

**Habitat for Humanity of Minnesota
Survey of Minnesota Habitat for Humanity Affiliates – Green Building
January, 2008 (updated March, 2008)**

BIG PICTURE

1. **How would you describe your affiliate’s level of involvement in “green building”? Would you say your affiliate is:**

a. very involved	8
b. somewhat involved	10
c. not very involved	5
d. no answer	1

2. **How would you describe your affiliate’s level of interest in “green building”? Would you say your affiliate is:**

a. very interested	12	(Central, Douglas, E. Central, Fergus, Goodhue, Itasca, Lakes, MN Valley, Prairie Lakes, Steele, TC, Winona)
b. somewhat interested	10	
c. not very interested	0	
d. no answer	2	

3. **What percentage of your homes are built to the 2006 International Residential Code (IRC) with the Minnesota Energy Code subsection?**

a. 100%	18
b. 50%	1 (affiliate builds in North Dakota, too)
c. unknown	3
d. no answer	1

* In fact, most of our building permit apps require that we use ResCheck and the Mechanical Code Check programs. (Lakes)

4. **Do you take efforts to maximize passive solar benefits in the orientation of your homes and the placement of the windows in the home?**

a. yes	8	(Douglas, Fergus, Itasca, Leaf, Prairie Lakes, Rice, SW MN, TC)
b. when we can / we try	7	(Central, Crow, Duluth, E. Central, Lake Agassiz, Lakes, Morrison)
c. somewhat / sometimes	2	
d. no	7	

CONSTRUCTION TECHNIQUES / MATERIALS

1. **Do you regularly build slab on grade?**

a. yes	12	(Douglas, Duluth, E. Central, Itasca, Lake Agassiz, Lakes, Morrison, N. St. Louis, Steele, TC, W. Central, Winona)
b. no	12	

If yes,

do you typically then use in-floor radiant heat?

- | | | |
|--------|---|---|
| a. yes | 5 | (Douglas, Duluth, E. Central, Itasca, N. St. Louis) |
|--------|---|---|

- b. no 3 (Lake Agassiz, West Central, Winona)
- c. no answer 3 (Lakes, Morrison, Steele)
- d. will be 1 (Twin Cities)

what R-value of insulation do you put under the slab?

- a. R-15 1 (Duluth)
- b. R-10 5 (E. Central, Itasca, Lakes, N. St. Louis, TC)
- c. R-7.5 1 (Douglas)
- d. R-6 1 (Lake Agassiz)
- e. R-5 1 (W. Central)
- f. 1" foam 1 (Winona)
- g. no answer 1 (Morrison, Steele)

how thick is the slab?

- a. 6" 1 (N. St. Louis)
- b. 5" 1 (Duluth)
- c. 4" 8 (Douglas, E. Central, Itasca, Lake Agassiz, Lakes, Steele, W. Central, Winona)
- d. 3-1/2" 1 (Morrison)
- e. no answer 1

2. Do you regularly build exterior walls at 24" on center?

- a. yes 4 (Douglas, Leaf, No. St. Louis, Rochester)
- b. no 20

3. Do you now use active and passive radon remediation construction techniques?

- a. yes 6 (Central, Douglas, Fergus, W. Central, Winona)
- b. just passive 7
- c. no 7
- d. sometimes 1
- e. 6 mil plastic 1
- f. no answer 2

4. Do you utilize a waste management plan that reduces the amount of construction waste?

- a. yes 9 (Duluth, Fergus, Freeborn/Mower, Lakes, Morrison, Prairie Lakes, S. Central, Steele, TC)
- b. no 9
- c. sometimes 1
- d. somewhat 3
- e. send to ReStore 1
- f. no answer 1

Can you provide us with an interesting statistic on this -- like your reduction in dumpster loads, etc?

- a. we don't use dumpsters at all (Fergus Falls, Goodhue)
- b. we needed less than 32 yds for 4 homes (Douglas)
- c. we dump only 2 yards per site now (Lakes)
- d. we had a 50% reduction in waste (Steele)
- e. we had a 10-20% reduction in waste (TC)

What types of waste construction materials do you regularly recycle?

- a. cardboard 10
- b. wood 7
- c. metal 4
- d. aluminum cans 3
- e. plastic bottles 2
- f. copper 1
- g. everything but drywall 1

5. Have you ever used extra-durable construction materials such as metal roofing or fiber cement (Hardy Plank) siding?

- a. yes 6 (E. Central, Rice, S. Central, SW MN, TC, Winona)
- b. no 18

Please let us know which materials you have used and why.

