Alaska Building Science News

A quarterly publication of the Alaska Building Science Network and Cooperative Extension Service

Summer 2003 ***Vol. 8, issue 4***

This publication was developed and printed through support of the Alaska Housing Finance Corporation (AHFC). The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those held by AHFC.

The *Alaska Building Science News* is a joint publication of the Alaska Building Science Network and Cooperative Extension Service, Office of the Energy Specialist. It is edited by Richard D. Seifert. Any letters, opinions and responses to the articles, should be directed to Mr. Seifert either by e-mail ffrds@uaf.edu, phone (907) 474-7201, or fax at (907) 474-5139.

Alaska Building Science News' sole purpose is to bring timely building science information to Alaskans in order to improve the quality and durability of the housing stock in Alaska as well as save energy and maintenance expenses for home owners.

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A UTILITY INCENTIVE PROGRAM FOR ENCOURAGING SOLAR ENERGY

Editorial Preface: The following article is based on a presentation made at the Net Energy Homes Conference on May 6th through 8th. This conference was held at Skamania Lodge in Stevenson, Washington. The presentation on the Sustainable Natural Alternative Power incentive program for solar energy was presented by Jim White. Jim is a graduate in mechanical engineering of the University of Alaska Fairbanks and is now employed by the Chelan County Public Utility District, which created this SNAP program to encourage homeowners. The following article describes how that system works and how it provides a very workable, uncomplicated method for encouraging renewable, alternative, green power in a utility situation in a community that is small and rural and has a very advanced working system to share with everyone on how to encourage the adoption of renewable energy.

SNAP stands for Sustainable Natural Alternative Power. The Chelan County Public Utility District, located in Washington on the eastern side of the Cascades in the Lake Chelan Valley, has been encouraging customers to become SNAP producers by connecting alternative power generators, such as solar panels and wind turbines, to the district's electrical distribution systems. The program is set up to link customers (SNAP producers) who want to develop solar and wind power within the county with those who are willing to pay a little more each month to buy solar and wind power. These are called SNAP purchasers in the Chelan PUD, but could also be simply green power purchasers in other utilities. The

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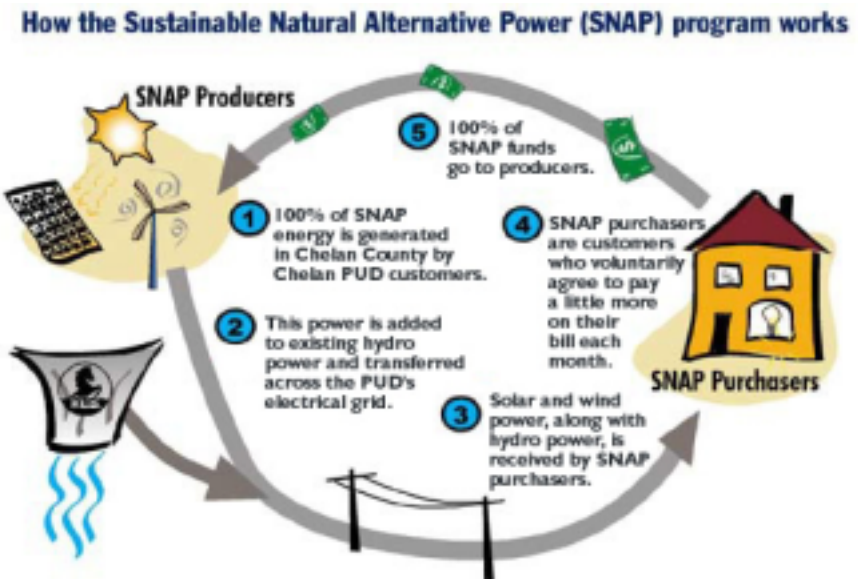

Figure 1. A chart depiction of how the Chelan (Washington) Public Utility district's "SNAP" plan works. SNAP is an acronym for Sustainable Natural Alternative Power and is a program designed as an incentive for utility customers to become electric power producers using small-scale renewable (solar and wind) energy systems and sell the energy to other Chelan utility customers who voluntarily buy the green power.

electricity generated by SNAP producers provides additional capacity to meet the needs of Chelan County PUD customers and could reduce the demand for the PUD to purchase more expensive power during periods of high demand.

