-439-8235
Fax: 518-439-8592
ddana@novusengineering.com
www.novusengineering.com
Description: *Novus Engineering is a multi-disciplinary engineering consulting firm, focusing on energy-consuming systems. We also provide comprehensive environmental compliance services.*
Specialties: *Energy Audit Services, Geothermal, Lighting Design*

October Engineering Associates, LLC

Morrison, Robert
16 October Rd.
Sudbury, MA 01776
Tel: 508-561-7553
rlm@octoberengineering.com
www.octoberengineering.com
Specialties: *Engineering Services, Energy Audit Services*

ONTILITY

Eiben, Nicole
3403 N Sam Houston Pkwy. W
Ste. 300
Houston, TX 77086
Tel: 281-854-1400
Fax: 832-201-8112
nicole.eiben@ontility.com
www.ontility.com
Description: *ONTILITY Services - Professional development & certification training; stocking warehouse at competitive prices; full range of support, financial and counsultive services.*
Specialties: *Consultant, Photovoltaics, Solar Hot Water*

Optimal Energy Solutions, LLC

Spindler, Henry
64 Peg Shop Rd.
Keene, NH 03431
Tel: 603-283-0366
Fax: 603-283-0366
hcs@optimalenergysolutions.net
Description: *Comprehensive building system analysis and design, including: building envelope, high-efficiency HVAC (esp. hydronic), customized control systems and renewable energy.*
Specialties: *Biomass, Radiant Heating, Space Heating/Cooling*

Partners for Architecture

Grasso, Stephen
48 Union St., Bldg. 1
Stamford, CT 06906
Tel: 203-708-0047
Fax: 203-348-4165
lagrasso@pfarch.net
www.pfarch.net
Description: *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.*

The very foundation of Partners for Architecture is the desire to create a built environment that is respectful to its surroundings and does not view our planets resources as 'being there for the taking'. From a conference table built from scrap steel to an office space exposing beautiful natural materials previously hidden by our societys habits, the environment is not something we talk about, it is something about which we care passionately and reinforce in our own office space. Beyond the environment, our 'workshop' is one which eliminates the common "chain of commands" found in large firms, our organization is known for a fresh, uncomplicated and straight-forward hands-on approach, with a principal completely involved in every aspect of your project.
Specialties: *Building Design/Construction, Energy Conservation*

Paul Huijing, Inc. Construction and Engineering
Huijing, Paul
P.O. Box 516
Wilbraham, MA 01095
Tel: 413-599-4884
Fax: 413-599-4884
phinc@charter.net
www.paulhuijing.com
Description: *Paul Huijing founded Paul Huijing, Inc. Construction and Engineering with a goal of establishing a small personal construction company with time to focus on the individual needs of his clients. Paul stresses sustainable projects with lasting value. His commitment to efficiency, organization, responsiveness, and knowledge make the company unique. An organized professional approach makes life easier/less stressful for customers. Quality scheduling and construction are a powerful combination for customers. A realistic completion date enables you to accurately plan your move-in date.*
Specialties: *Building Design/Construction, Insulation, Remodeling*

Paul St. Amand Designer & Builder
St. Amand, Paul
1093 Main St.
Coventry, RI 02816
Tel: 401-623-1154
Fax: 401-821-9715
saintpix1@aol.com
Specialties: *Building Design/Construction*

Pavers by Ideal
Feeley, Patti
P.O. Box 747
45 Power Rd.
Westford, MA 01886
Tel: 978-692-3076
info@idealconcreteblock.com
www.idealconcreteblock.com
Description: *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/Construction, Pavement*

Perihelion Renewables
McGillicuddy, Jean
1140 Fifth Ave., Ste. 4c
New York, NY 10128
Tel: 212-722-9404
jeanmcg@perihelion renewables.com
www.perihelionrenewables.com
Description: *Perihelion Renewables is a solar consulting and development firm that advises universities, artists of large-scale public art, and city parks on building commercial-scale solar systems and incorporating solar products and solutions into their properties and projects. Perihelion partners with clients to provide a complete and holistic solution tailored to your property's unique requirements. Perihelion stands apart in its complete, creative yet pragmatic, and educational solar solutions.Our company's objective is to provide customized solutions that are highly visible to the public and our youth, encouraging them to really see the many uses of solar and inspiring them to creatively incorporate solar into their lives.*
Specialties: *Green Electricity, Consultant, Energy Education*

Petersen Engineering
Petersen, James
P.O. Box 4774
Portsmouth, NH 03802
Tel: 603-436-4233
james@petersenengineering.com
www.petersenengineering.com
Description: *Petersen Engineering provides green consulting services in the areas of HVAC, plumbing, fire protection and building envelope for commercial, residential and industrial buildings.*
Specialties: *Building Design/Construction, Energy Conservation, Space Heating/Cooling*

Petra Schweitzer Translations
Schweitzer, Petra
18 Woodsia Ridge
Greenfield, MA 01301
Tel: 413-325-1875
Fax: 866-378-8230
petra@petraschweitzer.com
www.petraschweitzer.com
Description: *English to German and German to English technical document translation in the fields of Renewable Energy and Energy Efficiency.*
Specialties: *Translation*

Phinney Design Group
Phinney, Michael
142 Grand Ave., Flr. 3
Saratoga Springs, NY 12866
Tel: 518-587-7120
Fax: 518-587-7250
info@phinneydesign.com
www.phinneydesign.com
Description: *Phinney Design Group is a multi-disciplinary Architecture, Interior Design and Green Building Consulting firm with a focus on sustainable and environmentally sensitive construction methods.*
Specialties: *Building Design/Construction, Interior Design, Consultant*

Picton Brothers, LLC
Picton, Jim
10 Titus Rd.
PO Box 438
Washington Depot, CT 06794
Tel: 860-868-5007
info@pictonbrothers.com
www.pictonbrothers.com
Description: *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*

Pill – Maharam Architects
Pill, David
P.O. Box 1300
Shelburne, VT 05482
Tel: 802-735-1286
dpill@pillmaharam.com
www.pillmaharam.com
Description: *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 are continually doing research into and incorporating sustainable strategies so that our finished projects are environmentally responsible. We fuse creative ideas with functional, budgetary and programmatic requirements to create finely detailed sculptural spaces and buildings.*
Specialties: *Architecture, Building Design/Construction, Geothermal*