- a. fiber cement siding 4 (E. Central, S. Central, TC, Winona)
- b. laminate flooring 1
- c. we use asphalt shingles and vinyl windows / siding due to cost factors or because we get it donated 3
- d. smart board 1 because of a city ordinance

6. Have you ever or do you regularly do blower door tests of your homes?

- a. yes 10 (Central, Douglas, Duluth, E. Central, Goodhue, Leaf, Morrison, N. St. Louis, Rice, TC)
- b. no 14

Have you ever or do you regularly do infrared testing to identify areas of heat loss?

- a. yes 4 (Central, E. Central, Morrison, TC)
- b. no 20

If so, what were the results? What did you learn and did the results cause any building practice changes? What were the most common areas for heat loss?

- a. since 2004 every home we have built has been a 5 star or 5 star plus energy rated home with estimated annual heating costs of between \$287 and \$515 (Goodhue)
- b. areas of heat loss included: receptacles, windows, penetrations into the attic, doors, sole plate connections, corners, areas of poorer installation of insulation
- c. the annual heat cost for the home was projected to be \$370 (Douglas)
- d. we had the best results our energy consultant had tested to date (Rice)

7. Do you use low VOC paint?

- a. yes 20
- b. no 2 (Lake Agassiz, Steele)
- c. no answer 2

8. Do you use any recycled content materials in the construction or finishes in your homes?

- a. yes 9
- b. no 9
- c. no answer 6

If so, please let us know which materials.

cellulose attic insulation	7
salvaged items from ReStore	2
fly ash in concrete	1
OSB	1 (Steele)
OSB for shed	1
light fixtures	1

9. Do you use oriented strand board (OSB) or medium density fiberboard (MDF) that have no added formaldehyde?

- a. yes 11 (Duluth, E. Central, Goodhue, Lake Agassiz, Lakes, Rice, S. Central, Steele, SW MN, TC , Winona)
- b. no 2
- c. not sure 7
- d. we use standard OSB, I thought it didn't contain formaldehyde anymore, our supplier says the OSB we get from them only contains trace amounts of formaldehyde 3
- e. no answer 1

10. What fuel(s) do you use to heat your homes?

- a. gas 19
- b. electric 4
- c. electric on off-peak with natural gas backup 1 (E. Central)
- d. LP 1

What types of heating systems do you use to heat your homes?

- a. forced air 15
- b. in slab 5
- c. no answer 4

Does the heating system you use differ depending on the utility rebates or incentives offered in a particular area?

- a. yes 4 (E. Central, Fergus, N. St. Louis, S. Central)
- b. no 15
- c. no answer 4
- d. looking at it 1

Are you seeing any advantages or disadvantages to your fuel type or type of heating systems?

- a. gas is cheapest 6
- b. slab is harder to regulate in spring and fall
- c. slab heat is cheapest
- d. slab heat is low maintenance, user friendly, no combustion, no particulates (Itasca)
- e. gas heat is familiar and low cost but not as efficient in the long term

11. Do you feel that your installation procedures for sealing and controlling water flow around windows are state-of-the-art?

- a. yes 17 (Crow River, Duluth, E. Central, Fergus, Freeborn/Mower, Goodhue, Itasca, MN Valley, Prairie Lakes, Rice, Rochester, S. Central, Steele, SW MN, TC, W. Central, Winona)
- b. no 1 (Leaf)

- c. "up to date" 1
- d. working on it 4
- e. UBC/IRC compliant 1 (Lakes)

12. Do you feel that your procedures for limiting air leakage from the housing envelope are state-of-the-art?

- a. yes 17
- b. for the most part 1
- c. I'd say we are "good" 1
- d. somewhat 1
- e. no 0
- f. no answer 2
- g. we add 1" rigid to the entire exterior over the OSB, we comply with the IRC in using proper sealed outlet boxes and caulking all penetrations made by electrical lines and / or plumbing pipes 1
- h. there is always room for improvement, however blower door tests show that we are doing a good job of sealing leaks

Do you take special care to control leak points, use special outlets on exterior walls, seal holes from plumbing and electrical wires, caulk wall / floor joints, tape joins in plastic, etc.?

