How to Start a Weatherization Team

Weatherization Team - A group of neighbors who gather for regular weekend parties to weatherize each other's homes.

You get to:

- Meet neighbors
- Help a neighbor save on energy bills
- Learn the skills to weatherize your own home
- Fight climate change
- Eat food, listen to live music and gab with your community

By HEET (Home Energy Efficiency Team)
A Cambridge-based Weatherization Team
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NOTE: Please look at this document in "page layout" view (so you can see the text boxes) or as a PDF (but then you can't click on the weblinks).

This is a working document that should keep evolving. Please email us with stories, information, or addendums to add on to the appendixes.

Also, we'd love to translate this into Spanish and Portuguese. Please contact us, if you can help with that. Thanks.

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Introduction:

In the old days, the community would get together to help a neighbor build a barn. There would be music, food and work. It was a time to meet new people, exchange news and strengthen community.

Weatherization barn-raisings are fun. Anyone can organize one. These days with skyrocketing energy prices and looming climate disruption, many people are interested in weatherization barn-raisings.

At our first barn-raising, even though it was pouring rain, 40 people turned up with tools and food. That day we made a few announcements, then worked for two hours doing pipe insulation, window and door insulation. After that we cleaned up, ate food and listened to live music. Neighbors met each other, activists and job-seekers exchanged information, and friendships were started.

<u>Start your Weatherization Team in 11 Easy Steps:</u>

Everything in this manual is only a suggestion. There are a million ways to set up a group like this and to plan these sorts of parties.

You know your community's style and capabilities best. In starting your own Team, do what you think is best.

Steps:

1) **Assemble a core group of three of more people** who are willing to spend time organizing the first few barn-raisings. You *can* start with just two person (one to organize the work and the second to do the publicity) if you're willing to devote some time to it. The most important thing is to know a fair number of people with different skills who you can talk into helping. An alternate is to send out an appeal to neighborhood groups.

   After a weatherization party or two, you will probably begin to attract a lot of volunteers who are excited to help you. We sprung out of a neighborhood climate-action group. Within a month of coming up with the idea of weatherization parties, we had our first event. The interest in the concept was overwhelming.

2) **Find someone who has a home that needs some weatherizing**. You can ask friends, send a flyer out with neighborhood groups, put up notes in churches, schools or other public spaces. Look through the home and make sure it does need some weatherizing that your group can do.

   Explain the conditions of the barn-raising to the owner/renter:
   - We don't want people using the group to weatherize their home, then never turning up to help on other people's homes. The home-owner/renter is expected to help work at least three other barn-raisings after this.
   - The home-owner/renter is expected to get the materials necessary to do the work and enough food to feed the workers.
   - Discuss liability issues. An attendee at the weatherization event *could* get hurt. We have all attendees before they start work sign a liability waiver (for a sample of this waiver, see Appendix E), but it's unclear how much the waivers would hold up in a court of law. There's also the possibility the house could get damaged. We try to control this by avoiding any structural or large-scale work, because we will attract on average very unskilled labor. We try not to use dangerous power tools and we stick to smaller and less dangerous and less-potentially damaging work. See the examples of weatherization projects like this in Appendix B. Reassure the owner/renter that there will be team leaders teaching each weatherization skill and keeping control of any rambunctious workers, but that there still is the possibility something could happen. The owner/renter has to feel comfortable with this.

3) **Find one or two volunteers with weatherization experience.** Two people are better for they will teach each other and have more ideas. Have the person or people go through the home looking for what could get weatherized. Remember the work should not require specialized large machinery or skills. Just about anyone with a hammer and a few simple tools should be able to complete the task in a few hours with someone skilled instructing them and helping out. Luckily there are still a lot of tasks like this that almost any home could use.

Note on Low-Income Homes:

If the owner/renter has difficulty affording the weatherization materials and food, you can:

- Apply for grants to pay for the coop's work on low-income households
- At any high-income houses you work in, routinely ask for voluntary donations from the attendees
- Ask the high-income households to donate any of their surplus weatherization materials for use on low-income homes
- Ask the low-income household to have a fundraising party (a party they throw for their friends where each party-goer leaves a little money toward the weatherization)
- Ask for money for the weatherization from churches
- Form a buying club and get a cheaper rate by buying in bulk
- Ask a nearby hardware stores or contractors to donate their surplus supplies

High-income households emit many tons more carbon than low-income households. If global warming scares you then it's important to include work on high-income homes.