Polanik Architects
Polanik, Gregory J.
6 Pine Cone Dr.
East Sandwich, MA 02537
Tel: 508-833-6540
mr7b7@aol.com
www.polarch.com
Description: *Specializing in environmentally appropriate architecture, planning and consulting, we strive to design efficient, healthy buildings, that preserve the local community and are a delight for their users.*
Specialties: *Architecture, Building Design/Construction, Remodeling*

PowerDash
Lapointe, Stephen
50 Church St., 5th Flr.
Cambridge, MA 02138
Tel: 617-642-3521
info@powerdash.com
www.powerdash.com
Description: *At PowerDash, we're devoted to serving you with low-cost, simplified energy performance monitoring. By optimizing the collection, management, and usability of critical energy data, we're enabling the move to a cleaner, more distributed, more efficient power grid. PowerDash is currently serving hundreds of systems in several states. Customers and users include leading energy services integrators, municipalities and other government agencies, individual homeowners, SREC aggregators, and more. In Massachusetts alone, PowerDash is currently monitoring systems representing about 5 megawatts of solar PV generating capacity, with that number projected to reach 10 megawatts by the end of 2011.*
Specialties: *Energy Conservation, Energy Monitoring, Photovoltaics*

Precision Decisions, LLC
Vreeland, Chris
P.O. Box 746
Otis, MA 01253
Tel: 413-269-4965
vreeland67@msn.com
Description: *Providing engineering services for renewable energy, conservation and green construction. We service contractors, architects and directly to industry, commercial and residential clients. Professional Engineering licensed in MA, CT, NY, RI.*
Specialties: *Alternative Technologies, Consultant, Photovoltaics*

Project Planning and Management

Lapointe, Paul H.
224 Follen Rd.
Lexington, MA 02421-5825
Tel: 781-861-9545
paul@paulhlapointe.com
www.paulhlapointe.com
Description: *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*

Public Service of New Hampshire

Lemay, Gary
P.O. Box 330
Manchester, NH 03105-0330
Tel: 603-634-3500
Fax: 603-634-2667
lemaygs@nu.com
www.psnh.com
Specialties: *Green Electricity, Consumer Information, Alternative Technologies*

PV Squared

Stillinger, Bill
324 Wells St.
Greenfield, MA 01301
Tel: 413-772-8788
bills@pvsquared.coop
www.pvsquared.coop
Description: *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. Our organization is committed to the highest quality service for you, while providing jobs at fair wages in our community. We are eager to move toward a sustainable society by learning and adapting to new circumstances in ways that nurture and restore, rather than harm, natural systems. We're a local company operating year round; PV Squared is here to help you to own and maintain your renewable energy systems. We provide advice, equipment and assistance energy systems in New England. Our focus is solar energy & small wind turbine systems in CT & western MA.*
Specialties: *Photovoltaics, Solar Hot Water, Wind*

Quigley Builders, Inc.

Quigley, Mary
P.O. Box 2008
Ashfield, MA 01330
Tel: 413-625-2301
Fax: 413-625-6077
maryquigley@quigley builders.com
www.quigleybuilders.com
Specialties: *Building Design/Construction*

R. L. Benton – Builder

Benton, Rich
154 Schoolhouse Rd.
Center Sandwich, NH 03227
Tel: 603-284-6860
Fax: 603-284-6860
rlbenton@cyberpine.net
Description: *Full service builder/designer for energy-efficient residential construction in the NH lakes region. Timber-framing as well as advanced hybrid construction, with expertise in solar thermal system design and installation since 1978. Our Sandwich Cabinet Shop can furnish your project as well.*
Specialties: *Building Design/Construction, Energy Conservation, Other Renewable Energy Generation*

R.W. Chew Consultants

Chew, Bob
15 Garfield Ave.
Bristol, RI 02809
Tel: 401-447-7835
bob@rwchew.com
Description: *R.W. Chew Consultants, based in Bristol, RI, focuses on offering expert guidance using best practice gained from 30 years in the renewable energy field, to individuals, businesses, municipalities, schools and government agencies seeking viable and cost effective energy choices. The design, implementation, and integration of sustainable energy solutions necessitates the need for a long range plan or "road map" that incorporates variables specific to a particular project. There is no one size fits all in the renewable and energy efficiency field. By generating designs, specifications and project oversight, the company functions much the same as an architect in the building industry.*

Prior to starting R.W. Chew, LLC., Chew served as President of the Wind Business at Alteris Renewables and Chief Sustainability Officer.
Specialties: *Photovoltaics, Solar Hot Water, Wind*

Ra Solar Company

Vann, Jim
P.O. Box 2222
Littleton, MA 01460-3222
Tel: 978-486-8755
yimbo98@gmavt.net
Description: *Builders of energy efficient, solar, green homes, additions & 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: *Building Design/Construction, Energy Audit Services, Indoor Air Quality*

RBI Solar, Inc.

Kaur, Harman
5513 Vine St.
Cincinnati, OH 45217
Tel: 513-618-7214
Fax: 513-242-0816
hkaur@rbisolar.com
rbisolar.com
Specialties: *Photovoltaics, Manufacturing*

Re:Vision Architecture

Kelly, Scott
133 Grape St.
Philadelphia, PA 19127
Tel: 215-482-1133
Fax: 208-441-4564
young@revisionarch.com
www.revisionarch.com
Description: *Named Best Green Architect by Philadelphia Magazine and Sustainable Design Leader by PA Environmental Council, Re:Vision Architecture is a deep green architecture and sustainability/LEED consulting practice that was founded in 2001 to specialize exclusively in green building projects that take less from the planet (fewer natural resources, less pollution) and give more to people (more daylight, comfort, health, beauty, prosperity).*

As an early adopter of sustainable design, Re:Vision has an extensive portfolio of completed work that represents the following key services:
** Architectural design for projects that range from common sense green to cutting-edge sustainable design*
** LEED/sustainability technical consulting and management for designers, contractors, and owners*
** Green operations and maintenance implementation*
** Professional green design charrettes*
** Sustainability-related education*
** Green behavior change projects targeting building users*
** Sustainability research and policy development*
** Fundraising for Green Buildings*
** Indoor Air Quality Testing*

Behind the projects and the firm, Re:Vision is comprised of friendly people who are passionate about sustainability and community.
Specialties: *Building Design/Construction, Consultant, Environmental Education*