So how much do the SNAP producers receive for the electricity they generate? The amount paid by Chelan County Public Utility District to SNAP producers depends on the total amount contributed by the people who have elected to purchase renewable energy and the total amount of that renewable energy generated by all the SNAP producers. The greater the amount contributed by SNAP producers, the greater amount that will be distributed among the participating producers. The maximum payment is $1.50 per kWh. For example, if a producer generated 3% of the total SNAP power produced during one year and the purchasers contributed $30,000 to the SNAP fund during that year, then the SNAP producer would receive an annual payment of $900 (3% of $30,000). These payments are only estimates. The Chelan County Utility cannot guarantee the amount of revenue producers make from installing a SNAP generator. But producers also receive a percentage of the wholesale price of electricity. The wholesale amount paid is 75% of the average load hour price of electricity, which is traded at the mid-Columbia hub. This is more complicated than the situation in Alaska but shows how you can integrate it into a complicated system.

One might wonder how producers are paid. Payments are made to producers once a year on or before April 21st of that year. On the Chelan County Web site: www.chelanpud.org/snap/, a long discussion describes how much it would cost and how you might purchase a renewable energy generation system. It also describes what equipment and installation standards must be met and has a publication describing those. And each generation project that can be interconnected to the distribution system is limited to 25 kW, so no larger producers can become part of this system. It's designed for residential scale and renewable energy additions to the system.

There are other costs, and customers are responsible for the cost of connecting their generator to the Chelan County Public Utility District's distribution system. The connection fee is $100 and includes the cost of installing a meter. There is also an account service charge of $10 and a monthly meter fee of $3.65. You can actually get the meter fee deducted from the annual payment mailed to the SNAP producers.

Further information on this whole concept can be gleaned from the Chelan County PUD Web site www.chelanpud.org/snap/ and from Jim White whose email is: jamesa@chelanpud.org

NET ENERGY HOMES?

The concept of net energy home takes renewable energy as integrated into housing to the ultimate extent. It involves setting a goal for that housing such that it actually produces more energy onsite from solar, wind, or other amenities that are available at the geographic location than the house uses. This possibility is inconceivable to most people today. However, this conference (Net Energy Homes Conference) was dedicated to the prospect of building homes that actually produce most of their own power. This will get us started down the road to what ultimately may be an electric grid in which all the houses in a community actually help supply energy to all the other houses in the community, relying on a net-energy-producing housing stock. This, of course, is not without its costs, but it's very easy to demonstrate that these costs are easily integrated into the investment in a modern home as it is constructed.

It's also possible with existing costs for photovoltaic/solar systems, high though they may be, to invest in these options and make homes produce most of their own electrical supply. A significant exception to this is the thermal appliance option for most homes. These include the dryer and the cook stove. The water heater can almost always be augmented fairly substantially with solar energy, but the dryer and the cook stove are a different matter.

Figure 2. A portable 1/4 scale net energy home, used to demonstrate net energy homes to Washington State Utility customers. This one was built by Jim White and friends at the Chelan County, Washington Public Utility District.

Perhaps the most important message I bought home with me from the Net Energy Homes Conference (held at Skamania Lodge in Stevenson, Washington, May 6th through 8th 2003) is that we must start looking toward homes, which produce onsite power from renewable, permanent energy sources, and supply their own energy needs. And even beyond that, it was clear from the presentations that it's possible to build homes that do this now!

This realization of the importance of net energy homes comes from two very compelling directions. The first is that nonrenewable energy resources, fossil fuels particularly, are all in short supply and the continuing increase in demand due to population growth and housing demands, puts increasing pressure on these dwindling sources. In addition, nonrenewable energy comes with vulnerability to non-domestic supply dependence. This has all kinds of political repercussions in securing supplies from other nations, and the vulnerabilities that those supplies imply for our political security.

On the other hand, the materials and infrastructure requirements are getting more and more expensive, and we're using more and more land, less and less effectively by expanding the fossil fuel dependent system of energy consumption. Recently Cooperative Extension Service statewide held a series of workshops called The Alaska People's Forum, *In Time of Need*, reflecting on how we could become more prepared for emergencies and in light of the prospect of international terrorism and other disasters, which can interrupt our energy, food, and general material supply lines. It becomes a matter of personal, family, and community security to be as independent as possible from major supply line cutoffs, thereby improving the energy situation generally and improving our security vastly. So both these aspects of the energy supply system are magnificently handled by focusing on homes that can be designed feasibly, as shown in this conference, to produce most of their own energy needs without suffering any decrease in lifestyle amenities or standard of living.