At the same time, low-income households lose a much greater percentage of their income to paying for heat. A study in Boston showed that babies in low-income households tended to be underweight during cold winter months. The parents were forced to choose between feeding their children and keeping them warm.

Typical items to weatherize are:

Installing weatherization strips around doors
Put in CFL lightbulbs
Caulking exterior holes around pipes, storm windows and wires
Installing pipe insulation over hot water or heating pipes
Installing a programmable thermostat
Tightening storm windows
Insulating the band joist in the basement
Repointing the foundation
Putting a chimney flue pillow in to stop hot air escaped up the flue
Etc.

See Appendix B for a much more complete list of possible things to weatherize as well as info on how to do the weatherization, where to buy the materials and how much they might cost.

4) **Pick a date for the weatherization party**. Make it at least a month out. Pick a weekend afternoon (so those who go to church aren't excluded). Schedule the event to take between four and five hours.

5) **Find musicians** or entertainers or local celebrities who will entertain the workers. This isn't critical, but the promise of entertainment helps people understand the event will be fun. It might be that little thing that nudges them into turning up at one barn-raising and getting involved in the group for years to come. On the flyer, tell people they can bring their musical instruments and have a jam session.

6) **Get the word out about the upcoming barn-raising.** Make an announcement at or send a flyer to nearby climate-change groups, neighborhood groups, schools and the "calendar" section of local newspapers. Give flyers to all your friends, relatives and acquaintances. Try typing up a press release and sending it off to the media in the area. With our first party, we got on the cover of our local newspaper. If any media might come to the event, check with the homeowner/renter to make sure they are ok with the idea.

Ask people to RSVP so you get an idea of how many people will attend and how much work you might be able to complete. Generally, it's a good idea to have 4 to 5 attendees per task and team leader. You can always have more than one team on a task if there is a lot of one kind of work to be done (say 40 windows to be weatherized).

Sample invite:

Weatherization Party

Sunday, September 21
12:30-5:00pm
16 Smith Road, Cambridge

If the federal government won't cut carbon, let's do it ourselves!

- Help weatherize a neighbor's home (a skill you can take back to your own home)
- Make new friends and join a community effort to protect our planet
- Enjoy pizza, live music and celebrate
- Bring musical instruments and jam

Learn how to:

* Install window weatherization
* Pipe insulation
* Hydraulic cement
* And more

We are looking for team leaders to teach simple weatherization skills and then guide participants in doing the work. We also need volunteers for other non-handy jobs.

The number of participants will be limited to assure that everyone has guidance and support from a skilled team leader. **To sign up, RSVP to Jane Smith, JSMITH@Gmail.com, by September 15.**

Organized by the **Home Energy Efficiency Team (HEET)**, a Cambridge-based co-op bringing neighbors together to weatherize our homes and take the energy future into our own hands.

With soaring oil prices and a global climate emergency at hand, the time for community energy initiatives is now.

If you have kids, tell us. We hope to have a group babysitter.

7) **Find team leaders to teach the weatherization skills**. These should be people who have some weatherization experience and are good teachers. They also have to be able to manage anyone on their team who might be a little impetuous with a drill.

Try asking any of your handy neighbors if they'd be willing to volunteer. Ask at green building centers and call your local contractors. Put a note up at local hardware stores. Many contractors want to get into the "green" business. Call contractors you've used in the past and ask them. Explain you'll thank them publicly at the event and put their names on the flyers. Go to the building department in your town and put up a sign.

Tell the team leaders what the possible weatherization tasks are at the upcoming barn-raising. Ask them which task they'd like to teach.

8) **Make a list of the tools and materials needed for the weatherization.** Every handy person has different preferences about what tools to use to get a job done so make sure to pass the pertinent list of tools and materials by each team leaders. Otherwise the work might be held up an hour while someone runs to buy a box of 4-penny finish nails.

9) **Send the materials list to the homeowner.** Make sure to give them at least a week or two to get everything on the list. Make the list as clear as possible in terms of type of materials, where to buy it, how much to buy and exactly what color, size or whatever. The list should also have all the other materials they need to have available including drop clothes, rags, buckets, screws etc.

