Residential Energy Planning (CERE)

The severe human over population has caused a number of problems, including an increasing cost of energy. The following will offer some suggestions about how to reduce the consumption of electrical energy; thus, lowering the cost. Suggestions use the CERE concept; the three categories of Conservation, Efficiency, and Renewable Energy. While conservation items are primarily changes in behavior, the items for efficiency and renewable energy generation will require some level of investment. Although the investments result in benefits to both to one's ongoing costs and the environment, an initial outlay of some cash is required. The return on investment (ROI) is higher than most investments, while the payback period varies from months to a decade or more.

CONSERVATION

The following are some items that one can do to reduce the amount of energy needed to perform required activities:

1. Turn off lights when not in use, e.g., when leaving a room.
2. Turn off water when shaving, brushing teeth, or washing dishes.
3. Only wash full loads, e.g., washing machine, dishwasher.
4. Use the shortest cycle needed for cleaning clothes and dishes.
5. Air dry clothes instead of using a clothes dryer.
6. Adjust the thermostat to the highest acceptable temperature in the summer and the coolest acceptable temperature in the winter.
7. Take short showers, not baths.
8. Turn off televisions, radios, and other entertainment equipment when not in use.
9. Unplug or turn off the power strip for devices with phantom loads when not in use, e.g., when on vacation. Note, most equipment now contains electronics so have phantom loads, e.g., washing machines, TV's.
10. Close doors, windows, and registers in rooms that are not in active use.
11. Set the water heater thermostat to no higher than 125 ºF.
12. Repair or replace any faucet that drips water.

EFFICIENCY

1. Replace all incandescent or halogen lights bulbs with CFL (compact florescent) or LED lights.

2. Replace failed or very old appliances with “Energy Star” rated appliance.

3. Seal with caulk all air leaks around doors and windows.

4. Install “solar screens” on south facing windows.

5. Install “programmable” thermostats, so that the heating/cooling system is minimally activated when not needed, e.g., during the winter set for a lower temperature at night, then start to warm the rooms before getting up or when not at home during the day.

6. Put a timer on an electric water heater, so that the water heater does not run when not going to be used, e.g., when sleeping.

7. Install double-pane “low-e” windows, with vinyl or wood frames.

8. Install (more) insulation in walls, ceilings, under the roof and floor.

9. Insulate all exposed hot water piping.

10. Install an attic fan, usually thermostat controlled and may be solar powered, to circulate air in the summer.

11. Install insulating window coverings, e.g., honeycomb shades.

12. Install motion sensors or on/off switches on outdoor area lighting.

RENEWABLE ENERGY

Energy generation, unlike many of the efficiency items whose costs are only a few dollars and a little labor, generation of energy from renewable resources can require a significantly larger investment in materials and labor. One must carefully consider one's needs and location, then determine how much one should invest in renewable generation.

1. Solar lighting for outside areas.
2. Solar tubes or similar for adding daylight into rooms, especially areas with no or few windows.
3. Passive solar design for any additions or modifications, e.g., longer eaves over south facing windows.
4. Solar heating of domestic hot water. Use a switch or timer to re-circulate hot water before use, i.e., to not waste hot water, especially when there are long lines between the hot water tank and point of use.
5. Solar heating of spa, Jacuzzis, or pools.
6. Solar space heating, especially radiant floor heating.
7. Use of a geothermal heat pump.
8. Install photovoltaic (PV) modules. Systems can be modular, i.e., starting with one module and expanding. PV modules ideally should be mounted on dual-axis trackers; the least desirable location is the roof (the most desirable location for solar heating panels), because of angle of incidence and thermal efficiency issues.
9. Install other sources, e.g., wind or hydro, if an adequate resource is available. At least one year of wind velocity and water flow data is required to determine if the resource is adequate at the desired location.