Finally, the most recent article of *Solar Today* includes an update on the energy utilization by architecture. The article has the compelling title, "It's the Architecture, Stupid" by the famous author of a seminal work on passive solar energy design, Edward Mazria. He focuses on the need for reliance on architects and architecture to reduce more than 50% of the energy end use caused by all buildings (architecture) in the United States today. All this speaks very well for the focus and information available from the Net Energy Conference.

ALASKA HEALTH HOUSE CONNECTION

A new collaboration has emerged between Alaska Building Science Network, the Cooperative Extension Service of UAF, and the American Lung Association of Alaska. The collaboration stems from our mutual interest in the Health House™.

The Health House™ is an idea that originated in the Lower 48 through the auspices of the American Lung Association to assure consumers of a housing product, a whole house concept that would be marketable as a guaranteed high quality, healthier living environment for Americans. This is a marvelous new concept and is probably the ultimate evolution of housing. The contention for saying that is that for the past 30 years housing has been moving toward greater air tightness, greater energy efficiency, higher levels of insulation, a consequent demand for greater ventilation and control of that ventilation, and the emergence of indoor air quality as a major issue in both the consumer purchase of a house and the health of the family living in the house over its lifetime. All of the directions of these elements have pointed ultimately toward building a house that is healthier to live in and that incorporates all of the other progress that has been made in the technologies of materials, energy efficiency, insulation, and ventilation.

Because of this new collaboration, the Cooperative Extension Service and Alaska Lung Association's Health House™ shared a booth at the Fairbanks Home Show this year. This was a very positive experience. Cheryl Yates (shown in the photo below) and Energy and Housing Specialist Rich Seifert of the Cooperative Extension Service have planned to continue this collaboration in the future.

Health House™ courses are being developed for communities in Alaska and taught through the Alaska Building Science Network. The introductory courses are two hours long and cover all of the aspects of the house, its standards, its inspection regimen, its strategy for ensuring indoor air quality, and moisture and ventilation control.

Those of us in the housing industry who have followed these developments over the past 30 years are almost unanimous in support of the concept of the Health House™ as the direction all housing needs to go. It's the most positive outcome of the American housing industry improvements over the last several decades. It has the additional advantage of being promoted by a third party, not-for-profit entity, the Alaska Lung Association, which avoids many conflicts among vested interests. It is primarily aimed at educating consumers to strive to purchase, and have built for them, the best possible, technically proficient, healthy house that our technologies and experience can provide.

The Health House™ is designed to achieve all of these healthy aspects by having a fairly tight

Figure 3. A photograph of Health House™ advocate, Cheryl Yates, with the model health house at our Cooperative Extension Service booth at the Fairbanks Home Show, March 30, 2003.

prescriptive standard. All homes which carry the Health House™ label must meet this standard. The standard is multi-faceted and includes a detailed prescription for the air vapor barrier system, the caulking, the air leakage rate, the depressurization from exhaust fans, and all the insulation levels of course, are of the highest quality that can be justified.

In addition to this, source control over air pollution is a crucial element of the strategy for maintaining the Health House™. By this we mean that materials that are brought into the house should be very, very low in potential off-gassing of volatile organic compounds. Any toxins that could cause a bad reaction to the occupants are simply avoided by using materials that are free of VOCs and known respiratory irritants. The specification is many pages long and exceedingly detailed and also involves at least three tests during the construction of the home to ensure quality control and inclusion of all the guaranteed performance specifications needed.

In order to better understand this, we recommend to all readers that they sign up for a Health House™ Advantage course and learn more about this marvelous new approach to achieving the best possible housing for Alaskans while at the same time providing for a healthy indoor environment for our children. Call 1-800-USA-LUNG for course listings and plans for your community.

ENERGY STAR DESIGNATED APPLIANCES:

http://www.energystar.gov/

The Cooperative Extension Service is collaborating with the Energy Star Program nationally. Here is the Energy Star approach to improving the general performance of home appliances and how to seek them in the market.

