

**Seventh Annual Regional Sustainable Development Forum:  
Being a Part of the Climate Change Solution:  
Individual Action for Collective Impact**

**January 25, 2008, MIT Sloan School of Management**

**Session 3: Living with a Green Building**

Presenters:

**Rick Mattila**, Director of Environmental Programs, Genzyme Corporation

**Gwen Noyes**, Partner, Oak Tree Development

**Susan Rodgerson**, Executive Director, Artists for Humanity

Moderator:

**Iric Rex**, Architect, Mostue & Associates

Moderator Introduction:

I work for Mostue Architects doing sustainable design of multifamily housing and community buildings. We monitor and evaluate how well our buildings work and try to learn about the issues in their performance so that we can improve designs for the future. I would like to introduce the three panelists Rick Mattila, Gwen Noyes, and Susan Rodgerson, as having three different perspectives from commercial, to multi-family, to community-focused. All presenters also live or work in the buildings they played a role in creating. Susan Rodgerson co-founded Artists for Humanity and was involved in the design and development of the epicenter. Rick Mattila is the Director of Environmental Programs for Genzyme and was a member of the design team during the building process. Gwen Noyes is involved in many of the design decisions made for the multi-family projects developed by Oak Tree. She also lives in one of Oak Tree's multifamily projects, Cambridge Co-housing.

Rick Mattila:

Each of us will present quickly on our projects, then have a dialogue about our experiences.

I've been to many conference sessions like this, as I am sure you all have, and if you don't do something tomorrow as a result of this session today, then we've failed. So this is a challenge to us and to you. We must think of what you can do as individuals and collectively what we can all do.

I want to start with a few questions:

- How many people in this room love their job or, if you're a student, love what you do? – show of hands
- How many people in this room love where they live at home? – show of hands
- At the World Economic Forum Genzyme was recognized as a leading environmental corporation, and I'm very proud to work there. I also love where I

live in Hull, which I am proud to say has 2 wind turbines in town, one on either end.

Slide Presentation on the Genzyme Center:

- LEED-NC Platinum
- 350,000 SF office building
- 12 story full height atrium provides natural air flow and heat recovery from discharged air
- Filigree slab construction
- \$140 million, total cost
- \$105 million was the cost to construct the building, which is a price well in the realm of classic office building construction

The enhancement of natural light throughout the building is probably the biggest attribute of the building. Heliostats were installed on the roof to track the sun, which allows light to pass through even the lower floors. Two light studies were conducted. The first occurred 4-5 months post-occupation and results were compared against the previous space. This study found that 95% of occupants thought the natural light was better in the new space and 80% thought that the artificial lighting was also improved. 74% of respondents said the space was more supportive of their work, while 58% said they were more productive in the new space.

The second study was conducted two years later and the survey findings were very similar. Interestingly 88% reported that their well-being was better as a result of the green spaces and natural elements incorporated into the building's design. The remaining 12% reported no change; significantly, there were no negative responses.

In thinking about the productivity findings, the researchers stipulated that workers had to be approximately 10% more productive in order to notice and report a change in productivity. Using this assumption they found that 58% of the 900 Genzyme employees were more productive, translating into a savings of five million dollars.

Further the capitol cost estimates (\$105 million construction) were liberal, so that they could prevent arguments about what was included v. left out. Genzyme recently built a science center in Framingham, and with better information found the associated green costs to be less than 2%. Where we are coming from, we see great value in green building.

Susan Rodgerson:

Obtaining a LEED Platinum rating was a real stretch for a small arts organization in the 1990s. We decided that with the mission of our program, which is social justice oriented, we had a responsibility to be as sustainable as possible. The organization used to be located in a large warehouse, which was naturally ventilated only because of broken windows. We started out with a goal of being energy autonomous, which was a big challenge to our architects (Arrow Street Architects) because we had very little money to work with. The site is small and the building faces south and was able to take advantage

of this solar orientation. The other side has northern light, which is perfect for the art studios.

(Slide with chart) In comparing the base case to year three, the building performance chart shows that our energy use has increased slightly. We generally have 110-120 Boston public school students at any given time, working in various media. We have recently been able to increase our silk-screening program, which may account for the increased energy usage. The rooftop PV system produced 58,000 kWh (cost \$0.53 per square foot) in the first year. We are currently looking in to adding a wind turbine to address the increased energy demand. We are still working towards energy autonomy, and are currently 60% autonomous.