Redberry, LLC

Chew, Bob
140 Union St.
Providence, RI 02903
Tel: 401-569-0252
bob@redberryliving.com
redberryliving.com
Description: *Redberry, LLC, is a new partnership between longtime solar/green building pioneer Bob Chew (rwchew.com) and Donald Powers, AIA and Douglas Kallfelz, AIA, principals at Union Studio (unionstudioarch.com) and John Haley that is bringing a new generation of modular solar homes to the New England market. Redberry homes incorporate a grid-connected photovoltaic system with the Chew Solar Attic to provide cost-effective passive/active solar heating coupled with an innovative passive solar batch hot water heating system to preheat domestic hot water. The combination of high-quality super-insulated modular construction and traditional New England architecture makes Redberry a real game changer.*
Specialties: *Architecture, Building Design/Construction, Space Heating/Cooling*

Redberry, LLC, MA

bob@redberryliving.com
redberryliving.com
Description: *Redberry, LLC, is a new partnership between longtime solar/green building pioneer Bob Chew (rwchew.com) and Donald Powers, AIA and Douglas Kallfelz, AIA, principals at Union Studio (unionstudioarch.com) and John Haley that is bringing a new generation of modular solar homes to the New England market. Redberry*

homes incorporate a grid-connected photovoltaic system with the Chew Solar Attic to provide cost-effective passive/active solar heating coupled with an innovative passive solar batch hot water heating system to preheat domestic hot water. The combination of high-quality super-insulated modular construction and traditional New England architecture makes Redberry a real game changer.
Specialties: *Architecture, Building Design/Construction, Space Heating/Cooling*

Redberry, LLC, CT
bob@redberryliving.com
redberryliving.com
Description: *Redberry, LLC, is a new partnership between longtime solar/green building pioneer Bob Chew (rwchew.com) and Donald Powers, AIA and Douglas Kallfelz, AIA, principals at Union Studio (unionstudioarch.com) and John Haley that is bringing a new generation of modular solar homes to the New England market. Redberry homes incorporate a grid-connected photovoltaic system with the Chew Solar Attic to provide cost-effective passive/active solar heating coupled with an innovative passive solar batch hot water heating system to preheat domestic hot water. The combination of high-quality super-insulated modular construction and traditional New England architecture makes Redberry a real game changer.*
Specialties: *Architecture, Building Design/Construction, Space Heating/Cooling*

Renewable Energy Systems, LLC
Boyle, Erica
P.O. Box 262
No. Scituate, MA 02066
Tel: 781-545-3320
Fax: 781-545-3321
erica@ressolar.com
www.ressolar.com
Description: *Renewable Energy Systems LLC specializes in solar thermal hot water and space heating. We also work with energy conservation and solar electricity.*
Specialties: *Radiant Heating, Solar Hot Water, Space Heating/Cooling*

Renewable Sales, LLC
Price, Kevin
16 Everett St.
Holliston, MA 01746
Tel: 508-309-4437
Fax: 508-302-1070
kprice@renewablesales.com
www.renewablesales.com
Description: *Renewable Sales LLC provides contractors with photovoltaic, solar thermal, and geothermal products for residential and commercial use.*
Specialties: *Domestic Water Heating, Geothermal, Photovoltaics*

Reno Engineering and Light Design
Reno, Victor
Reno Rd.
HCR32 Box 729
Marlow, NH 03456-9708
Tel: 603-446-3426
Fax: 603-446-3731
renoengineering@earthlink.net
Description: *Architectural lighting design, energy-conscious lighting, and energy conservation. Also full electrical engineering services.*
Specialties: *Energy Conservation, Lighting Design*

Richard Renner Architects
Renner, Richard
35 Pleasant St.
Portland, ME 04101
Tel: 207-773-9699, 508-651-2385
Fax: 207-773-9599
rrenner@rrennerarchitects.com
www.rrennerarchitects.com
Description: *Environmentally responsible design is a cornerstone of our architectural practice.*
Specialties: *Building Design/Construction*

Right Environments
White, David
268 Degraw St.
Brooklyn, NY 11231
Tel: 718-522-4976
david@rightenvironments.com
www.rightenvironments.com
Description: *Technical consulting for energy efficiency and environmental quality in buildings. Envelope detail consulting and MEP for new construction/extensive renovation. Projects in NY, CT, MA, ME, etc. Certified Passive House Consultant.*
Specialties: *Building Design/Construction, Consultant, Engineering Services*

Robert L. Spencer, AICP – Environmental Planning Consultant
Spencer, Robert
15 Christine Ct.
Vernon, VT 05354
Tel: 978-479-1450
Fax: 802-254-9607
spencebbc@aol.com
Description: *Professional planner specializing in organic waste management & project development. Assessment of on-site & off-site recycling of food waste, manure, yard waste & biosolids.*
Specialties: *Other Renewable Energy Generation, Research*

Rodman & Rodman CPAs
Rodman, Steve
3 Newton Executive Park
Newton, MA 02462
Tel: 617-680-3870
Fax: 617-965-1792
steve@rodmancpa.com
Description: *The Rodman & Rodman "Green Team" is a specialty accounting practice dedicated to providing alternative energy producers and other businesses that pursue energy efficiency initiatives with expert counsel and services in green energy tax accounting and business strategy. Rodman & Rodman's experienced "Green Team" CPAs are domain experts in alternative energy finances. The firm offers tax advisory, financial and accounting services for companies involved in solar, wind, biomass, and energy efficiency projects. The Rodman & Rodman Green Team provides clients with a sustainable financial roadmap through: expert partnership/corporate structuring for optimal tax benefit; grant qualification assistance and auditing; ongoing advisory services for federal, state and local tax incentives; and specialized strategic financial planning and management for alternative energy and sustainability projects.*
Specialties: *Finance/CPA*

RST Thermal
Hickey, Mary Ellen
372 University Ave.
Westwood, MA 02090
Tel: 781-320-9910
Fax: 781-320-9906
mehickey@rstreps.com
Specialties: *Domestic Water Heating, Space Heating/Cooling*

S&H Construction
Leef, Jamie
26 New St.
Cambridge, MA 02138
Tel: 617-876-8286
jamie@shconstruction.com
Description: *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 Hot Water*

Sage Builders, LLP
Kantar, Jonathan
672 Chestnut St.
Newton, MA 02468
Tel: 617-965-5272
Fax: 617-630-5272
info@sagebuilders.com
www.sagebuilders.com
Description: *Award-winning, full service Boston area residential design-build company committed to responsible design and construction practices. Experts in energy efficiency and weatherization. Sage Builders, LLP is committed to energy efficiency in our built environment. Sage provides blower door tests and thermal imaging with infrared scans as well as complete energy audits and budgets, including HERS energy ratings.*
Specialties: *Building Design/Construction, Energy Conservation, Remodeling*