- a. yes 20
- b. no 0
- c. no answer 1
- d. we do what is required by the IRC and it is inspected 3
- e. we seal every perforation of vapor barrier using tape and caulk
- f. we use 2 2" Dow rigid in walls
- g. outlets are code, so is taping joins in plastic
- h. some measures taken, quality control is a challenge with the skill levels of volunteers
- i. we use special boxes for electrical devices on outside walls and seal holes made for electrical and plumbing where they penetrate the house envelope
- j. we seal holes, caulk wall / floor joints, and tape joints in the plastic
- k. we use ICF walls which is far superior to stick built houses for controlling leaks

INSULATION

1. What is the R value you use for your wall insulation?

- a. R-32 1 (Rice)
- b. R-26 1 (Lakes – we use R-21 in wall envelope plus R-5 on exterior)
- c. R-24 2 (Douglas, Freeborn/Mower -- Douglas uses R-19 fiberglass in 2x6" walls plus 1" foam to total R-24 except at corners where they have ½" OSB with ½" foam to provide thermal break
- d. R-21 4 (Duluth uses Icynene, E. Central uses "high density", Fergus, N. St. Louis uses fiberglass)
- d. R-19 16

2. What is the R value you use for your attic insulation?

- a. R-50 8 (Crow, Duluth, E. Central - also uses 18" truss energy heels, Goodhue, Itasca, Leaf, Morrison, N. St. Louis)
- b. R-48 1 (S. Central)
- c. R-44 6 (Central, Douglas, Lakes, SW MN, TC, Winona)

- d. R-41 1 (Fergus)
- e. R-38 4 (Prairie Lakes, Rice, Rochester, W. Central)
- f. R-33 1 (Lake Agassiz)
- g. R-30 1 (MN Valley)
- h. R-20 1 (Steele)
- i. 14" of cellulose 1 (Freeborn/Mower)

3. Have you found that the communities where you build are now requiring you to provide thermal calculations prior to their providing building permits?

- a. yes 16 (Central, Crow, Douglas, E. Central, Freeborn/Mower, Goodhue – in Red Wing, Lakes, MN Valley, Morrison, N. St. Louis, Prairie Lakes, Rice, Rochester, South Central, SW MN, TC)
- b. no 8 (Duluth, Fergus, Itasca, Lake Agassiz, Leaf, Steele, W. Central, Winona)

4. Do you regularly use foam wall sheathing (like the 1" Dow foam board) instead of (or in addition to) OSB?

- a. yes 7 (Douglas, Fergus, Freeborn / Mower, Lakes, SW MN, W. Central, Winona)
- b. no 16
- c. yes, not regularly 1

5. Do you regularly use insulated concrete forms (ICF) for your foundations?

- a. yes 9 (Fergus, Freeborn / Mower – if we get 2" foam free, Goodhue, Rice, Rochester, S. Central, SW MN, TC, Winona)
- b. no 12
- c. we do slabs 3
 - we do put R-10 rigid Styrofoam along side the foundation walls 4' deep
 - we used to before we did only slabs, the technique is sound, volunteer friendly and effective

6. Have you ever used ICFs for the walls of a home?

- a. yes 9 (Duluth, Freeborn/Mower, Itasca, Rice, Rochester, S. Central, SW MN, W. Central, Winona)
- b. no 14
- c. we have used ICF for foundations, but they weren't volunteer friendly

7. Have you ever used structural insulated panels (SIP) in a home?

- a. yes 4 (Crow River, Leaf, N. St. Louis, TC)
- b. no 19
- c. no answer 1

If yes, how did that work out for you and would you do it again?

- a. yes 4
- b. no 0

* cost is an issue, if that could be overcome we would do it again, some mechanical and electrical concepts were missed a bit by the engineers

8. Have you found well insulated windows or doors to install in your homes?

- a. yes 17

- b. no 2
- c. not sure 5

If yes, what makes, models and energy values have you found?

Marvin	5	(Crow, Duluth, N. St. Louis, Rochester, Winona)
Thermo Tech	5	(Central, Crow, Douglas, Prairie Lakes, W. Central)
Pella	2	
Vynylite	2	
Hayfield	2	
Andersen	3	
Hurd	1	
Weathershield	1	
Gerkin	1	

ENERGY CONSERVING APPLIANCES / FIXTURES

1. Do you now or have you ever installed on-demand hot water heaters in your homes?

- a. yes 7 (E. Central, Fergus, Freeborn/Mower, Morrison, Prairie Lakes, TC, Winona)
- b. no 17

How is that working out?

- * ok 2
- * no complaints thus far
- * too early to tell
- * installation costly
- * we had installation issues

2. Do you install low flow faucets as well as low flow shower heads in your homes (2.0 GPM is what we consider low flow)?

