# Chapter 11

# Amenities

| Recommendations | First Cost | Energy Use **Reduction** by Following Recommendations | Energy Use **Savings** by Following Recommendations |
|---|---|---|---|
| 1. Reduce impact of energy-**intensive** amenities — pools, spas or Jacuzzis, fireplaces, skylights, freezers. | R/N/S | 20-75% | — |
| 2. Use energy-**saving** amenities — porches, microwave ovens, outdoor cooking areas. | M/H | — | 5% |

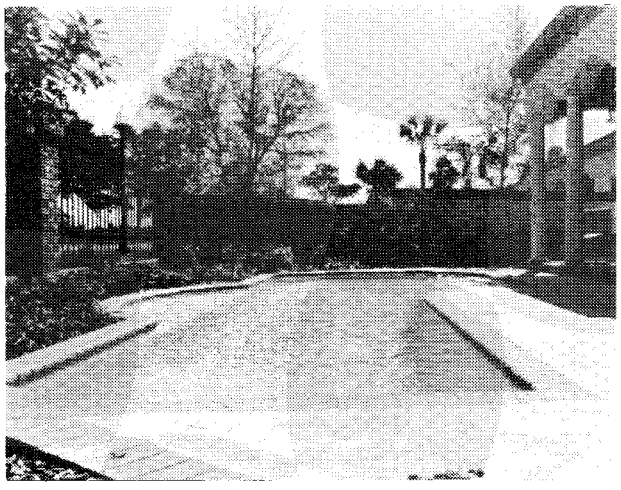
Cost Codes:
R = reduced
N = negligible
S = small (<$0.25/ft² of floor area)
M = medium (>$0.25 and <$1.00/ft² of floor area)
H = high (>$1.00/ft² of floor area)

# Marketing Energy-Efficient Amenities

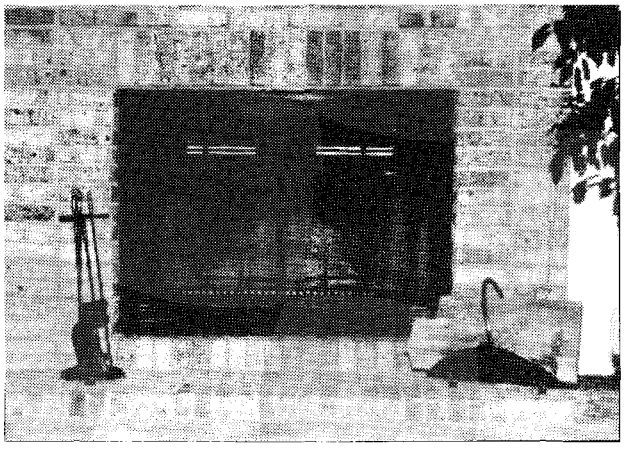
Amenities are those little (or big) extras you put into your homes even though they are not essential. They can be sold by describing them to clients, but they usually will be easier to sell when they can be seen, as in a model home. A home buyer typically will view an amenity either as something that looks nice but is useless — or as a delicious ice-cream topping. In the latter case, it may be the feature that makes a good house irresistible. Because amenities can be desirable to some but not all home buyers, it generally is best to market them as options.

Although energy savings rarely is the prime reason a home buyer chooses an amenity, both you and the buyer should be aware of its energy impact and most effective use. This chapter provides you with the energy information on amenities and ideas for marketing them.

Amenities that can significantly affect a home owner's energy bills are termed energy-intensive. If you have built and marketed an energy-efficient house, and the home buyer chooses to have skylights, swimming pool, Jacuzzi, freezer and/or fireplace, the utility bills are likely to be quite high. Without discouraging home buyers' desires, you should inform them of the energy costs of the amenities so they will not accuse you of building a home that consumes too much energy. This chapter contains important tips on how to minimize the impact of energy-intensive amenities, including advice to pass on to your clients.