Saltonstall Architects, Inc.
Saltonstall, William
380 Wareham St.
Marion, MA 02738
Tel: 508-748-1043
Fax: 508-748-2330
will@saltonstallarchitects.com
www.saltonstallarchitects.com
Description: *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: *Building Design/Construction*

Scarano Architect PLLC
Scarano Jr., Robert
110 York St.
Brooklyn, NY 11201
Tel: 718-222-0322
Fax: 718-222-4486
arch59@aol.com
www.scaranoarchitect.com
Description: *Scarano Architect PLLC a subsidiary of Scarano Realty LLC is a full service design and management company that specializes in environmentally sensitive and regenerative projects.*
Specialties: *Building Design/ Construction, Energy Conservation, Remodeling*

Schock USA, Inc.
Capone, Matthew
182 Pleasant St.
Watertown, MA 02472
Tel: 617-212-2252
matt@arch4d.com
schock-us.com
Specialties: *Other, Building Design/ Construction*

Second Generation Energy
Whitaker, Edward
11 Rosenfeld Dr.
Hopedale, MA 01747
Tel: 800-653-4270
Fax: 508-275-8541
info@sgegroup.com
www.sgesolar.com
Description: *Second Generation Energy provides "Turn-key" Solar Installation services. We design, install and maintain Photovoltaic facilities for our residential and commercial clients. Our experience, expertise and excellent customer service sets us apart and our passion for clean, affordable renewable energy drives us. We are a SunPower Authorized Dealer & Installer, an EnergyStar Partner and hold a full NABCEP certification. We are proud to be Massachusetts - locally owned and operated. Our main offices are in Hopedale, MA.*
Specialties: *Photovoltaics, Other*

Sellars Lathrop Architects, LLC
Lathrop, Ann
1 Kings Hwy. North
Westport, CT 06880
Tel: 203-222-0229
ann@sla-arch.com
www.sla-arch.com
Description: *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*

Siemens Industry – Building Technologies Division
Drummond, Jerry
40 Sharpe Dr.
Cranston, RI 02920
Tel: 401-225-5432
Fax: 781-575-9590
jerry.drummond@siemens.com
Specialties: *Energy Monitoring, Building Design/Construction, Energy Conservation*

SJP Environmental Consulting, LLC
Pick, Sally
P.O. Box 303
Montague, MA 01351
Tel: 413-367-0082
sjp@crocker.com
Description: *Offering a range of services including writing (i.e. news releases, policy papers, & grants); managing projects & collaborations; and directing public education programs.*
Specialties: *Communications, Consumer Information, Environmental Education*

Solaire Generation
Winston, Logan
150 West 28th St., Ste. 1801
New York, NY 10001
Tel: 646-738-6955
eaccounts@
solairegeneration.com
solairegeneration.com
Specialties: *Photovoltaics*

Solar Design Associates, Inc.
Strong, Steven
P.O. Box 242
Harvard, MA 01451-0242
Tel: 978-456-6855
sda@solardesign.com
www.solardesign.com
Specialties: *Photovoltaics, Engineering Services, Alternative Technologies*

Solar Electric Power Systems, Inc.
McDermott, Michael
830 South Dogwood Rd.
Walnutport, PA 18088
Tel: 610-760-1554
mike@solareps.com
solareps.com
Description: *NE PA's Solar Installer. Any and all types of solar Electric systems designed and installed. From 1 panel to 200 panels. Roof mount, ground mount, top of pole mount and speciality mount. We have over 1.7mW's of experience. We are a full service Licensed and Certified Electrical and Solar Contractor.*
Specialties: *Photovoltaics*

Solar Engineers
Gillett, P.E., Drew
33 Holbrook Rd.
1 Solar + Efficiency Way
Bedford, NH 03110-5917
Tel: 603-668-7336
deaneg@hotmail.com
Description: *Providing integrated solar and energy design for residential, commercial, and industrial projects. Specialize in assisting clients in understanding and evaluating renewable energy.*
Specialties: *Alternative Technologies, Energy Conservation, Engineering Services*

Solar Frontier Americas, Inc.
Rolufs, Peter
3945 Freedom Cir.
Santa Clara, CA 95054
Tel: 408-916-4150
www.solar-frontier.com
Description: *Solar Frontier, a 100% subsidiary of Showa Shell Sekiyu K.K., established the world's first gigawatt-scale CIS module factory in 2011 with a mission to create the most economical, ecological solar energy solutions in the world, on the world's largest scale. Solar Frontier's proprietary CIS technology, denoting key ingredients copper, indium, and selenium (in addition to gallium and sulfur), has the best overall potential to set the world's most enduring standard for solar energy. This is based on our legacy of work in solar technology since the 1970s, the priority focus our laboratories have given to CIS since 1993, and our success in large scale CIS commercialization since 2007. The critical factors that combine to make CIS the overall economical and ecological leader include high efficiency modules and production processes as well as superior reliability, stability, sustainability, non-toxicity, and lower overall energy consumption in manufacturing to yield a faster energy payback time. These factors at gigawatt scale enable Solar Frontier to meet worldwide demand for the new standard in affordable solar panel performance.*
Specialties: *Manufacturing, Photovoltaics, Research*

Solar Plumbing Design
Baldwin, Jessica
893 Bedford Ave.
Brooklyn, NY 11205
Tel: 917-207-2403
pipeworks100@gmail.com
ww.solarplumbingdesign.com
Description: *Solar Plumbing Design is a NABCEP certified installer fully insured & accredited small business with 13 yrs. of plumbing experience and 4 yrs. in solar thermal.*
Specialties: *Solar Hot Water, Alternative Technologies*

Solar Store of Greenfield
Chang, Claire & Ward, John
2 Fiske Ave.
Greenfield, MA 01301
Tel: 413-772-3122
info@solarstoreof
greenfield.com
www.solarstoreofgreenfield.com
Description: *Local western MA renewable energy advice, design and installation for residential and commercial clients. Also pellet stoves, interior window inserts, lighting, biodiesel, and energy conservation available in the store.*
Specialties: *Photovoltaics, Energy Conservation, Solar Hot Water*