Sample Materials List:

Chimney flue draft stoppers:

MATERIALS:

- 3 flue draft stoppers. Measure the flue above the damper. Make sure to get the correct size for the flue. Make sure to order this early so they get there before the barn-raising. You can order them from: http://www.energyfederation.org/consumer/default.php/cPath/21_3284_3285

TOOLS:

- Drop cloth
- Water and towels to clean up
- Scissors
- Trowel
- Dustpan and broom

Install programmable thermostat in kitchen:

MATERIALS: (try Home Depot or Boston Buildings Material Coop)

- 1 programmable thermostat, make sure it seems readable to you and that it works for your needs
- If thermostat needs a battery, get that as well

TOOLS:

- Screws and dry-wall anchors
- Safety goggles
- Dustpan to clean up
- Philips and flat head screwdrivers of medium size
- A drill and bits (to put in holes for wall anchors)
- Maybe electrical tape and wire cutters, (but probably not)

10) **Make sure the homeowners buy the materials on time.** About a week before the event, check that they have what they need. If they have a problem getting hold of the 12 hammers needed, then send an email out to the people coming to the event to see if they can bring them.

11) **Figure out what food you're going to have**. You can send out for pizza, or ask people to bring potluck, or have Food Not Bombs cook food or whatever. Take a poll of what you, the home-owner and the group of people you're bringing together prefer. Don't forget non-alcoholic drinks, as well as paper plates, cups, napkins, etc. With food, it's better to have too much than too little.

THE EVENT ITSELF:

- **All the tools necessary for each job should be separated and put in the correct work area**, **before the event starts.** In other words, have the saw, hammer and nails by the windows for the window weatherization team, and have a second saw, hammer and nails by the door for the door weatherization team.

  You could have all the tools in one central area, but then someone is going to walk off with the hammer while three other groups grind to a halt, unable to work. Do your best before the event to make sure each group has everything they need to finish the job.

- **Have a sign on the front of the building so people walking by can learn about the weatherization team**. Have flyers out there explaining the concept of the weatherization parties.

- **Have volunteers assigned to the following roles:**

  Greeter – This person greets each newcomer. S/he has to have the attendees sign the liability form before they step into the house – very important. Then the greeter can describe the different possible work tasks and assign each attendee to a team based on the person's interest. We find it's best not to have teams bigger than four to five people, or not everyone can see what is happening as well as try the skill out. Get email addresses of attendees so your next barn-raising will be easier to organize. Nametags are a good idea so people feel more comfortable.

  Gopher – This person runs back and forth between the teams, relaying messages and tools and materials. The gopher can help make sure attendees know where the bathroom is, bring water, etc.

  Organizer – This is the person who has been most involved with this particular barn-raising. This person knows all the details of who is supposed to be where, doing what etc. This person should settle disagreements, check the work is being done correctly, answer questions and generally run interference.

  Team leaders – Each team leader has a specific task that s/he believes can be demonstrated to unskilled people and then actually be done in the time allotted.

- **Have explanatory flyers at a front table** with a description of the weatherization team, how to contact it, when the next event will be, and how to sign up to have your own home weatherized.

- **Have soda and water available** from the start of the event. Working makes people thirsty.

Safety rules:

Lead paint – Lead paint was used extensively in the United States until 1978. Lead chips or dust are hazardous to human health and especially to children. It can cause permanent harm to a child's brain and other organs. A single chip of paint the size of a postage stamp can kill an infant.

If the home is older than 1980, then choose methods that will mean you won't have to cut, chip, sand, scrape or otherwise impact with any painted surface. With windows, choose Niagara Ice-O-Tac V-Seal so you don't have to cut the paint to take off the molding or sashes.

(Under no circumstances use sanders. Sanders turn the paint into dust and spread it through the air and around the room. Don't vacuum lead paint either because that also spreads the dust around.)

Asbestos – Also needs to be avoided. Asbestos is sometimes even now used as a flame-retardant and insulator in many buildings. Small particles of it can flake off and be inhaled, increasing the chance of lung cancer and other ailments. It can be found sometimes still wrapped around pipes or other places. Don't work in an area you suspect asbestos might be in, and especially do not remove any insulation you suspect is made of asbestos.

- **Schedule** - Spend half an hour at the start of the event announcing what work will be done today, who will lead each team, where each task will take place, and how long the work will last for. Try to quantify as much as possible how much today's work might help in terms of decreasing an energy bill and carbon emissions. Announce when the next barn-raising will be. Introduce important people and rules and tools and safety info. Then start working. The work should last between 2 and 4 hours. After that, break for food and music.