Did you know that the average home spends about $1300 on energy costs every year? Change to appliances that have earned the ENERGY STAR, and you can save $80 a year in energy costs, while helping the environment.

Save Energy, Save Money

When buying an appliance, remember that it has two price tags: what you pay to take it home and what you pay for the energy and water it uses. ENERGY STAR qualified appliances incorporate advanced technologies that use 10-50% less energy and water than standard models. The money you save on your utility bills can more than make up for the cost of a more expensive but more efficient ENERGY STAR model.

Help Protect the Environment

Simple actions can make a big difference. If just one in 10 homes used ENERGY STAR qualified appliances, the change would be like planting 1.7 million new acres of trees.

For top performance, premium features, and energy savings, look for energy-efficient clothes washers, refrigerators, dishwashers, room air conditioners and dehumidifiers that have earned the ENERGY STAR. This mark may appear on the appliance, the packaging or the Energy Guide label.

HOW TO BUY AN ENERGY-EFFICIENT HOME APPLIANCE
Produced in cooperation with the U.S. Department of Energy

You go shopping for a new refrigerator, and you're on a budget. The best buy is the 'fridge with the lowest sales price, right? Not necessarily. If you buy the lowest-priced refrigerator, you may end up spending more than if you buy a more expensive one. The reason? The cost of owning a home appliance has three components: the initial purchase price, the cost of repairs and maintenance, and the cost to operate it.

To figure out how much you'll spend over the lifetime of the appliance, you have to look at *all* these costs. The appliance with the lowest initial purchase price, or even the one with the best repair record, isn't necessarily the one that costs the least to operate. Here's an example of how an appliance's energy consumption can affect your out-of-pocket costs.

Suppose you're in the market for a new refrigerator-freezer. Different models of refrigerators with the same capacity can vary dramatically in the amount of electricity they use. For one popular size and configuration, for example, the annual electricity consumption varies across models from a low of about 600 kilowatt-hours a year to a high of more than 800 kilowatt-hours a year. Based on national average electricity prices, that means the annual cost to operate this refrigerator can range from about $50 to $70, depending on which model you buy. A $20 difference in annual operating costs might not sound like much, but remember that you will enjoy these savings year after year for the life of the appliance, while you must pay any difference in purchase price only once. As a result, you may actually save money by buying the more expensive, more energy-efficient model.

You can learn about the energy efficiency of an appliance that you're thinking about buying through the yellow-and-black Energy Guide label it displays. The Federal Trade Commission's Appliance Labeling Rule requires appliance manufacturers to put these labels on:

- Refrigerators, freezers, dishwashers, clothes washers
- Water heaters, furnaces, boilers
- Central air conditioners, room air conditioners, heat pumps
- Pool heaters

When you shop for one of these appliances you should find the labels hanging on the inside of an appliance or secured to the outside. The law requires that the labels specify:

- The capacity of the particular model
- For refrigerators, freezers, dishwashers, clothes washers and water heaters, the estimated annual energy consumption of the model
- For air conditioners, heat pumps, furnaces, boilers and pool heaters, the energy efficiency rating
- The range of estimated annual energy consumption, or energy efficiency ratings, of comparable appliances.

Some appliances also may feature the EnergyStar logo, which means that the appliance is significantly more energy efficient than the average comparable model. For more information on the EnergyStar program, operated by the Department of Energy and the Environmental Protection Agency, visit the EnergyStar Web site at www.energystar.gov.

For An Energy-Smart Deal On Your Next Appliance...

- Read the Energy Guide label.
- Compare the energy use of competing models.
- Estimate their differences in energy costs.
- Consider both purchase price and estimated energy use when deciding which brand and model to buy.

Why should I care about energy efficiency?

The more energy efficient an appliance is, the less it costs to run, and the lower your utility bills. Using less energy is good for the environment, too; it can reduce air pollution and help conserve natural resources.

Don't all appliances have to be energy efficient?

All major home appliances must meet energy conservation standards set by the U.S. Department of Energy. It's the law. But many appliances beat the standard, use even less energy and cost less to run.

What makes one appliance more efficient than another?

Most of the differences are on the inside — in the motors, compressors, pumps, valves, gaskets and

seals, or in electronic sensors that make appliances "smarter." Even if two models look the same from the outside, less-obvious inside features can mean a big difference in your monthly utility bills.

