Northwest CERT Meeting Summary – Making Energy Efficiency Happen!

November 2nd, 2006
1:00 pm – 4:00 pm
Waldsee BioHaus Environmental Living Center
8659 Thorsonveien NE, Bemidji, MN 56601

Attendees: Mike Triplett, Mike Hiemenz, Jim Steenerson, Amy Rutten, Randy Hilliard, David Bahr, Tessa Haagenson, Dan Boyce, Ruth Trask, Shawn Balstad, Colleen Oestreich, Karen, Mueller, Pam May, John Shimek, Simone Senugles, Robert Shimek, Jihan Gearon, Edwin Dehler-Seter, Joel Haskard, Lissa Pawlisch, Linda Kingery, Edwin Dehler-Setter (23 attendees)

After a round of introductions, Warren Schulze, the Assistant Director for Facilities gave the group an introduction to the Concordia Language Villages http://clvweb.cord.edu/prweb/. The villages are part of Concordia College's mission "to prepare young people for global citizenship." They have 14 languages and cultural immersion courses in six villages, and the BioHaus has been one of their most challenging, significant and "weird" projects yet. They figured since sustainability is also part of their mission and they needed more student housing, why not do an environmentally-friendly building to boost their environmental programming? And so the BioHaus was born http://waldseebiohaus.typepad.com/biohaus/. Edwin Dehler-Setter, the Environmental Education & Natural Resource Management Specialist, gave the rest of the tour. Using the German *passivhaus* design, the BioHaus uses 85% fewer BTUs than standard Minnesota construction and was declared "the tightest building in the U.S." by one of the pioneers of the Blower Door Test. Based originally on the "2000 Watt Society" in Switzerland, this two-story, 5,000 Square feet building is the first certified *passivhaus* building in North America. Stephan Tanner, http://www.stephantanner.typepad.com/ the architect from INTEP, LLC, used cutting-edge building components and systems to achieve incredible energy efficiency:

- Vacuum insulated panels (VIPs). First designed by NASA 30 years ago, 2" inch thick VIPs made of fumed silica sit on top of standard 6" walls to achieve an R-70 insulation value.
- Where VIPs aren't used, 20" thick walls are filled with 100% water-blown spray insulation and then covered by an additional 8" of expanded polystyrene (EPS) foam boards on the outside for an R-70 value.
- Under the floor, 16" of EPS insulation prevent the warmth of the building from draining into the ground.
- High tech triple-pane windows imported from Germany with cork insulation and a frame structure that eliminates thermal bridging between the interior and exterior of the building. The windows are rated U value 0.13.
- A green roof system with over 2000 plants of eight species top off the building. In the winter the flat roof allows snow to accumulate and act as an insulation blanket, and in the summer the plants help retain rainwater and reduce erosion.

- A unique air exchange & heat recovery system that is 85% efficient replaces 100% of the air inside while recovering much of the energy from the discharged air.
- All the hot water needs are met with a solar hot-water system supported by the geothermal heat pump. The geothermal heat pump also pre-tempers the fresh air via 330' feet of five earth tubes.
- A control and monitoring system gives students real-time energy information from sensors inside and outside the building.
- Automated drapes drop to block sunlight and can change pitch to still allow light in.
- Dual flush toilets to use less water.

After Edwin's excellent presentation and tour the group took a quick break and was treated to coffee and cookies before Mike Heimenz from the Mahube Opportunity Council http://www.mahube.org/ began his presentation on his Community Action Program (CAP) weatherization programs. They focus on energy efficiency upgrades for low-income residents (income ½ of the state's median). Because there is an energy code that obligates rental property owners to make upgrades, the CAPs focus on owner-occupied homes. Last year Mahube served 87 homes with energy audits and upgrades; there are lots of people they can't serve and they are forced to take only the ones with the highest energy consumption. They tackle heat loss by primarily focusing on insulation, air sealing and the heat system itself. One problem they often find is that many homes have had several additions cobbled onto them, and often these are less efficient than much larger new homes. They also do lots of work with mobile homes which often have issues with duct leakage. The CAPs are good at being more objective about heating systems then contractors who may have a product to sell, and they can locate attic bypasses and needs for insulation rather than trying to sell the latest and greatest windows (one trick is to pressurize the house using a blower door test and then see where the dust pops up on the attic insulation to find the bypasses). After the audit is completed, the CAP creates a job book which they send out to contractors to bid on the weatherization projects. The CAP then provides the materials and the contractors provide the labor. Typically a job costs $2,826, which includes time and mileage for the CAP, materials and labor, inspection, and data entry and analysis. Mike distributed several handouts including the "Do Your Part, Be Energy Smart" booklet which is a guide to help people understand and improve their home's energy usage. He also showed two separate audits and pointed out the significant annual energy and cost savings for the households. He noted that since 1995 the Department of Energy funding fell by 45%, which forced layoffs and means Mike is the only one doing weatherization work at this agency. They also need more people on the contracting end of things; currently there is one contractor serving three counties but it is hard to recruit and train more because it isn't as profitable as other building construction/maintenance jobs. Mike ened his presentation by stating he believes they should include blower door tests into the building codes, but the codes are designed for the builders, not the occupants, and people don't know what a blower door is and

builders don't want to put up a brand new home and then blower door it and show that it is leaky and energy inefficient.

Next up, David Bahr, physics professor at Bemidji State University, updated the group about the energy efficiency design project they are working in conjunction with the renovation of Sattgast Hall. The project is designed so that people will think about smarter systems and really focus on ventilation. The present air handling system pushes too much air to places it's not needed and not enough air to places it is needed. There are currently seven supply blowers and five return blowers pushing air through the entire building all the time, even though most of the time rooms are not occupied. David and his students are studying the potential for room-by-room forced air which should not only save considerable energy but also will enhance occupant comfort and support greater productivity. The room-by-room HVAC system would be activated by occupancy sensors, and they might be able to put in light and oxygen sensors as well. The study, partially funded by CERTs, will also provide service-learning opportunity for students and give them practical work experience. The final report will include the model database applicable to other building projects and a cost-benefit analysis that can be used to budget and plan future projects. Each building on the Bemidji State campus will be coming up for renovations in the next 10 years, so hopefully this project will be replicated many times over. The final project report will be due to CERTs on June 30th, 2007.

CERTs wishes to thank Edwin and Warren for hosting the meeting at the BioHaus at the Waldsee German Language Village at Concordia.

4:00 pm Adjourn.