- **During the assigned work time, you might not get all you wanted to done.** Not every window or door or pipe might be weatherized, but you will have helped a lot. A half an hour before the time for food, walk around and tell everyone they should begin to soon start putting windows and doors, etc. back into working condition and clean up *before* breaking for food and music.

- **Ask as many attendees as possible for their feedback** on what could be improved on and what worked well. Don't forget to ask the home-owner/renter and the team leaders. Take notes or ask them all to fill out evaluation forms.

That's it. We suggest picking a regular time to have a barn-raising on (for instance the third Saturday of the month, or first Saturday, or whatever), so interested attendees can plan ahead.

If you need more help, inspiration, information, whatever, contact us. If we are able to, we will come to talk to your group to help get your group going.

How to Slash Your Energy Bills Dramatically Without Spending Any Money

Talk about Behavior Changes: (Instructor: if you can bring feedback gadgets such as a Killawatt monitor, Fridge thermometer, water heater thermometer, Blueline Power Cost Monitor. Set the gadgets up around the home in places to demonstrate your points. Go through the home and show how to do each activity, such as clean off the fridge's coils, etc. Try to bring info about rebates and costs of adding insulation to walls or attics and switching to more efficient appliances or furnaces.)

Discuss:

Buy secondhand. It's cheaper and it stops more natural resources from being used. Why buy crap from Target when you can get something beautifully made from a secondhand shop?

Shop at farmers' markets. Your average food item is shipped and refrigerated across 1,500 miles to get to you, meaning it might take many more calories of fossil fuel to reach you than the calories it delivers to your belly. Also, food at farmers' markets has frequently been harvested that day) and thus is more nutritious.

Eat less red meat and dairy. A pound of conventionally raised red meat uses many times as much land and energy (in terms of fossil-fuel inputs and caloric inputs) as does a pound of chicken, fish and vegetables. Switching from red meat is one of the biggest changes you can make to decrease your carbon emissions. It's also a lot healthier for you.

Heating a home –

- **During the winter turn down the heat** as far as you can. In the Northeast, for every degree you turn the thermostat down during the winter you will save 3% off your heating bill. If you turn down the thermostat from 70 to 65 degrees this winter, you will save 15%.
- **Install a programmable thermostat** so it will turn the heat down automatically when you're away at work or asleep. This can save your 10% of your energy bill.
- **Replace your furnace's air filter** once per season if you have forced hot air furnace. Otherwise it will cut down on your furnace's efficiency as it's trying to blow air through a dirty filter.
- **Make sure all interior heating vents are opened and not obstructed**. No need to heat your furniture and drapes.
- **Make sure all radiators are not obstructed or covered.**
- **Close chimney flues and storm windows at the start of the winter**. Make sure the flue damper is really closed securely. For hot air in your home, the chimney is probably the biggest and fastest exit to the sky. Also, make sure the storm windows are closed correctly, so the top sash is on the outside (furthest from the interior of the home). The bottom sash should be the one closer in. The meeting rails (where the sashes touch) create a tighter seal that way.

Air conditioning –

(First off, you might be able to not use AC at all. With some simple tricks listed below, you can get rid of or severely decrease your need for AC, radically cutting down your electricity bills. Leaving the AC on for two weeks costs as much in energy as leaving your fridge door open all year.)

- **Draw the shades in the day,** especially on the east and west side of your home. These are the sides where the summer sun can really angle in to heat up your home. This will cut the amount of sun getting into your home and thus your need for AC. The shades work best if they are on the outside of your home, because they stop the sun before it gets in. A trellis or deciduous tree works well because, during the winter it will let the sunlight through, but during summer it will create thick shade.
- **Installing insulation,** especially in the walls and attic, works to keep homes cooler during the summer as well as warmer during the winter

- **Close the windows in the morning** to keep out the hot air. Open them at night to let in cool air.
- **Whole house fans** can be used to pull in cool air at night, then shut off during the heat of day. Because they are just moving already cool air, rather than trying to cool that air also, they take much less energy than AC.
- **Install a ceiling fan**. In the winter a ceiling fan can be run one way to push heat down toward you. In summer can revolve other direction to pull heat up to ceiling.

If you are going to use AC, then:

- **Turn up the temp on the AC**. Do you really need it *that* cold? Changing the temperature from 70° to 76° can save you 10% on your cooling costs.
- **Don't leave the AC on when you're at work.** It won't make your home feel any colder when you do get home. Use a programmable thermostat or automatic timer to turn the AC on an hour before you get home.
- **Clean and tune your AC**– If the filter gets dirty, the AC will break earlier and it also will take more energy to circulate the cooled air. Here's how to clean a window AC.