SolarFlair Energy, Inc.
Arner, Matthew
11 Mayhew St.
Framingham, MA 01702
Tel: 508-293-4293
Fax: 508-293-4003
info@solarflair.com
www.solarflair.com
Description: *SolarFlair is a full service solar energy firm providing solar electric (PV) and solar hot water systems for Massachusetts homes and businesses. With over 10 years of experience and hundreds of systems installed, SolarFlair will help you achieve your goals for energy savings and energy indepen-*

dence. See our website for more information or contact us today.
Specialties: *Energy Conservation, Photovoltaics, Solar Hot Water*

Solectria Renewables
Worden, Anita
360 Merrimack St., Bldg. 9
Lawrence, MA 01843
Tel: 978-683-9700
Fax: 978-683-9702
inverters@solren.com
www.solren.com
Description: *Solectria Renewables designs and manufactures grid-tied photovoltaic inverters and related equipment (string combiners and data monitoring) for residential and commercial applications.*
Specialties: *Photovoltaics*

South Mountain Company
Abrams, John
P.O. Box 1260
15 Red Arrow Rd.
West Tisbury, MA 02575
Tel: 508-693-4850
Fax: 508-693-7738
info@somoco.com
www.southmountain.com
Description: *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/ Construction, Energy Conservation, Photovoltaics*

SouthPoint, LLC
Lastella, Michael
77 Arlington St.
Leominster, MA 01453
Tel: 978-840-4300
info@southpoint-llc.com
www.southpoint-llc.com
Description: *Provide design/installation services; specializing in solar electric systems in the New England area. Our systems are for new and existing residential and commercial applications.*
Specialties: *Consultant, Domestic Water Heating, Photovoltaics*

Sparhawk Group
Holden, Matthew
81 Bridge St., Ste. 107
Yarmouth, ME 04096
Tel: 207-846-7726
mholden@sparhawkgroup.com
www.sparhawkgroup.com
Specialties: *Consultant, Energy Audit Services, Engineering Services*

Spire Solar Systems
Hogan, Steve
1 Patriots Park
Bedford, MA 01730
Tel: 781-275-6000
Fax: 781-275-7470
shogan@spirecorp.com
www.spirecorp.com
Description: *Spire Corporation - Spire is the leading global solar company providing capital equipment to manufacture PV modules & cells, turnkey solar manufacturing lines and PV systems. Spire has provided innovative solar technologies for over 30 years.*
Specialties: *Alternative Technologies, Photovoltaics, Manufacturing*

Spirit Solar
Kocsmiersky, Mike
P.O. Box 80007
Springfield, MA 01138
Tel: 413 883-3144
info@spiritsolar.net
www.spiritsolar.net
Description: *Spirit Solar provides installation and service for all types of solar hot water systems, solar educational services, and third party PV system verification.*
Specialties: *Consultant, Educator, Solar Hot Water*

Steele Kellogg
Kellogg, Chris
3 Walnut St.
Madison, NJ 07940
Tel: 973-377-5757
halfmoonhouse@mac.com
www.steelekellogg.com
Specialties: *Building Design/Construction, Consultant, Alternative Technologies*

Stephen Turner, Inc.
Turner, Stephen
P.O. Box 2523
Providence, RI 02906
Tel: 401-273-1935
stephen@sturnerinc.com
www.greenbuilding commissioning.com
Description: *Commissioning services for commercial/institutional clients in Southern NE. Specializing in complex, high performance projects, sustainable strategies, & on-site renewables.*
Specialties: *Alternative Technologies, Energy Conservation, Indoor Air Quality*

Sterling College
Brown Library
P.O. Box 72
Craftsbury Common, VT 05827
Specialties: *Library, College/University, Environmental Education*

Stewart Hoyt Design and Build
Hoyt, Stewart
770 Washington Ave., Apt.2
Brooklyn, NY 11238-4590
Tel: 347-528-1822
stewarthoyt1@gmail.com
Description: *Designer, Builder, LEED AP BD+C, Yale 1980 BS Art. Custom furniture and green apartment improvement. Grey water gardens.*
Specialties: *Alternative Technologies, Building Design/Construction, Consultant*

Stiebel Eltron, Inc
Riley, Bill
17 West St.
West Hatfield, MA 01088
Tel: 800-582-8423
Fax: 413-247-3369
bill.riley@
stiebel-eltron-usa.com
www.stiebel-eltron-usa.com
Description: *Stiebel Eltron is the German manufacturer of the energy saving Tempra Plus tankless electric water heaters, Accelera 300 heat pump water heaters and solar hot water heating renewable energy systems. Tempra Plus whole house tankless electric (99% efficient) water heaters feature advanced flow control to automatically keep output temperature constant and provide unlimited hot water, 15-20% energy saving, water saving, space saving 17"x15"x5" and no venting easy installation. Accelera 300 Heat Pump water heaters extract up to 80% of their energy requirements from energy in the air around them. Compressor and fan consume only 1kWh of electricity to generate the heat equivalent of 3 - 5kWh. Among Energy Star rated heat pump water heaters, the Accelera 300 has the largest capacity (80 gal), highest energy factor (2.51), lowest power input (2.2 kW) and lowest power consumption (1739 kWh/year) as determined by DOE testing. Stiebel solar thermal systems for domestic and radiant floor water heating present a great hedge against current and future fossil fuel price volatility. Federal tax credits, often state and local incentives too, can cut the cost of an installed system up to 40%. SOL 27 Premium flat plate collectors are certified among the most efficient by the SRCC. A New England family can expect to satisfy 65-75% of their annual hot water needs. Tempra Plus tankless units provide an ideal backup to the solar systems when the sun needs a little assistance.*
Specialties: *Energy Conservation, Manufacturing, Solar Hot Water*

SunDurance Energy
Martin, Todd
2045 Lincoln Hwy.
Edison, NJ 08817
Tel: 732-520-5025
tmartin@
sunduranceenergy.com
www.sunduranceenergy.com
Description: *SunDurance Energy, LLC is a solar energy company that develops, designs, builds and operates megawatt-scale solar power solutions for commercial & industrial, federal government, and utility-scale markets. SunDurance provides full turnkey solar solutions in complex environments to demanding customers who value our integrated approach. SunDurance offers full in-house design and project execution capabilities, rigorous value engineering processes, $350 million per project bonding capacity, and deep design/build experience. Founded in 2004 (originally under the name of "Alternity Power"), SunDurance is part of The Conti Group, a century-old, nationwide leader in infrastructure development, engineering and construction, power, water, environmental remediation and homeland security.*
Specialties: *Photovoltaics*