How can I be sure energy efficiency claims aren't just sales hype?

Manufacturers must use standard test procedures developed by the Department of Energy to prove the energy use and efficiency of their products. Many have these tests performed by independent laboratories. The test results are printed on the EnergyGuide labels, which manufacturers are required to put on many of their appliances.

What's the purpose of EnergyGuide labels?

The EnergyGuide labels help you compare the efficiency or annual energy use of competing brands and similar models. Look for the labels on clothes washers, dishwashers, refrigerator/freezers, room air conditioners, water heaters, pool heaters, and on central home heating and cooling equipment. If you don't see an EnergyGuide label, ask a salesperson for the information.

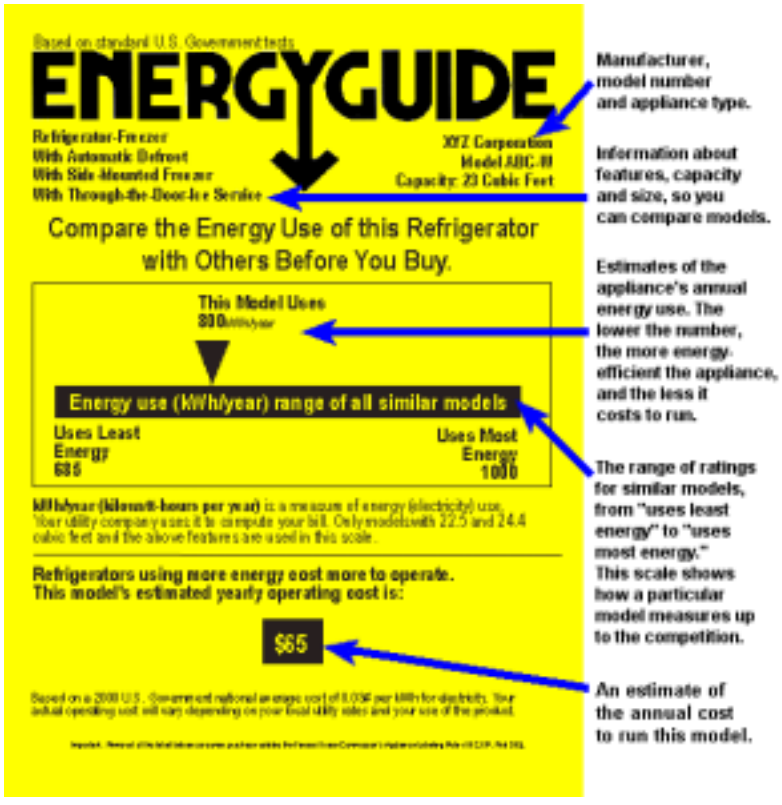

Figure 4. Energy Guide label example.

Tips to Lower Your Monthly Energy Bill

Being an energy-smart consumer means getting the most from the energy you use. Here's how you can cut energy waste without sacrificing comfort or convenience.

- Move your refrigerator if it's near the stove, dishwasher or heat vents. Vacuum the coils every three months to eliminate dirt buildup that reduces efficiency. Check the door gaskets for air leaks. Defrost the freezer when more than a quarter-inch of ice builds up.

- Scrape but don't pre-rinse dishes by hand if you have a dishwasher that automatically pre-rinses or has a rinse/hold cycle. Use the "energy saver" option found on many machines.

- Use pots that fit the size of your stove-top burners. Use lids on your pots and pans so you can cook at a lower burner setting.

- Match the water level and temperature settings on your clothes washer to the size of your load. Don't fill the whole tub for a few small items.

- Clean your clothes dryer filters after each use or as necessary.

- Ensure that the temperature on your water heater is set to 120 degrees. Some thermostats are preset at the factory to 140 degrees.

For More Information

The Federal Trade Commission offers a wide range of business and consumer information online at www.ftc.gov. This information also is available by calling the toll-free helpline at 1-877-FTC-HELP (382-4357) (TDD: 1-866-653-4261) or by writing: Federal Trade Commission, Consumer

Response Center, 600 Pennsylvania Avenue NW, Washington, DC 20580.

The Department of Energy's Energy Efficiency and Renewable Energy Network offers a clearinghouse of energy-efficiency information at www.eren.doe.gov. This information also is available by calling the toll-free hotline at 1-800-DOE-EREC (363-3732) (TDD: 1-800-273-2957) or by writing: U.S. Department of Energy B EREC, PO Box 3048, Merrifield, VA 22116.