The studio space has a tremendous amount of natural light. In the summer we never turn on the lights, showing our focus on conservation. Being an affordable green building, is probably this project's biggest achievement. The glass façade used recycled car windshields (Crown Victorias) and the concrete floors act as a heat sink. The building is naturally ventilated, and choosing not to install air conditioning was probably the project's biggest risk. The first year we were in the building was the hottest summer on record and the next year was again designated as the hottest summer on record in the South Boston area, speaking to climate change. These conditions had an impact on the estimates and assumptions we used in designing the ventilation strategy. As it stands that building works well all but a few weeks in the year. Because of the flexibility of our program, we are able to use that time to take the kids to the beach and also teach the teens about the partnership they have with nature.

We rent the bottom gallery space for events. This space is partially underground, so it stays cool in the summer. This is the only green function space in the city of Boston. We also rent furniture to the event made of recycled junk mail, highlighting how the greening of our building space has impacted our programming. Our biggest challenges have been training adults to conserve, particularly to apply simple measures to how they live. Examples are getting people including caterers, youth, their families, and other visitors to recycle, and convincing people to save energy by turning off the lights and raising the window shades or taking the stairs instead of the elevator.

#### Gwen Noyes:

Our Company, Oak Tree Development, has been working in housing for 35 years. Energy Star is the centerpiece for most of our current work, though we use LEED when feasible. I would like to highlight the importance of siting in multi-family housing development, especially when the site is near public transportation; you're already way down the pike in terms of energy conservation and then we focus on the envelope itself. Further we try to highlight the healthier indoor environment as a selling point to green building. We are a small company so gathering data on the projects after completion is extremely difficult. This is compounded by fact that when you develop condominiums, you sell them, and then between the management company, builders, developers, etc., it becomes very difficult to go back and dig up data.

(Slide Presentation) Cambridge Co-housing won the AIA award in 1998, before LEED, for being in the top ten green buildings. The building has a geothermal heat pump, which generates no emissions, noise, or smoke. We used modular construction including Hardy plank, and all the good building materials available. We intended to have one HVAC system with sub-metered individual units, but this was against state law; this law has not been changed yet, so we weren't able to use this energy program.

We used LEED for a completed project located across from Alewife station. We were close to getting the rating, but by the end the LEED process became too expensive; the project would have received a certification had we had the money to move forward. The footprint is a U-shaped, energy efficient form, which has a center courtyard. There are ZipCars available on the property and parking is underground. Unfortunately the management company did not understand the need for continuous fresh air flow, and removed the devices after we were no longer in control of the project. In another recent project, which utilized Energy Star, we paid attention the LEED materials requirements but again did not pursue the rating. We included a partial green roof/deck area to increase accessible open space for residents. Although it was a big expense, especially because code requires an elevator to be installed to go to the roof, it served as a positively received sales feature. We are still not sure of whether it will pay for itself. I like to say that the way we work is, we design, calculate with Energy Star, build, get inspections, then pray....

We are working on another project in Lexington that is going for LEED silver. Thus far there is low incentive for market-rate housing to pursue LEED, but we think this is beginning to change. Lexington does not have a train, but we are subsidizing Lexpress, a shuttle service, thus the project is transit-oriented to the extent possible. The housing units are located above commercial spaces, and so far the most expensive units have sold, indicating the desirability of this multi-use project.

We currently have a patent pending for a new building system that includes 24 different plans and 144 different possible configurations, using LEED principles. We have used it on several projects and it greatly expedites the entire process, especially for pricing, siting, and enhancing energy efficiency. In Finland there are systems which produce automatic feedback about energy use and further there are incentives for using electricity when demand is lowest. In Sweden switches to shut off phantom loads, are used extensively. The resale value on our buildings is higher than average, so that's a success for us.

*Moderator:* We'd like to open to discussion, but we want count categories of who is attending this session.

Count:

Architects - 3

Builders - 1

Planners - 4

Engineers - 2

Building managers - 3

Students - 4

Developers - 7+

Other – 3+ (Green Building Scientist, self-described Bureaucrat, Lending and Training Specialist)

*Question:* How important is obtaining a LEED rating? I'm working on greening my synagogue and feel it is more important to get substantive improvements than the label.

*Rick Mattila:* I agree that the label is not as important, but sometimes it is needed as a team motivator. It is also helpful in getting the project public recognition.

*Susan Rodgeron:* For us it was critical for fundraising. It gave us a voice. It was a huge expense, but it was one that we weighted carefully.

*Gwen Noyes:* One benefit is that more architects are becoming sophisticated with LEED work with lower costs and there are more trained contractors. You could go either way.

*Question:* What are some things a local government can do to incentivize green building?

*Rick Mattila:* Don't be a barrier. Don't be a barrier. There are things in municipal government like permitting and zoning that can help or impede the process. Towns should think about those in relationship to the impact of buildings on the environment. For example, we wanted to go with zeroscaping for a building, but someone on the planning board said "we want grass in that office park". If there is a change that needs to be made or a barrier, find a way to work within requirements.