Sungage
Ross, Sara
34 Main St., Ste. 9
Amherst, MA 01002
Tel: 413-835-5825
contact_us@sungage.net
www.sungage.net
Description: *Sungage is committed to helping more people own solar. We offer products and services to help homeowners make a smart investment in solar electric (PV) systems. Sungage helps customers answer the question: "Does solar make financial sense for me?" Through an on-line decision-support tool, customers can evaluate whether an investment in solar for their home can provide an attractive return. Sungage provides financing for the project as well as on-line tools for loan repayment, monitoring of system and investment performance.*
Specialties: *Finance/CPA, Photovoltaics*

Sustainable Retrofits
Fine, Lawrence
9 Lake Boon Dr.
Hudson, MA 01749-3033
Tel: 978-562-9223
Fax: 617-277-2499
lorenzonine@gmail.com
home.earthlink.net/~lorenzonine/
Description: *Consultant, Designer and Fabricator. Innovative, integrated systems, simple, safe, durable, easy to maintain, attention to detail. All aspects of sustainable design and fabrication*
Specialties: *Alternative Technologies, Consultant, Other*

Symmes Maini & McKee Associates
Galloway, Elizabeth
1000 Massachusetts Ave.
Cambridge, MA 02138
Tel: 617-547-5400
egalloway@smma.com
www.smma.com
Description: *SMMA's 180 person staff has made sustainable design a focus of its multi-disciplinary design practice, and has long incorporated sustainable design elements into all projects. A signatory of the 2030 Challenge and USGBC Member, SMMA's success in sustainable design continues to be enhanced by the 70+ LEED-Accredited Professionals who represent all of our in-house technical disciplines. SMMA offers in-house Sustainable Design Administration from a partially fixed and partially rotating "studio" developed in order to train and maintain continuing education programs for design team members in all disciplines. SMMA is committed to our Sustainable Design Action Plan which sets forth a variety of in-house initiatives including a recycling plan, hybrid company cars, company bicycles, and tracking our carbon footprint and gathering data to estimate energy use of projects since 2009.*
Specialties: *Building Design/Construction, Energy Conservation, Engineering Services*

Synergy Construction
Cheimets, Alex
10 Powers St.
Leominster, MA 01453
Tel: 781-648-7177
bzero@mysynergyhome.com
synergy-green-builders.com
Specialties: *Building Design/Construction, Energy Conservation*

TCF Equipment Finance – Solar Capital
Goolden, Mike
201 Shannon Oaks Cir., Ste. 200
Cary, NC 27511-5570
Tel: 919-654-4510
Specialties: *Finance/CPA*

The Boston Solar Company
Strecker, Romain
10 Churchill Pl.
Lynn, MA 01902
Tel: 781-715-3983
romain@bostonsolar.us
Specialties: *Energy Audit Services, Photovoltaics*

The Community Preservation Corporation
Padian, Andrew
28 E. 28th St., 9th Flr.
New York, NY 10016
Tel: 212-869-5300 x544
apadian@communityp.com
www.communityp.com
Description: *CPC is a nationally recognized leader in helping developers finance and build affordable multi-family housing. To CPC, no loan is simply a financial transaction. Each project reflects CPC's commitment to help developers succeed at strengthening communities. CPC serves as a borrower's ally and "one-stop shop," guiding the project from deal inception to project completion. Throughout the challenging process of developing or rehabbing a property, CPC provides useful technical assistance at every step. Financing with CPC is an easier, client-friendly process that borrowers welcome. CPC is sponsored by 70 prominent banks and insurance companies - the world's largest among them. In its 37 years CPC has financed more than 144,000 new or rehabbed units. This investment of over $8 billion has improved the quality of life for tens of thousands of people, preserving and enhancing dozens of communities.*
Specialties: *Finance/CPA, Energy Conservation, Building Design/Construction*

The Energy Conservatory
Spevak, Frank
2801 21st Ave. S, Ste. 160
Minneapolis, MN 55407
Tel: 612-827-1117
Fax: 612-827-1051
fspevak@energyconservatory.com
www.energyconservatory.com
Description: *The Energy Conservatory (TEC) manufactures precision diagnostic equipment used to solve comfort, energy use, durability and air quality problems in buildings. Our reputation for innovative design and excellent technical support have made us a leading manufacturer of performance testing tools for the building industry.*
Specialties: *Manufacturing, Alternative Technologies*

The Green Engineer, LLP
Schaffner, Christopher
54 Junction Sq.
Concord, MA 01742
Tel: 978-369-8978
chris@greenengineer.com
www.greenengineer.com
Specialties: *Consultant, Engineering Services*

The United Illuminating Company & CT Energy Efficiency Fund
Burns, Patrick
157 Church St. MS 1-6B
P.O. Box 1564
New Haven, CT 06505
Tel: 203-499-3504
Fax: 203-499-2800
patrick.burns@uinet.com
www.uinet.com
Description: *The United Illuminating Company (UI) is an administrator of the Residential and Commerical & Industrial Energy Efficiency Programs through the Connecticut Energy Efficiency Fund (CEEF). The CEEF promotes efficient energy use, helps residents and businesses save on their electric bills, advances economic development, reduces electric demand and helps reduce air pollution. UI and CL&P administer the CEEF through conservation programs that serve residential customers, including fixed-income customers, as well as business and municipal customers. Connecticut's energy efficiency programs are funded by a charge on customer bills. Additional information on Connecticut's energy-efficiency programs can be found at www.ctenergyinfo.com.*
Specialties: *Building Design/Construction, Energy Audit Services, Energy Conservation*

The Valle Group, Inc.
DeMello, Julie
70 East Falmouth Hwy., #3
East Falmouth, MA 02536
Tel: 508-548-1450
Fax: 508-548-1950
jad@vallegroup.com
www.vallegroup.com
Description: *The Valle Group sets the standard for thoughtfully-planned communities in southern New England. The company's special expertise is planning and creating communities of quality, energy-efficient homes, and building and remodeling for homeowners.*
Specialties: *Building Design/Construction, Remodeling*

Thermotech Fiberglass Fenestration
Thwaites, Stephen
2121 Thermotech Rd.
Ottawa, ON K0A ILO
Canada
Tel: 613-816-6156
Fax: 613-839-6158
steven@
thermotechwindows.com
www.thermotechfiberglass.com
Specialties: *Windows*