Turn devices off:

(Use a Killawatt monitor to demonstrate some of the math of conservation).

- **Turn off lights** when you leave the room (perhaps install motion detectors for lights in halls).
- **Turn off TV** when you're not watching it.
- **Unplug 24x7 things** - cell phone chargers, power strips, electric clocks, computers, fans. Many gadgets left on standby, use electricity even when they seem to be turned off. This "vampire" load represents about 5 percent of an average home's annual electricity costs.
- **Get rid of any second fridge or freezer.**
- **Turn off air handler in the furnace** - huge savings.

Fridge – (Use a thermometer in fridge to measure temp).

- **Don't open the fridge all the time and leave it open** while contemplating the state of the universe. Label the containers so you don't have to open each one. Keep the food as organized as you can so you don't have to do a shelf-by-shelf search all the time.
- **Turn up fridge temp**. It doesn't need to be cooler than 40° Fahrenheit.
- **Leave shelves 30% full** so the objects inside retain the fridge's temp when you open and close doors. This way not as much energy is sucked out each time. (Fill water bottles and leave them in there if you need to).
- **Brush dust off coils** in back of fridge once a year.
- **Move fridge out from wall** so air circulates.
- **Move fridge away from sunlight.**
- **Keep the fridge away from hot appliances.**

Water heater –

- **Insulate it if it's over 10 years old.**
- **Turn down the heater**. The water coming out of it doesn't need to be hotter than 120° Fahrenheit. You'll waste energy and scald someone. Run the water as hot as you can for 3 minutes, then fill a cup with it and measure the temperature. If it's over 120°, turn the heater down.

Washing clothes –

- **Wash in cold water.** Cold water cleans also. At least do a cold-water rinse.
- **Wash only when you have a full load.** It will save on your energy bills and your washer will last longer from being used less frequently.
- **Buy an Energy Star gas washer** next time you need a new one. Their efficiency will save you money

Drying clothes –

- **Line dry clothes**. It saves money on your energy bills and your clothes will last longer without the wear and tear of the dryer. In winter, hang your clothes up inside to dry. They will humidify the air inside your home during the dry winter months.

Dishwasher –

- **Change settings so the dishes aren't automatically dried** (if possible on your dryer). They will air-dry fairly quickly.
- **Run the washer only with a full load.**
- **Buy an Energy Star dishwasher** next time you need a new one.

Discuss any available rebates for installing insulation, buying more efficient appliances, furnaces, etc.

Appendix B
Items a Weatherization Team can Work on

Note: This is a comprehensive list of possible tasks a weatherization team could work on. You can pick and choose which ones you'd like to do at each barn-raising. It's a good idea to vary them from event to event so you keep people coming back to learn new tasks.

Also, none of these work items are very difficult. We have checked with experts to make sure these measures are all highly effective in decreasing energy bills. However we include only basic instructions on how to do each here, enough to get you a sense of how to perform these repairs. Please find several sources on how to do each weatherization before attempting it yourself.

Install a programmable thermostat

A programmable thermostat will remember for you to turn the heat down while you're sleeping and at work and then turn the heat back up for you before you wake up or return from work. Lowering your thermostat by ten degrees for eight hours at night can reduce your energy costs by as much as 7%.

Some sample thermostats – (make sure to chose a model with an Energy Star label)
Energy Federation's models
Home Depot's models
Directions how to install it

Air Seal the Exterior of the Home

This is critical. It's done to decrease the heat escaping out small holes in a building. Air-sealing combined with increasing the insulation in your home is the biggest thing you can do to decrease your heating bills while increasing the comfort in your home.

Caulk and tighten interior of storm windows:

First, while outside, tighten all the screws on the storm window so there are no gaps between the edge of the storm window and the wall of your home. Second, from inside of the home, open each window and run a bead of caulk along the inside of the storm window, the spot where the storm window connects to your house wall or window frame. Make sure not to get caulking on any of the moving parts of the window or storm window. You want both to still work. Make sure you don't obstruct the "weep" holes at the bottom of the storm frame. These let rainwater that gets into the window drain out so it doesn't cause water damage inside your window frame.

