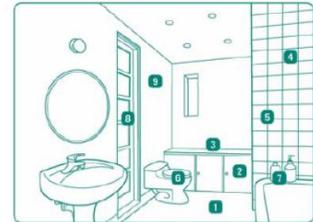




Remodeling does not always get its fair share of attention in the realm of green design and sustainability. However, remodels make up approximately 50% of the residential building industry, which accounts for nearly 40% of what goes into landfill sites. Home remodels should focus on longevity to prevent further construction, waste, and use of valuable resources. Green remodels can add health benefits to existing homes, as well as reduce costly maintenance and repairs.

Below are several components to consider when redesigning your kitchen, bathroom, or laundry room.

- **water conservation**
- **energy efficiency**
- **air quality**
- **durability**
- **low impact, high performance**



Water Conservation

- **Showerhead:** Install low flow shower head as some shower systems use more than 20 gallons of water per minute. High efficiency showerheads, which cost about \$15, can reduce water use by 50%.
- **Toilets:** Install smaller, dual-flush toilet (Water efficient toilets use 50% to 80% less water). Older toilets use as much as 5 gallons per flush (GPF), compared to new models' 1.6 GPF.
- **Faucets + Pipes:** Ensure that all leaks are fixed. As much as 60% of water is lost through leaky pipes. (A small leak from a faucet can waste 50 gallons of water a day and a leaky toilet can waste 260 gallons a day).
- **Pipes:** Look for copper instead of PVC piping for both the supply line and the drain.
- **Washers:** Always wash full loads of clothes and dishes. (Washing machines use 30 to 60 gallons of water for the wash cycle).

Energy Efficiency (see Energy Efficiency Brochure)

- **Lighting:** Replace incandescent with lower-energy-consuming fluorescent and halogen lighting.
- **Heating:** Install tankless water heater for the tub/shower to minimize energy use.
- **Appliances:** Install Energy Star appliances (refrigerators, washers, stoves, etc).

Air Quality (See Paints + Finishes Brochure)

- **Paint/ Finish:** Use low or no VOC paints and finishes.
- **Flooring:** Consider linoleum made from wood flour, resins and linseed oil or high performing bamboo or natural rubber.
- **Cabinets / Vanities:** Avoid materials like particle board that contain formaldehyde. Instead, seek out sustainably harvested woods or rapidly renewable materials like bamboo, wheat straw, or sunflower plants bound with resins free of VOCs.
- **Tile:** Consider recycled glass, ceramic or porcelain tiles for the walls.
- **Countertops:** Look for vetrazzo, made from recycled glass.
- **Ventilation:** Operable windows and good ventilation systems are a good way to keep fresh air circulating through the space. Without sufficient ventilation, the toxic substances in conventional caulking can have serious health impacts.
- **Insulation:** Replace old single-pane windows with two double-pane windows.
- **Cleaning Products:** Use more environmentally sound products (that do not emit VOCs) so that the benefits of green remodeling are not limited in terms of air quality.
- **Other Materials:** Consider rubber mats, plastic shower curtains and cosmetics which can eliminate the gains made in reducing VOCs. Evaluate your use and disposal of cleaning and body care products before you buy them.



High Efficiency, Low Impact

- Try to leave existing structural walls in place, and remove or replace other walls.
- Avoid adding energy-consuming features like heated floors while adding insulation and tightening the envelope of the exterior walls that you open up.

Infrastructure Needs

1. Determine your hot water needs.

In general, the hot water flow rate of a small tankless water heater can support a bathroom and a kitchen with a dishwasher. The key to selecting the proper model is knowing the flow rates of your fixtures, the coldest temperature of incoming water, and your usage patterns (how many faucets do you expect to be able to use at the same time?). Work with your plumber to choose a size that best fits your needs. You can also install more than one heater to heat water by zone.

2. Understand your dishwasher and clothes washer.

Your appliances may need hot water from your tankless heater or they may heat water internally.

3. Carefully plan the location of your water heater.

Tankless water heaters use an intense flame to heat water on demand. They require more air for combustion and vent more exhaust than conventional water heaters. This affects how and where you install them in two ways:

- Venting: For direct venting (through the wall), the vent termination must be at least three feet from any operable window. If you are venting through the roof, the length of the vent is determined by the size of the heater (the BTU output) and the number of elbows, or turns, in the vent. You may not be able to vent the heater through the roof if the vent run is long - for example, if the heater is in the basement of a three-story building.
- Combustion air: A gas-fired water heater (tankless or not) requires a source of oxygen for combustion. To avoid back-drafting that combustion air through another appliance's exhaust pipe, your water heater should be sealed combustion direct-vent.

4. Check your gas and water supplies.

Tankless water heaters can produce three to four times the BTUs a conventional heater produces. Your plumber must verify that your current gas line size, length and even gas meter can provide sufficient gas flow to the unit. Tankless heaters also require minimum water flows for activation; again, your plumber should verify that your supply meets the specifications.

5. Avoid long runs between the heater and the faucet.

Because tankless heaters generate hot water only when you turn on the hot water tap, it takes some time (a small delay) to heat cold water to the optimal temperature. Locating the heater far from the tap can result in a more noticeable "sandwich effect" when hot water is used intermittently. One way to overcome this problem is to use a recirculation pump that brings water from the farthest fixture in the plumbing run back to the tankless heater, but because these pumps use a lot of energy keeping water in the loop hot, it is better to preheat or buffer hot water.

For additional tips, see -- <http://www.greenhomeguide.com/index.php/knowhow/entry/700/C217>