- a. yes 8 (Crow, Fergus, Leaf, MN Valley, Morrison, N. St. Louis, Prairie Lakes, Winona)
- b. no 5
- c. not sure 6
- d. sometimes 2
- e. just shower heads 1
- f. use what Ferguson donates 1
- g. no answer 1

3. Do you install Energy Star fixtures and light bulbs in your homes?

- a. yes 12 (Central, Crow, Douglas, Duluth, E. Central, Fergus, Goodhue, Leaf, Morrison, Prairie Lakes, S. Central, W. Central)
- b. most of the time 1
- c. some / sometimes 3
- d. homeowner chooses 3
- e. no 4
- f. no answer 1

4. If you provide clothes washers / dryers for your homes do you require that they be Energy Star appliances?

- a. yes 7 (Central, Douglas, Duluth, E. Central, Lakes, S. Central, Winona)
- b. no 6
- c. don't provide 8
- d. not sure/Whirlpool 2
- e. no answer 1

5. Do you install (the donated) Whirlpool Energy Star refrigerators in your homes?

- a. yes 24
- b. no 0

6. Do you install (the donated) Ferguson ProFlow ultra low flow toilets in your homes?

- a. yes 9 (Duluth, Fergus, Lake Agassiz, Leaf, Rice, Rochester, S. Central, Steele, SW MN)
- b. no 14
- c. no answer 1

7. Have you ever installed dual flush toilet fixtures in your homes?

- a. yes 0
- b. no 23
- c. no answer 1

VENTILATION

1. Which of the following do you regularly install to provide mechanical ventilation:

- a. continuously running vent fans 5 (Douglas, Freeborn/Mower, Morrison, Prairie Lakes, S. Central)
- b. vent fans with timers 7 (Crow, E. Central, Lake Agassiz, Lakes, N. St. Louis, W. Central, Winona)
- c. vent fans that turn on with humidistat sensors 6 (Central, E. Central, Leaf, N. St. Louis, Prairie Lakes, Winona)
- d. none of the above 7
- e. no answer 3

2. Do you install energy conserving air to air exchangers such as a heat recovery ventilator?

- a. yes 15 (Central, Duluth, E. Central, Goodhue, Itasca, Lake Agassiz, Lakes, Leaf, Morrison, N. St. Louis, Prairie Lakes, Rice, S. Central, SW MN, Winona)
- b. not typically 1
- c. used to 1 (Crow)
- d. no 5
- e. no answer 2

3. Do you regularly install direct vented or combustion sealed furnaces?

- a. yes 17
- b. no, electric 3

- c. no 1 (Lake Agassiz)
- d. no answer 3

4. Do you regularly install direct vented or combustion sealed hot water heaters?

- a. yes 13
- b. no, electric 5
- c. no 4 (Duluth, Lake Agassiz, Rochester, SW MN)
- d. no answer 2

5. Have you encountered any problems with ventilation in your homes?

- a. yes 5
- b. no 16
- c. no answer 3

If yes, what kinds of problems and what have you done about it?

moisture issues – we adjusted ventilation timers, educated/informed the homeowner about heat exchange maintenance, added make up air vents to mechanical room, added a high volume low speed bathroom fan and a range hood exhaust

RESULTS OVER TIME

1. Have you encountered any negative issues related to “green” techniques / materials over time?

- a. yes 1
- b. no 19
- c. too soon to tell 1
- d. no answer 3

If so, what?

- volunteers want to frame not use SIPs
- minimizing OSB sheathing on exterior walls drives some different issues in squaring walls during framing phase of construction
- We tend to take the lower cost materials weighing only quality, price and long term costs to the homeowner family. We have had discussions on vinyl vs. alternate siding but vinyl wins either because of maintenance issues or price. We are working with the Sustainable Forestry Association to build with sustainable wood products. This would have the most impact on pricing for interior doors and trim. (N. St. Louis)
- only cost and learning curve

2. How do your homeowners respond to the parts of their homes that are “green”?

- * too soon to tell
- * they and the community at large love to see us use the energy efficient methods
- * ok 2
- * not sure
- * There is no detectable response. Initially there are a number of other aspects of their homes that are apparently much more important.
- * Some don’t quite get it. They cut down shady deciduous trees. (Shade in the summer and let light through in the winter. Passive solar.) Once they see a direct cost savings to them they are more willing to be positive and engaged. Simple things like air to air heat exchangers are seen a positive “green” additions they support.
- * positive

- * they are appreciative
- * Our homeowners have been happy with what we build – “green” or otherwise.
- * they are mostly unaware of differences
- * too new to tell
- * neutral

Do they have maintenance issues with the “green” parts?