Your state and local energy offices and local utility company also may be good sources of information.

The FTC works for the consumer to prevent fraudulent, deceptive and unfair business practices in the marketplace and to provide information to help consumers spot, stop and avoid them. To file a complaint or to get free information on consumer issues, visit www.ftc.gov or call toll-free, 1-877-FTC-HELP (1-877-382-4357); TTY: 1-866-653-4261. The FTC enters Internet, telemarketing, identity theft and other fraud-related complaints into Consumer Sentinel, a secure, online database available to hundreds of civil and criminal law enforcement agencies in the U.S. and abroad.

FEDERAL TRADE COMMISSION
FOR THE CONSUMER
1-877-FTC-HELP www.ftc.gov June 2000

TECH CORNER REVISITED: RE-WIRING YOUR HRV

by Phil Kaluza
Arctic Energy Systems

Editor's Preface: Phil Kaluza is a member of the Alaska Building Science Network and has operated Arctic Energy Systems for more than 20 years. He has also installed many HRVs and done a lot of backdraft testing and pressurization testing of housing over the years. This is a wonderful tinkerer's discussion of various ways to enhance the performance of heat recovery ventilators using the latest techniques. In the case of "Dr." Phil Kaluza's experiments, you'll note in the text that it cost a circuit board "frying" in one experiment but generally his cost improvements were very minimal and resulted in much better performance of the house and a higher ability to control relative humidity indoors. Relative humidity is a very important factor for health and comfort indoors. We all want to live in the subtropical environment of 50% relative humidity and 70°F. And good humidity control with an HRV and a tight building shell is the best way we know for achieving this technical solution. (It should also be noted that Phil has long suffered from asthma, and thus has high motivation for good indoor air quality.)

I installed my first Heat Recovery Ventilator (HRV) over twenty years ago. The unit came as a long galvanized sheet metal box holding the heat exchanger core. Two fans were mounted externally, one at each end. Defrost control consisted of a 120v temperature sensor in the supply air duct which would shut off the supply air fan if the supply air reached near freezing conditions when the heat exchanger core was freezing up. Each fan was wired to a separate speed controller. To balance the system you opened a window during a calm day and tweaked one of the speed controllers until you had no flow out the window. I went all out and included a 120v de-humidistat that bypassed the speed controllers and ran the unit on high until the humidity was lowered. The simple HRV system worked reasonably well.

Five years later, I installed my second HRV. It was about the size of the first unit with comparable flows and heat recovery. It had incorporated more sophisticated defrost and speed controls on an internal circuit board. Life in Nome, Alaska, means incredibly dusty summers. The standard small filters provided within the HRV captured little of that fine dust. Higher efficiency filters were available, but because of the small size, they required regular changing. And, being a specialty-size filter, they were not cheap. Instead, I built a 20"x 24" filter box so I could use a high efficiency pleated furnace filter. These readily available filters were lower in cost and would go years between changing. The larger surface area of the filter allowed little pressure drop across the filter, maximizing airflow through the HRV. Another benefit of the large surface area and low flow at the filter intake were

that bugs and debris did not clog up the intake screen, a common problem with typical HRV intake hoods. I found the HRV core remained much cleaner and required less maintenance.

After a few more dusty summers, I decided to take advantage of my supply air filtering system and rewire the HRV for a "summer" mode. By simply bypassing the speed controller for the supply fan, I was able to run the supply fan on high continuously, while operating the exhaust fan on a "standby" mode for intermittent exhaust only. By pressurizing the home with clean supply air from the HRV, dust accumulation within the home was dramatically reduced. I would run the HRV in the summer mode until temperatures dropped into the forties and would then manually switch back to the normal operating mode of balanced ventilation for the winter. An automatic temperature control for the summer mode was pondered but never implemented.