Seal all tiny cracks on the outside of your home around porch light fixtures, phone wires, security wires, cable, outdoor faucets, kitchen and bathroom fans and electric service holes:

Walk around your home and run a bead of caulk around the base of anything that enters your home –wires, pipes whatever– even if you can't see a visible hole. You want to plug up any tiny gap. All these little holes add up in the average home to a 30-square-inch hole. You wouldn't leave a window open that much all winter, so close all these tiny holes.

When to use caulk versus spray foam:
Caulk: Seals gaps of less than 1⁄2". Select the kind (interior, exterior, high temperature) based on where it will be used. You can get paintable or transparent or white caulking so it blends in.
Spray foam: Fills large cracks and small holes. It can be messy. Don't let it drip on you. It is sticky beyond belief. Try out the new latex-based foams. Wear gloves and eye protection. DO NOT USE near flammable applications (e.g., flue vents). DO NOT USE expanding types on windows and doors; they will go everywhere.

Install tight dryer vent covers:

Heartland dryer vent decreases the amount of air let in through a vent when the dryer is off.
Also, run a bead of caulking around the edge of the vent where it's mounted on your home to airseal its edges.

Attics, basements, crawlspaces, garages, details

Pay particular attention to anywhere where your home connects to the basement along the foundation. Run a bead of caulking or exterior grade spray foam in any gap along here. The same goes for where your home connects to the attic and to any garage or building details.

Repair any damaged sheathing pieces

Any piece of your home's exterior that's missing is going to let heat escape during the winter (or cool air during the summer). Fix it using the appropriate materials.

Weatherize doors with Q-lon and door sweeps

Weatherstripping around doors is done to decrease the wind sneaking in around the edges of doors.

Q-lon – Q-lon puts a soft gasket between the door and doorframe, cutting down on the air that can escape around the top and sides of a door. It costs about $25 per door.

Energy Federation installation directions

Door Sweeps – Door sweeps attach to the bottom of the door, cutting down on any heat that can escape under a door. A door sweep will cost between $5 - 9 per door. They are just screwed or nailed on so they lightly touch the threshold when the door is closed.

Energy Federation doorsweep
Boston Building Materials Co-op doorsweeps and Q-lon

Repointing the foundation

Holes in the foundation of your home will leak cold air into your home.

Hydraulic cement – buy a bucket of this. Don't do this if the foundation is just plain crumbling. That means you have to call in the professionals. However, if there are one or two foot-size gaps that need some help then you might be able to handle this. Keep whatever stones are supposed to be part of the foundation and use the hydraulic cement as mortar to fit them back in.

How to do it – Get someone who knows what they are doing to demonstrate this one. You want to it this one right.

Interior Sealing -

Install light switch and electric outlet sealer gaskets –

Every place where there is a light switch or electric outlet, there is an electrical box behind it inside your wall. If the wall is an exterior wall, then that box is taking up space where there should be insulation. Cold air can infiltrate your home in these spots. Sealer gaskets are foam pads that go under the light switch or outlet cover to decrease any cold air that could sneak through at this point. Just unscrew the cover and take it off. Press the precut foam pad into place, then screw cover back on. Easy as pie.

Cover dryer vent hoses with tinfoil insulation –

Dryer vent hoses are big hoses to the outside. They can funnel air into your home. Tape any gaps shut with aluminum tape. You can also wrap radiant insulation over your dryer vent hose and tape in place with aluminum tape.

Caulk around every penetration through the interior drywall –

Decrease air infiltration by closing off all interior holes, especially the ones that run from a heated air space to an area that shouldn't be heated. Run a bead a caulk around the point where these items connect

with the drywall. You can get paintable or transparent or white caulking. Smooth it into place. Really, closing every gap you can, no matter how small, will help your insulation work much better.

- Seal all holes that are vertical (that run from one floor to another, *especially* from the top floor into the attic and from the basement to the first floor). Heat loves to rise. Seal around electrical wires, plumbing, ventilation, etc. Start in basement and work your way methodically upward.
- Seal the pipes under the sinks. Seal around recessed lights, AC penetrations, pipes for exterior faucets, kitchen and bathroom fans.
- Seal the ductwork and plumbing chases and holes in mechanical room closets.
- Seal electrical switch, outlet, and circuit breaker boxes to drywall with caulk or foam.
- Seal light fixture boxes and medicine cabinets to drywall.
- Seal all duct boots to floor or drywall with caulk, foam, or mastic.
- Seal gaps around the whole house fan with spray foam and tape (though make sure the louvers function properly).