Thornton Tomasetti Fore Solutions
Hubbard, Gunnar
386 Fore St., Ste. 401
Portland, ME 04101
Tel: 207-347-5066
ghubbard@
thorntontomasetti.com
www.fore-solutions.com
Description: *Thornton Tomasetti Fore Solutions is a Structural Engineering and Sustainability Firm based in New York City with a Sustainability office in Portland Maine.*
Specialties: *Building Design/Construction, Consultant, Engineering Services*

Thoughtful Balance
Nettleton, Laura
456 S Graham St.
Pittsburgh, PA 15232
Tel: 412-661-6010
Fax: 412-363-9911
laura@thoughtfulbalance.com
www.thoughtfulbalance.com
Specialties: *Architecture*

Timeless Architecture
MacLean, Henry P.
147 School St.
Milton, MA 02186-3513
Tel: 617-696-6448
hmaclean@timearch.com
www.timearch.com
Description: *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*

Tom Harden and Associates
Harden, Tom
32 Hill St.
Lexington, MA 02421
Tel: 781-652-8297
tomharden@rcn.com
www.tomhardenand
associates.com
Description: *Specializing in residential design, we seek to translate our clients' aspirations into well-crafted, energy-efficient houses that provide healthy, comfortable living environments.*
Specialties: *Building Design/Construction, Energy Conservation, Remodeling*

Transatlantic Climate Bridge
Schuett, Claudia
Consulate General of the
Federal Republic of Germany
Three Copley Place, Ste. 500
Boston, MA 02116
Tel: 617-369-4934
Description: *The aim of the Transatlantic Climate Bridge is to help Americans and Germans exchange know-how and to pave the way for joint solutions.*
Specialties: *Workforce Development, Energy Education*

Transformations, Inc.
Scott, Carter
8 Coppersmith Way
Townsend, MA 01469-4412
Tel: 978-597-0542
Fax: 978-597-0543
rcarterscott@msn.com
Description: *Transformations, Inc. is focused on creating Zero and Near Zero Energy homes including Sustainable Developments.*
Specialties: *Building Design/Construction, Photovoltaics*

TransOptions
Ciaffone, John
2 Ridgedale Ave., Ste. 200
Cedar Knolls, NJ 07927
Tel: 973-267-7600
Fax: 973-267-6209
jciaffone@transoptions.org
www.transoptions.org
Specialties: *Other Transportation Technologies/Services*

Trillium Architects
DiSalvo, Elizabeth
129 Washington St.
Norwalk, CT 06854
Tel: 203-838-5689
trilliumarchitects@gmail.com
www.trilliumarchitects.com
Description: *At Trillium Architects we design Fine Green Homes. We believe that you should live in a home you cherish today and would be proud to leave your grandchildren tomorrow.*
Specialties: *Building Design/Construction*

Trina Solar, Inc. (US)
McCullough, Beth
100 Century Center Ct., Ste. 340
San Jose, CA 95125
Tel: 408-459-6710
elizabeth.mccullough@
trinasolar.com
www.trinasolar.com
Specialties: *Photovoltaics, Manufacturing*

Truth Box, Inc.
Case, Peter Gill
460 Harris Ave., Unit 104
Providence, RI 02909
Tel: 401-453-1300
pgc@truthbox.com
www.truthbox.com
Description: *This architecture and development firm is for clients who seek alternatives to wasteful building practices. We offer cost effective design solutions that help the environment and enhance design and comfort. Truth Box also offers consultation on building development and can be a versatile partner in small to mid-sized projects that generate value from thoughtful design and high energy-efficiency.*
Specialties: *Building Design/Construction, Energy Conservation, Real Estate*

Turn Key Builders, Inc.
Meehleder, Jim
50 Miles St.
Greenfield, MA 01301
Tel: 413-774-9946
Fax: 413-774-9926
turnkeybuild@gmail.com
www.turnkeybuilders.net
Description: *Quality super insulated homes, additions and photovoltaic installs. Member Home Builders and Remodelers of Western Ma, Energy Star Building Partner.*
Specialties: *Building Design/Construction, Photovoltaics, Remodeling*

Urban Habitat Initiatives, Inc.
38 Chauncy St., Ste. 1401
Boston, MA 02111
Tel: 617-939-0717
Fax: 617-624-3933
kim.vermeer@
urbanhabitatinitiatives.com
urbanhabitatinitiatives.com
Description: *Urban Habitat Initiatives is focused on advancing sustainability in multifamily housing, offering green project management services to developers for the entire development process*
Specialties: *Consultant, Real Estate*

US Solar Works, LLC
Fine, Pete
7 North Main St.
Attleboro, MA 02703
Tel: 508-226-8001
pete@ussolarworks.com
Specialties: *Consultant, Energy Conservation*

Vantem Panels
Anderson, Doug
74 Glen Orne Dr.
Brattleboro, VT 05301
Tel: 802-254-3435
Fax: 802-254-4999
doug.anderson@
vantempanels.com
www.vantempanels.com/
northeast.html
Specialties: *Manufacturing, Building Design/Construction*

Viessmann Mfg.
Brennan, Desoree
45 Access Rd.
Warwick, RI 02886
Tel: 401-681-4021
Fax: 401-732-0590
brnd@viessmann.com
www.viessmann.us.com
Specialties: *Manufacturing, Biomass, Energy Conservation*

Wagner Solar, Inc.
Gaebler, Joerg
485 Massachusetts Ave.
Ste. 300
Cambridge, MA 02238
Tel: 617-230-5604
joerg.gaebler@
wagner-solar.com
www.wagner-solar.com
Specialties: *Domestic Water Heating, Photovoltaics, Space Heating/Cooling*

Walden Street Web Services
Lapointe, Stephen
1619 Massachusetts Ave.
Cambridge, MA 02138
Tel: 617-864-0770
stephen@waldenstreet.com
www.waldenstreet.com
Description: *Walden Street offers a suite of hosted web services to support the missions of leading sustainability organizations. Applications include web-based energy monitoring and customizable solutions for search, news, and mapping.*
Specialties: *Consumer Information, Environmental Education, Photovoltaics*