In my most recent house project in Anchorage, Alaska, I again incorporated the large pleated furnace filter in the supply along with the summer mode switch. My next project was to deal with the depressurization within the house caused by the dryer. The dryer is capable of depressurizing our tight home (650 cfm_{50}) in excess of 10 pascals. Though I have no back-draft susceptible appliances within the living space to be concerned about, depressurizations of that level can increase soil gases entering the home, such as radon, and even pull sewer gases out of dry traps or leaky vent pipe connections. Smaller tight homes, such as those built in rural Alaska would experience even higher negative pressures within the home from a dryer, and many have woodstoves and other back draft susceptible appliances within the living space. Certainly with 100+ cfm being exhausted out of the house from the dryer there was little need for the additional ventilation from the HRV while the dryer was operating.

So, the goal of this re-wiring project was to turn the HRV into a make-up air supply for my dryer. With the HRV located directly over the clothes washer and only a few feet from the dryer, I decided to use a simple air pressure switch (from an old Toyo space heater) connected into the dryer duct to sense when the dryer was on. The pressure switch activated a relay that I wired into the circuit board to turn the supply fan on to high, and the exhaust fan off completely. After a lot of head scratching and one circuit board explosion, the makeup air controller works great. Because the HRV supply airflow is less than the dryer exhaust, I was unable to eliminate all the depressurization, but did significantly lower it from over 10 pascals to less than 4 pascals with the controller. Total material costs: (not including the circuit board whoops) about twenty bucks.

My future re-wiring project: incorporate a smart relative humidity (RH) sensor into the HRV controls to maintain a reasonable RH level in the house based upon outdoor temperatures. The colder it gets outside the lower the RH is the home. For example, at minus 20 deg.F or colder, the RH could be kept around 30%, depending upon the quality of construction and ability to avoid condensation. As it gets warmer outside, the RH is allowed to climb up to 50-60%. At roughly 50-60 deg.F outside temperature, the controller would ignore the humidity sensor all together. This would eliminate seeing the HRV run on high all summer because the dehumidstat is set to low for summer conditions. In southeast Alaska, a dehumidifier control could be incorporated into this system. The RH sensor would determine whether increasing ventilation or turning on the dehumidifier is the most appropriate option given the current outdoor air temperature and humidity.

This last project may require more complex rewiring, but could very easily be incorporated into the manufacturing process at a minimal cost. If manufacturing cost is a concern, manufacturers could simply provide more external control options, so people like me aren't blowing up circuit boards trying to re-wire them.

SPACIA HAS ARRIVED IN FAIRBANKS

Many issues ago in this newsletter, I covered a review in the International CADDET Energy Efficiency Newsletter from International Energy Agency, an article about Spacia Evacuated Glazing. I had known about this new material from its original inventor. He is Dr. Dick Collins, an acquaintance of mine and a professor emeritus at the University of Sydney in Australia. His idea was to develop glass material for commercial use, which used an evacuated space between two pieces of normal glass to increase the insulating value of a window. He perfected the concept and sold a product license to this glazing system to Nippon Sheet Glass Co. of Japan. That glass is now being produced commercially in Japan with the trade name "Spacia®".

Figure 5.

Since the article appeared the first time in this newsletter, I have been talking about this glazing system in my Cold Climate Homebuilding courses and most recently in my Solar Energy for Alaskans Introduction course. Recently I actually received a real production piece of this new glass. Yoko Collier and her husband actually went to Japan to look into the commercialization of Spacia glazing and its possible use in Fairbanks. Yoko is a professor of Japanese language at the University of Alaska Fairbanks and after taking my course and considering building a home in the community, also got very interested in looking into all the details of this marvelous new technology. Professor Collier got all the specifications data for various types of the glazing and brought back a piece of sample Spacia glazing, in this case, the version that's designed for use in the colder parts of Japan.

Spacia was designed so that its finished thickness would be very close to the same as most of the standard single pane glazings that are used all over Japan. This makes Spacia a perfect fit to replace the standard single pane glazing. You could more than triple the insulating value of all the windows in Japan by doing this. For the cold weather case, all they do is add another layer of glazing, put a coat of low-E material on the outward-facing surface of that glass, and fill the space between the two glazings, the Spacia and the single glazing, with argon. This system, I have calculated, yields an R-value of more than 5 in the English system.

Of course with all these technologies it's interesting to get some feel for the cost. Yoko Collier has also been very good at dogging these from the manufacturer as well. Using a conversion of 118Yen to the dollar, we calculated that the version for cold weather that has an R-value of 5 of Spacia based on the cost per square meter, which is how it is quoted, is approximately $407 per square meter. I recently checked with fabricators of Heat Mirror 88 glazing, a standard low-emissivity, high quality glazing common in

Figure 6.