- * air to air exchanger maintenance 3
- * The ones with wood siding have not been in their homes long enough yet to have to deal with the painting and staining issues.

3. Have you had to make changes to your homeowner education sessions to provide guidance on maintenance of “green” materials / equipment?

- a. yes 5 (Crow, Douglas, Fergus, Freeborn/Mower, Leaf)
- b. no 13
- c. no answer 5
- d. not sure 1

If yes, what kinds of changes have you had to make?

- no more air to air exchangers – now we use timed fans
- We have made some changes in our orientation to the home regarding managing the heating system and water heating. So far we have not encountered complaint or even questions -- time will tell.
- just explaining CFLs, motor speed control on fan, furnace
- use and maintenance of air exchangers
- we will be adding some training in green building

4. Do you have any hard data on the cost to heat your homes?

- a. yes 6 (Douglas, Fergus, Lakes, N. St. Louis, Rice, Winona)
- b. no 15
- c. no answer 3

Have you ever surveyed your homeowners on this question or have you asked your utility companies?

- a. yes 4
- b. no 9
- c. no answer 11

What can you tell us?

- we have asked but they are generally unresponsive
- our utility company advised us the annual heat cost would be about \$370 for our standard home
- our homeowners pay about \$750 a year on propane
- We have tried to collect the data without success to draw any conclusions. Even with the systems we install, family behavior still is the controlling factor (ex. mom likes the house warmer than the kids; kids respond by opening windows in winter causing the heater to run more often causing the house to be warmer causing the kids..... resulting in HIGH UTILITY BILLS).
- We have some data from the local homeowners as well as utility bills from the PUCs. Total utility costs are averaging \$200/month. We estimate that heating costs are around

\$750/year. This below average amount is still a burden for our homeowners so additional conservation measures are in order. (N. St. Louis)

- On our most recently built homes of 1200 sf our 6 homes cost about \$100/month for both the gas and electric in the coldest months of the year.
- We reviewed utility bills for 5 homes all built with ICF walls, the heating costs averaged \$25 per month! (Rice)

OTHER

1. Have you identified the average increase in costs per home associated with the “green building” techniques and materials you regularly use?

- | | |
|--------|----|
| a. yes | 5 |
| b. no | 17 |

If yes, what are your numbers?

- it adds about \$2,000 for a power vent water heater, R-50 attic, and 2 stage modulating furnace at 95% efficiency (Crow)
- We have not, in '07 we made many significant changes in our “standard” build; some related to being more green, some to just be more energy efficient and some to reduce purchase cost of the homes. As an example, going to Energy Star lighting fixtures more than doubled our cost for fixtures – even close to triple. We did not drive out a changed cost directly related to being green; but the net result of our changes was a significant reduction in construction costs – mostly from building on a slab vs. over a basement. (Douglas)
- \$2,000 (East Central)
- There is about a \$7,000 increase in cost for ICF homes. (Itasca)
- We’ve determined to make these changes for the long-term benefits, not necessarily on installation costs. (Lakes)
- actually reduces container costs (Prairie Lakes)
- ICF can add \$3 to \$5 per SF upfront, in-floor radiant \$4 to \$6 per SF (W. Central)
- We calculate it costs 3% more per house. (Rice)

2. What else should we know about how / what your affiliate is doing relative to “green building”?

- In 2008 we will be doing a “green build” with geothermal heat, full ICF exterior walls, pervious concrete and passive solar (Central)
- We want to build with SIP walls again to speed construction process and would like to use Hardy board siding (Crow)
- see my attached manifesto (Fergus)
- There is a small chance we will be collaborating with a residential construction company who is an experienced user of “green building” materials and practices. (Goodhue)
- We are interested in building more green. (Lake Agassiz)
- We’re just beginning to evaluate the utilities cost savings for a SIP home with thermal heat storage. (Leaf)
- We do not do anything specifically other than comply with codes. (MN Valley)
- We will be doing active radon protection in all future houses. (Rice)
- We are exploring the options. (Steele)
- We are just interested in doing a better job. (Winona)