Warren Design Build
Warren, Carl
268 West St.
Berlin, MA 01503
Tel: 978-838-0022
carl@warrendesign.com
warrendesign.com
Description: *Over 30 years experience using current building science techniques to design and build durable, low maintenance, healthy, low-impact homes. Check us out at warrendesign.com*
Specialties: *Building Design/Construction*

Water Energy Distributors, Inc.
Orio, Martin J.
2 Starwood Dr.
Hampstead, NH 03841
Tel: 603-329-8122
Fax: 603-329-0285
martin@northeastgeo.com
www.northeastgeo.com
Description: *Geothermal design & geothermal heat pump distribution for the northeastern United States since 1978.*
Specialties: *Energy Conservation, Geothermal, Space Heating/Cooling*

Water House Pools
Rawlings, Chris
P.O. 4007
154 Dyer Rd.
Ashfield, MA 01330-4007
Tel: 413-530-7910
chris@waterhousepools.com
www.waterhousepools.com
Description: *Our natural swimming pools create valuable habitat, provide year-round enjoyment and can be constructed in any location. Native wetland plants with mechanical and biological filter*
Specialties: *Building Design/Construction, Landscape Design/Construction, Remodeling*

Winn Companies
Carucci, Patricia
6 Fanueil Hall Marketplace
Boston, MA 02109
Tel: 617-239-4438
Fax: 617-742-4321
pcarucci@winnco.com
winnco.com
Specialties: *Real Estate*

Western Massachusetts Electric Company (WMECo)
P.O. Box 2010
West Springfield, MA 01090
Tel: 877-659-6326
www.wmeco.com
Specialties: *Energy Audit Services, Energy Conservation, Consumer Information*

Wolfworks, Inc.
Wolf, Jamie
195 West Main St.
Avon, CT 06001
Tel: 860-676-9238
jamie@homesthatfit.com
www.homesthatfit.com
Description: *We are guides. We guide a process for clients who are prepared to design and build collaboratively and responsibly. Together we create spaces that look great, work well and feel good to be in. We rely on building materials and energy to create a project. Our choices are guided by the opportunity to use materials and energy wisely. This means seeking solutions that make the best use of available space before constructing additional space. It means striving to use energy efficient equipment and construction strategies. It means seeking materials that are durable, safe, and resource efficient. We expect to respect what we use. We are trained to design and build using the Passive House Planning Package to produce extraordinarily low energy buildings. We think solar is for dessert—after you eat your veggies!*
Specialties: *Building Design/Construction, Remodeling*

Wright Builders, Inc.
Paige, Joyce
48 Bates St.
Northampton, MA 01060
Tel: 413-586-8287 x32
Fax: 413-587-9276
jpaige@wright-builders.com
www.wright-builders.com
Description: *A design/build general contractor specializing in energy efficient housing since 1977, serving the Pioneer Valley.*
Specialties: *Remodeling*

Zehnder America, Inc
Stephens, Barry
540 Portsmouth Ave.
Greenland, NH 03840
Tel: 888-778-6701
Fax: 603-422-9611
info@zehnderamerica.com
www.zehnderamerica.com
Specialties: *Space Heating/Cooling, Geothermal, Energy Conservation*

Zensky Electrical Contracting, Inc
Zensky, Paul
140 Circle Dr. N
Piscataway, NJ 08854
Tel: 732-356-2211
paul@zenskyelectric.com
Specialties: *Photovoltaics, Energy Conservation*

ZeroEnergy Design
Prince, Adam
156 Milk St., Ste. 3
Boston, MA 02109
Tel: 617-720-5002 x102
aprince@zeroenergy.com
www.zeroenergy.com
Description: *Green Architecture, Mechanical Design & Energy Consulting for new construction/major renovations. Core services: - Architecture of modern houses & green homes.- HVAC Design & Energy Consulting for your high performance home or building. Passive House Consultants & Registered Architect on staff. Working in MA, ME, NH, VT, RI, CT, NJ, and more.*
Specialties: *Architecture, Engineering Services, Consultant*

Zola European Windows
Speier, Florian
844 Main St., 104B
Louisville, CO 80027
Tel: 303-578-0001
florian@zolawindows.com
www.zolawindows.com
Description: *Zola offers high performance windows and doors, with overall frame values as low as U-0.123. Zola Windows are custom crafted in Europe, and large units are especially well priced. Zola owner, Florian Speier, is a Swiss-trained architect, CPHC, and LEED AP. He and the Zola team of professionals is ready to guide you through your window selection and installation to make sure you get the best performance and price possible.*
Specialties: *Windows*

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NORTHEAST SUSTAINABLE ENERGY ASSOCIATION

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Share your discoveries #gboh

Now there's a choice for renewable energy DHW

Stiebel Eltron SOLKit 2 Solar Thermal

Stiebel Eltron has been designing solar thermal systems for 40 years. Our newest collector, the Sol 27 Premium, is one of the top 10 solar thermal collectors as certified by the SRCC. The highly efficient flat plate collector has an extremely low profile and uses precision o-ring connectors for fast installations. Our solar tanks are among the highest efficiency tanks on the market, with extremely low standby losses and large heat exchangers. Our new rack system is made from rugged, extruded aluminum, and assembles with only 2 socket sizes. We make these components ourselves in Germany and in the U.S.

Because every installation is different, we have a full line of SOLKits and mounting hardware configurations, and all components are available for individual sale. From simple systems to commercial installations, including large, district systems, we are committed to supplying the best solar thermal components available. We've been at the forefront of water heating technology for almost 90 years. As a leader in the field we have no intention of standing still.

Solar PV + Accelera® 300 Heat Pump Water Heater

Our thirty years of experience with heat pumps has taught us how to design our heat pump water heater to be as efficient as possible. We rely on the heat pump to make hot water. A single, specially-designed 1700 watt element (that can be disabled) is used only as back-up. We don't waste energy pumping DHW through the heat pump – heat is transferred from the refrigerant via a wrap-around on the tank. We designed an 80-gallon tank that over the course of a year is more efficient than competing 50-gallon tanks.

The Accelera® 300 heat pump draws only 500 watts, low enough that operation off-grid with PV is a viable option. Use the back-up element and grid-tie is probably necessary, but with a full tank of 140°F water, and a 78.6 gallon first hour rating, daily hot water needs may be satisfied without it. Sometimes solar thermal isn't a choice, and when it's not, there's a renewable energy option.

Don't quite believe us? Try here:

» passivehouse.us/blog/?p=125

» greenbuildingadvisor.com/blogs/dept/musings/solar-thermal-dead

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