Alaska now, and it is about $13 - $14 a square foot. On a square foot basis, Spacia would be a little more than $37 a square foot. So clearly (and shockingly!) Spacia is now three times the cost per square foot of our highest quality local available glass. It is at most only 20% to 25% better in R-value for the complete system. This is based on a comparison of an R-value of about 5.1 versus an R-value of about 3.85 for Heat Mirror 88.

Certainly price is going to be a factor. Keep in mind also that the price that I've quoted are FOB Tokyo from the manufacturer. The Spacia would still have to be transported here along with the incidental breakage, which always happens in transport. But it's wonderful to actually have a real sample of this material. The figures show what it looks like.

Figure 5 shows the reflectance of the different panes of the glass. The test that one normally does to see if a glazing is a double or triple pane is to see how many internal reflections it has. This is very tough to do with Spacia because there is only 2 tenths of a millimeter between the two glazings, so the reflections are extremely close together. It is somewhat difficult to see in this photo. The photos are also intended to show some of the real dimensions of a window system using Spacia.

Figure 6 (above) is a cross-sectional view with scale, a flashlight for showing the tiny little dots (slightly visible in the photo). These dots are the ends of the small pillars of glass that keep the .2mm vacuum separation from sucking the two panes of glass together. These pillars are 2 centimeters on center in a grid in the Spacia system and are virtually invisible without really looking hard at the glass.

We intend to follow up on this window product, as does Yoko Collier. We'll keep you posted on the potential for actually getting more exotic use of these systems for cold regions, which we hopefully can experiment with in Alaska.

AN ADDENDUM TO THE CARBON MONOXIDE THREAT

In our last edition of Alaska Building Science News, we did a major review of the carbon monoxide threat. ABSN member, Conrad Zipperian, pointed out an oversight, which I am seeking to remedy in this erratum. Conrad pointed to a very high quality battery-powered, low-level carbon monoxide monitor produced by a company called CO-Experts. Their telephone number is 1-417-426-5504, and they're based in Eldridge, Missouri at Co-Experts, 19299 Katrina Lane, Eldridge, MO 65463-9102, USA.

These products are extremely accurate - probably the best carbon monoxide monitor that I've seen available in the country. Rural Energy Enterprises has these for sale in Anchorage (www.rural-energy.com). This monitor is guaranteed to let you know what the highest record level of CO was over the past 18 hours. Although it has a digital display, this monitor doesn't read out digitally in a continuous fashion. It has to be read mechanically by pushing the test button to retrieve stored data. It then gives you a report on the recent CO levels in the location where the monitor has been present.

These are perhaps the best quality CO monitors on the market, and have a correspondingly high quality price; they are over $100 retail. These monitors seem to be well worth the expense however. As we all should be aware, carbon monoxide is the single most dangerous indoor air pollutant we ever encounter.

Figure 7. CO-Experts Low-Level Carbon Monoxide Monitor.

EARTH VILLAGE

If we could shrink the earth's population to a village of precisely 100 people, with all the existing human ratios remaining the same, it would look something like the following

There would be:

- 57 Asians
- 21 Europeans
- 14 from the Western Hemisphere, both north and south
- 8 Africans
- 52 would be female
- 48 would be male

- 70 would be non-white
- 30 would be white
- 70 would be non-Christian
- 30 would be Christian

- 89 would be heterosexual
- 11 would be homosexual

- 6 people would possess 59% of the entire world's wealth and all 6 would be from the U.S.
- 80 would live in substandard housing
- 70 would be unable to read
- 50 would suffer from malnutrition
- 1 would be near death; 1 would be near birth
- 1 (yes, only 1) would have a college education
- 1 would own a computer

Credit to many contributors and passed on to the newsletter by Roxie Dinstel.

CALENDAR OF EVENTS

9th-12th July 2003, Alaska Building Science Network Annual Meeting at AVTEC in Seward. For more information go to the ABSN Web site at www.absn.com

Call Rich Seifert at 474-7201 or 1(800) 478-8324 for more information.

Workshop Schedule for Alaska Building Science Network

Call ABSN @ 1(800) 563-9927 or (907) 562-9927, or e-mail: absn@alaska.net for information.