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DESIGN MATTERS

Sustainable Design a Perfect MATCH for Boston School

By Jeffrey Stein

THE WHITE HOUSE IN WASHINGTON, D.C., does it. The Coast Guard's John F. Williams building in downtown Boston does it. And now, the MATCH School, Boston's new Media and Technology Charter High School at 1001 Commonwealth Ave., does it too.

These three buildings all produce their own electricity. By means of solar photovoltaic panels fastened flat to their roofs (you can't even tell they're there), all three of these buildings produce a large portion of the electricity necessary for heating, cooling and lighting. Renewable energy, sustainable building and accessible technology – something like that should get an award.

The Cambridge firm HMFH Architects designed the renovation that has created the MATCH School. And it is an award winner. Just this past month at the 28th annual Northeast Sustainable Energy Association conference at the Park Plaza Hotel in Boston, the MATCH School – and its architects – received a Northeast Green Building Award in a competition sponsored by the Massachusetts Technology Collaborative's Renewable Energy Trust. Project Manager Phillip Lewis and photovoltaic guru Chin Lin, both of HMFH, saw the MATCH School honored with the top prize in the solar electric building category. Nearly 1,500 people attended the four-day conference.

The MATCH School is just the latest evidence of a revolution in state energy policy that has developed over the last decade. Concerns over transportation, air pollution and the cost of running public buildings have driven a dozen states, including Massachusetts, to develop their local economies and secure jobs by focusing on renewable energy sources. In the Bay State, a policy that added a 70 cent surcharge to the average electric bill has funded the Renewable Energy Trust, overseeing some 20 pilot programs that are changing how buildings are designed and built. The trust provides grants for renewable technology, high-performance design and energy efficiency, and provided the funds – through its Green Building Program – not only for HMFH Architects to research and design the solar system at the MATCH School, but also to purchase and install the hardware itself. All involved expect a payback time of around five years – that is, in the next five years the school will have saved the entire cost of installation by producing its own electricity.

Photo courtesy HMFH Architects

The MATCH School at 1001 Commonwealth Ave. in Boston uses rooftop solar photovoltaic panels to produce its own electricity.

At the MATCH School, HMFH has mounted the solar hardware – photovoltaic panels – atop the building's roof. The panels are a standard commercial product from Powerlight Solar Electric Systems of Berkeley, Calif. Because of their flat mounting, the panels are protected from wind and provide significant thermal insulation to the roof. They also protect the roof membrane from ultraviolet rays and thermal degradation. As usual, the solar panels are connected directly to the electric utility power grid, so when they are producing electricity, the school's electric meter is actually running backward, feeding 30 kilowatts of power into the shared grid.

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JEFFREY STEIN *is the architecture critic for Banker & Tradesman.*

Generating Energy

The kind of energy it takes to operate a charter high school is not limited to what can be produced by either the sun or by oil-fired generators. A school building itself should generate a sense of community among the people who use it; it needs to radiate a sense of belonging; people ought to be excited by it, connect to it, and in the end, if the building is truly sustainable, it must have a kind of energy around it that will make people want to sustain it, to lavish care on it so it will continue to sustain them.

The architecture of the MATCH School helps do that for relatively few dollars per square foot. Without lapsing into high-design vocabulary, HMFH has focused on a few careful architectural interventions. These include retaining the building's large windows. This place was designed in 1917 as an automobile showroom, home to Ellis the Rim Man, a business made familiar to many regionally through its frequent advertising campaigns. Large openings that once let sunlight in to illuminate cars now let sunlight in to illuminate minds. Those openings once let air leak in, too, but now are filled with high-performance, insulated glass. Positioned to reduce glare, the windows let natural light wash the walls of classrooms that are somewhat smaller (500-600 square feet) than the normal (800 square feet) cavernous public schoolrooms. All the better for smaller class size.

Earthquake codes have firmed up since the building was first constructed, and HMFH's engineers elected to stabilize the three-story structure with a series of steel X-braces between the major columns right at the outside walls, where they can be seen doing their work behind the windows (at the indented ground floor these braces jump out in front of the windows) and where they have now become a dynamic design element for the building. You can learn a lot about architecture just by going to school here.

The architects inserted a new entrance to the school around the corner, away from busy Commonwealth Avenue. Here, a bit of the building has been removed to provide a covered stair and handicap ramp that must negotiate a serious change in level from outside to inside without infringing on the public sidewalk. The new entry also allows extra daylight into the main lobby of the school. Once inside, that daylight illuminates restored ornate, giant-order Greek columns that flank a grand staircase and also treats visitors to views of the school's "great hall," a glassy, multipurpose space that displays not cars, but students learning. It is a room filled with light, year-round, where students congregate before class, where the entire school comes together for weekly meetings, where tutoring, study hall, eating, performances and graduation are all held. Its placement in the building has allowed, at the school's most public corner, the location of a Sprint phone store run by students at the school. Nothing like learning about entrepreneurship by being entrepreneurs!

Forty percent of the energy budget of the entire United States goes to heat, cool and illuminate buildings, mostly by burning fossil fuels. (This figure is actually a bit higher for chilly New England.) Since we do not produce oil or natural gas in this region, perhaps we should not be so keen to design buildings that need to import those fuels to operate. The MATCH School, living on sunlight, is a model not for our state's future but for the present.

But the state program that funded the photovoltaic roof at the MATCH School – the Green Building Program of the Massachusetts Renewable Energy Trust – was recently the target of state senators who voted to remove $17 million from the trust and distribute it to other areas of the deficit-ridden state budget. This is not a good precedent, especially in a time of economic and physical insecurity. Where we get the energy to run our buildings, to fuel our lives, has become a matter of regional and national security. When energy from sunlight falling on every roof in Massachusetts can be turned into electricity to power what goes on beneath those roofs, we should be doing whatever we can to harvest it.

Christopher Flavin, president of the Worldwatch Institute, tells the story of a European statesman discussing a flowering plant with his gardener. "It will take 10 years to bloom," said the gardener. "In that case," replied the statesman, "we should plant it today!" HMFH Architects, the Massachusetts Renewable Energy Trust and the community of students, parents, teachers and administrators of the MATCH School have planted an important and sustainable building on Commonwealth Avenue in Boston. Let's watch it bloom. ■