A good picture of what to seal
Another good picture of what to seal

Insulate attic hatch door and pull-down stairs -

If the attic or knee wall access is located in a conditioned space, insulate and seal it carefully. This is a huge hole in your insulation if you don't.
Directions how to do this

Mastic on duct work –

Some researchers say this is the single most important efficiency measure to do on many houses. You want the hot air intended to heat the living areas of your house to reach the living areas. Leaking duct work can cost hundreds of dollars and cause serious heath problems. Seal any joints in the ducts with mastic and then aluminum tape. Doing this sealing is especially important if the ducts are in the attic because hot air rises. Any heat that leaks in the attic will stay there and you will be paying a lot of money to heat your unlived-in attic.

Water heater -

Insulate the first 6 feet of the hot and cold water pipes connected to the water heater. Use foam pipe insulation. Measure and cut to size and tape in place with foil tape. (Insulating more than the first 6 feet is unnecessary according to recent research. Insulate both the hot water pipes coming out of the heater and the cold water returning, because the heater loses most of its heat through conduction down the first few feet of pipes.)
Set the water heater thermostat to 120°F.
Insulate the water heater tank with a fiberglass jacket if older than 10 years

Furnace pipes –

Insulate all of them. Not just the first 6 feet.

Put in CFLs

This is so important and easy. CFLs use 1/4th the amount of energy as incandescent bulbs and create the same amount of light. Switch in as many of them as the home-owner will allow. Try to do them in high-use areas.

Chimneys -

Seal between a masonry chimney and the attic framing using sheet metal or other.
Non-combustible sheet goods and high-temperature (450°F), fire-rated caulk. Do this only with an expert watching and helping. You don't want to make a mistake on this.

Installing a chimney flue balloon

This is done so the heat from your home doesn't fly up the chimney. Dampers are frequently not closed or don't close all the way. Even if they do, they are only metal, not insulated in any way. Generally each home

is figured to have about a 30 square inch hole in the side of it and the chimney flue is a lot of that. Manufacturers say the average household can save over $200 per year per chimney balloon in heating bills. Chimney balloons cost between $40-$80 dollars depending on the size of your fireplace.
Chimney balloon option A
Chimney balloon option B
How to install: Measure the length and depth of the inside of the flue, above the damper. Choose a spot with parallel walls. Order a Chimney Balloon up to 6 inches larger in either dimension. Put it in the flue where it's not going to get hit by the damper flap or other hardware. Inflate it. There is a bright label that hangs down into the fireplace so you'll remember it's there and deflate it before you next want to have a fire. Don't install this if there's any chance the furnace is being vented into the chimney because you don't want to block off the gas being vented out of the house. You could kill everyone in the house. Also don't do this if you don't have a chimney cap on your furnace because otherwise the rain that sneaks down your chimney will build up on the top of the balloon and cause water damage.

Insulating the band joist (or sill) in the basement -

A lot of heat is commonly lost in the area where your foundation meets the exterior walls of your home. This is called the band joist. If you have access to this area (if it isn't covered up by interior walls), then you have several options:
Caulk is best for sealing gaps or cracks that are 1/4 inch or less.
Use spray foam to fill gaps from 1/4 inch to about 3 inches.
Or for the most complete job, cut rigid insulation to fit in between each rafter so it covers the whole band joist from one rafter to the next. Press it into place and then use Great Stuff or other type of foam around the edges to seal it in and to cover any spots where the insulation doesn't quite fit. Move to the next two rafters and repeat, so you cover the whole band joist between each rafter all the way around the house.

Conserving water -

The average U.S. household uses 146,000 gallons of water per year, with up to 50% of water going towards landscaping during summer months. Water takes a lot of energy to clean and transport, and it costs the home-owner a lot. It is a *major* source of carbon emissions. As climate change increases the number and severity of droughts, and as the population of cities grows, conserving water is of critical importance.

Rain barrels and rain water gardens -

Installing a rain barrel is one way to reduce outdoor water use. You can collect the water when it rains and use it when you need it. Plants also grow better with rainwater than with artificially purified water. By capturing water on a 1500 square foot roof and using it to water their garden, a family could reduce their water bill by 50%, have healthier plants and save 43,000 gallons of water yearly.
Rainwater gardens are sunken gardens to catch runoff from a home or paved roads. Plants that like a lot of water are planted there. The plants thrive and the run off is used to grow plants rather than running into municipal sewer systems.