*Iric Rex:* One aspect of zoning that works against green building is parking requirements. LEED for example, encourages less.

*Gwen Noyes:* My experience has been predominantly in Cambridge, which has a very enlightened building department. I would encourage you to look at the best practices used by Cambridge.

*Comment:* I'm a developer and didn't pursue LEED, but used inner marking materials that say "Green Best Building Practices", because 99% of communities are not like Cambridge in my experience, and LEED doesn't have the same seal of approval in the marketplace. In the market, using the term "Best Green Building Practices" seems to offset a need for LEED certification.

*Comment:* Three things obstruct best practices: parking requirements, minimum lot sizes, and zoning to discourage mixed-use.

*Comment:* LEED makes it difficult for multifamily development to meet the prerequisite of having a non-smoking environment. You must demonstrate that no smoke passes between units. Some people want a smoke-free environment, but many don't. For

example, if you want to attract international students, you want to provide the option of smoking. Here's where LEED, because the people who created it want to discourage smoking, comes up against the marketplace.

*Question:* Rick, did Genzyme see a shorter absentee rate?

*Rick Mattila:* Yes, but this is a complicated issue to record. People may take a 'sick day' for any number of reasons. In this case anecdotal evidence is more telling. Features like automatic faucets, also contribute to decreasing the spread of germs.

*Question:* Is it difficult to train staff to maintain the building?

*Rick Mattila:* Everyone has to be onboard with the design of the building. The Genzyme building has a complex building management system which we use to constantly adjust and experiment with new ways to save energy.

*Gwen Noyes:* People's own motivations for simple things, like not leaving the window open when the air conditioning is on, are important. Feeling like these actions are not a sacrifice, loving the earth the same way we love a spouse. This is why I am interested in talking about what motivates us to do small changes. I have four questions here. I'm going to pass this out and I want you to answer any question that resonates for you and talk about it with the person beside you, then we can share some of our conversations and ideas with the whole group.

*Iric Rex:* We have a few minutes to discuss your motivations with your neighbor and then we will come back as a group and discuss what you learned from each other. (Hands out questions sheet to steer discussion: Do I pay attention to the amount of my home's monthly gas and electric bills? What have I done in the last year to reduce my gas or electricity consumption? What would it take to inspire/motivate me to make substantial reductions in my energy consumption? Would it make any difference in my electricity use if I could have an ongoing read-out of my usage? Or if there were some additional reward of incentive for me to reduce my consumption?)

(Questions/Discussion in pairs for 5 minutes)

*Audience Discussion of questions:*

- I live in an Acton co-housing community, and back in early 1990's we tried to do a number of green initiatives. Now I am wondering what else can we do? Install a wind turbine maybe? Someone brought in a meter and offered for people to use it for a day to see what energy each appliance uses.
- I work for a nonprofit that gives funding to local nonprofits doing development. We have discussed the motivations of maintenance people and builders. There is a disconnect with people at the bottom of the chain (maintenance people) and people at these conferences. We need to close the

- loop. We need to improve education for residents and staff. It could be as easy as a small form with crucial info for all people moving in.
- I was horrified to learn that HUD has collected a massive database on energy use and doesn't know what to do with it.
  - My motivation is a combination of comfort and cost. I live on the second floor of a triple-decker and we had a \$300 gas bill last month. As a renter I don't know my options to make it more efficient. Plastic over the windows is one idea. Since my gas bill is huge, I want to know what percent is from heating and from cooking. I'm guessing most is heating, but I don't know.
  - My neighbor did an Energy Star audit on her 3-story farmhouse. Motivation was that her feet were freezing when sitting at her desk. NSTAR pays for half of insulating your home and also changed all light bulbs to CFLs for free.
  - I have a refrigerator that is 10 years old, oldest Energy Star model. Should I replace it and throw it in a landfill because it's not the most efficient? I don't think so. (GN: keep it full and clean the bag often)
  - I live with 5 roommates and we all chipped in to put plastic over the windows and switched to CFLs in the common spaces. But I agree that as a renter, it is hard to know what you have control to change.
  - I'm motivated by fear, others are motivated by reward. Fees would get my attention. I'd be willing to work with percentage success fees, distribute back to collaborative team. Pay them 80% upfront followed by an annuity of sorts. This fosters a collaboration that is more than transactional, it's relational.

*Question:* If you get LEED certified, which is a snapshot in time, then you're working on improvements to the building, how do you know the LEED standards are being maintained? For instance, how do you make sure the new paint is low VOC? LEED never comes back to check on building performance.

*Rick Mattila:* Management needs to be on board. It's not perfect. There's discussion of how to change it, but the point you made about paint – we've seen the market change, so more products are available. But LEED was made to be a snapshot in time.