3. Can you describe the factors that may be keeping your affiliate from doing more in the “green building” area?

- overall costs, partners
- costs and volunteers wanting to do it the old way
- Economics are important, we will try to minimize monthly cost of homeownership for our partner families – this includes mortgage, insurance, utilities and maintenance.
- education and funds
- availability
- money and people in our affiliate who are not concerned about global warming
- lack of information
- Having a better understanding and more specific guidelines / information about green practices as it related to affordable housing both from the construction expense and the homeowner savings. We also have the issue of identifying people that will facilitate and maintain the idea.
- lack of knowledge
- There are changes we choose not to make based on installation costs: would like to do Isonone wall insulation vs. rolled bats; however, the cost is prohibitive for return on investment at this time – we are watching for these products to drop in price.
- unfamiliar with practices, additional cost, we’ve always done it this way mentality
- pricing and possibly availability of materials
- lack of knowledge
- up front cost, learning curve, available materials
- knowledge and desire to do it right regardless of time involved
- We are interested in doing solar, but it is too expensive right now.

Do you need better information?

- yes 15
- we need documentation on the benefits, too

Do you need to know where to get “green” products?

- yes 15

Do you need more funding to support this activity?

- yes 14
- perhaps 1 However, right now our issue is people to work on the ideas.
- some 1

4. So much has been said about “green building” that everyone seems to have their own definition of what it means. If you feel a need to share your thoughts on your definition of “green building” please do so, if not that is ok too!

- durable / recyclable / energy efficient / environmentally sound
- I think this whole survey and the use of “green” in general needs definition and boundaries so that when we engage in discussion and data collection we are all on the same page.
- Green building to me means building a house that is healthy for the homeowner but is also healthy for the planet. The health of the owner is sometime negated if they smoke inside the house. Also, it should save the owner money. But what is discouraging is the expense of some materials.
- It seems that the phrase “green building” could mean a lot of different things from the simple to the very complex and may raise costs or not depending upon the actual

technique or practice. Without further discussion regarding what is meant by “green building” and what techniques and/or practices it entails it is hard to make judgments or ascertain what, exactly, our position on green building is.

- Establish building practices that have the lowest possible impact on our global environment when constructing a house. I do feel we need to take a cautious approach when establishing green building practices that end up with no or negative results.

TRAINING NEEDS

1. HFH-MN is planning on holding one or two one-day sessions on “green building” during January and February. What topics in particular would you like to see in these sessions?

- what is green defined, house plan designs
- on-demand water heaters, steel roofing, air exchange issues
- A broad ranging presentation that acquaints us with all the aspects/products of “green”. We do not know much about use of recycled materials in construction. Tips/ideas for reducing construction waste. Economic analysis of green products/processes – the initial and long term costs/savings/impacts.
- recycling of construction materials
- ReStore sources
- hold the trainings in the Twin Cities
- What is the definition and the requirements. How to control the initial cost.
- green methods of construction and cost or energy savings
- ICFs, green building products, energy efficient heating
- cost effective, easy to incorporate changes
- passive solar design and cost comparisons of energy efficient designs
- waste reduction, energy savings
- available construction materials produced within 500 miles, availability of materials
- in-floor radiant systems, shallow foundations
- framing methods, roof ventilation methods
- how to evaluate first cost vs. operating costs

2. How many days of training should we provide (1, 2, or more)?

- | | |
|----------------|---|
| a. one | 9 |
| b. two | 6 |
| c. we’re open! | 1 |

How many people from your affiliate do you think would like to attend?

- 1 to 2
- 2 to 3
- 3 to 5
- 3
- 2
- 1
- at least 4
- 2 to 3
- at least 2
- 2 to 4
- 1 to 2
- 2
- 1 to 3
- 1 to 2

- 1
- 2

3. The Minnesota distributor for Rinnai on-demand hot water heaters is willing to provide a demonstration of the product (which you can get donated through HFH-I), would you like to know more about this product?

a. yes 18

4. In the “dare to dream” category, look into the future and tell us what “green building” techniques you would like to implement but you just can’t identify the resources to do?

- slab on grade, ICFs
- ground source heat pumps
- raising our consciousness of all aspects of what “green” can or should be
- water conservation and recycling
- green products for building homes
- a super insulated house that relies primarily on passive solar heat using sustainable forest materials and other locally produced materials
- solar (dual fuel off peak heating)
- our hope is a cluster of energy efficient homes, landscaping, but we need land
- metal roofing, water management systems, heating systems that are easy to operate, knowing embodied energy consumption with “green” products
- solar heating systems for the whole house, geothermal heat, sustainable lumber
- simple techniques that are volunteer friendly
- solar heat, hot water and electricity