Install low-flow showerheads, sink aerators

This is really easy to do, just unscrew the showerhead and screw the new one on. If it leaks at all around the edges, unscrew it, wrap some plumber's tape around the screw threads and then screw it back on.
With the sink aerators, buy a dual threaded faucet aerator so that whether the threads on your faucet are on the inside or outside, the aerator will thread on correctly. Screw it on and it should work.

Toilet water savers –

You can buy a toilet tank bank in the toilet's water tank and save a gallon of water each time you flush. Or just fill a plastic soda bottle and put it in the toilet's water tank instead. Make sure it's out of the way of all the working parts of the toilet's tank. Each time you flush, the tank uses less water to fill up and thus saves water.

If any windows don't close properly (rattle, have any gaps at the "meeting rail," or are warped or bowed) then install 2 window locks per window so window is pulled better into alignment and actually closes. The research we've seen didn't show that v-seal weatherization between the window sashes and the frame helped much. It was better to invest in storm windows, caulk them well into place and to make sure the interior windows closed tightly.

Replace a forced hot air furnace's air filter once per season

Make sure all interior heating vents and radiators are opened and/or not obstructed.

Build a radiator reflector to between a radiator and an exterior wall so the heat bounces *into* the room rather than is absorbed in the wall.

Shading a home during the summer: (most important to do along the east and west of the home. This is where during the summer the sun comes in at a long oblique angle, heating up interior spaces.)

Create a trellis to shade windows with vines during the summer.

Plant shade trees

Fridge:

Plastic jars – If your freezer and/or fridge aren't normally 30% full of food, put plastic jars full of water in them to keep them this full. Then each time you open and close the doors, all the cold air inside isn't lost. Instead the water in the jars retains the cold.

Add insulation onto the fridge

Cut rigid insulation to fit tightly around the sides and top of a fridge. Don't cover the back where the coils are. Tape the insulation together, then cover with the contact paper of your choice to make it look pretty and keep the insulation from getting too battered. The extra insulation will dramatically increase your fridge's efficiency.

Appendix C

Special thanks to people who have been involved

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Appendix D

Helpful email, websites and contact list

Great weatherization websites to look at:

Energy Federation Inc. – great place to buy weatherization stuff

Resource Conservation Technology – great place to buy weatherization stuff

The Lawrence Livermore Lab's Home Energy Saver Calculator, helps you figure out cost and return on investment given your exact zipcode and house configuration

MCAN – Massachusetts Climate Action Network. Good people to network with.

A Do-It-Yourself Guide to Energy Star Home Sealing

A Second EnergyStar Guide to Air Sealing and Insulation

EnergyStar Guide to Duct Sealing

EPA Guide to Weatherizing

Measure How Energy Efficient Your Home Is

Federal Tax Credits for Energy Efficiency Measures

Massachusetts Department of Energy Resources: Home Heating Guide and Energy Efficiency for Your Home

NH Office of Energy and Planning: StayWarmNH

Vermont Sustainable Energy Resource Group: Energy Savings Tips

US Department of Energy's A Consumer Guide to Energy Efficiency and Renewable Energy

Alliance to Save Energy: How is Your Home's Physical Fitness?

American Council for an Energy Efficient Economy (ACEEE): Consumer Guide To Home Energy Savings

Energy STAR's Do It Yourself Guide to Air Sealing and Insulation

Energy STAR's Guide to Duct Sealing

Efficient Windows Collaborative

The Home Energy Diet by Paul Scheckel

Appendix E

Liability waiver

Note: This is our best and mildly researched guess at a liability waiver. We are certainly not lawyers. Please use it only as a guide but do your own research. Each state has laws specific to it concerning liability.

Please read the following Release carefully and sign. This Release is valid for the duration of the Weatherization Barn-raising held on _____.

I,_____, hereby on behalf of myself and my heirs, assignees, etc, release any and all claims against and hold harmless _____ (the owner[s] of the home being weatherized), their renters and the Home Energy Efficiency Team for any and all personal injury, property damage or any claims of whatever nature and however incurred arising from any participation by me in the activities of this Weatherization Barn-raising. I recognize that the Home Energy Efficiency Team is a nonprofit, non-commercial association of volunteers interested in promoting environmental benefits such as protecting against global warming. In consideration of Home Energy Efficiency Team's collaborating with me in such non-commercial work to promote environmental benefits, I am knowingly entering into this release and assuming the risks and liabilities associated with the "Weatherization Barn-Raising" and any related work.

_____ _____

Date Signature