**Correct pump choice and run times will reduce the energy consumption of swimming pools.**



**Fireplaces are attractive, but conditioned air escapes year round unless preventive measures are taken.**

The table below points out the typical energy impact of some of the more common amenities:

| Amenity | Energy Use | Monthly Cost |
|---|---|---|
| 2x4 ft clear skylight | 240 kWh/year * | $ 4[s] |
| 16 cu ft vertical freezer | 900 kWh/year | $ 6 |
| 20,000 gallon swimming pool | | |
| — pump | 3000 kWh/year | $20 |
| — heat | Fuel dependent | $100-200[w] |
| 500 gallon spa (pump & heat) | 3000 kWh/year | $20 |
| Fireplace | 450 kWh/year** | $ 3 |

* due to increased air conditioning load

** due to increased infiltration of air, whether in use or not

[s] summer months only

[w] when heat is required: typically late fall, early spring, and winter months

Fortunately, if strategies described later in this chapter are followed, the energy costs of these amenities can be reduced by 30-40% on average. It should not be difficult to promote sealing the chimney penetrations or using tight-fitting glass doors on fireplaces. Promote an efficient freezer the same way you promote any other efficient appliance (see Chapter 10).

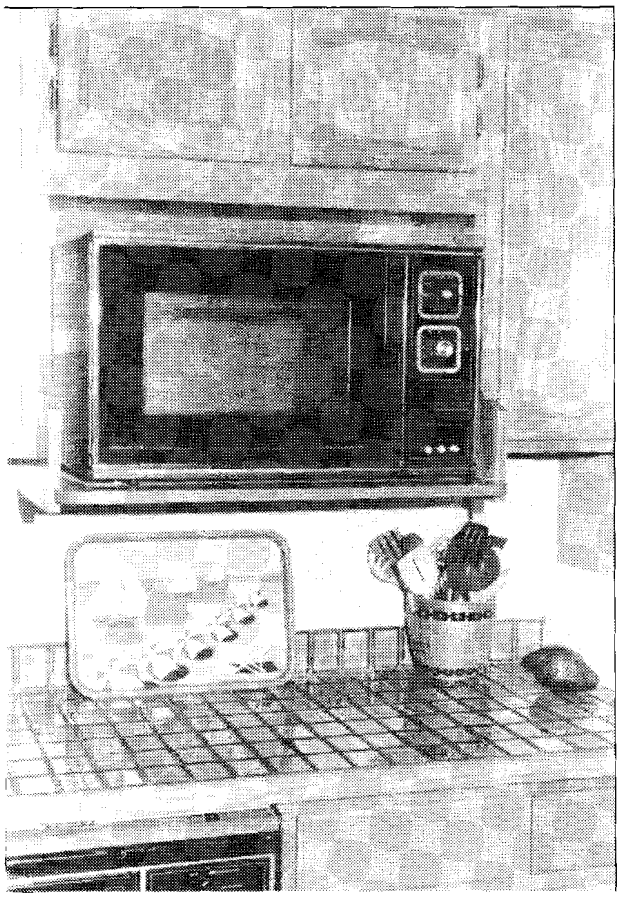
Promote the advantages of shaded skylights, as opposed to clear unshaded ones, because they provide better-quality light and greater comfort for occupants, as well as lower air conditioning bills. Recommend proper running times, efficient pumps and efficient heaters for pools and spas or Jacuzzis. The cost savings can be outstanding, as shown in the table below:

| Savings in pool pumping costs by: | | Savings from base ($240/year) |
|---|---|---|
| Running pump only for the required time | 60% | $140 |
| Efficient pump choice | 40% | $100 |
| Combination of pump choice and running time | 75% | $180 |

Some amenities can be promoted as energy-saving. Covered porches, microwave ovens, ceiling fans and outdoor cooking areas can reduce air conditioning costs.

Promote covered porches as an excellent energy-saving amenity that provides both shade for the house and an outdoor living area. The shade helps reduce cooling bills. And, if occupants spend time on the porch rather than inside the house, the load on the air conditioner is reduced even more.

Having the microwave unit built in can assure a convenient location and reduce counter clutter. Inform potential home buyers that microwave cooking is five times more efficient than with a conventional oven. With less wasted heat, the air conditioner will not have to work as hard. The kitchen will be more comfortable, a benefit every food preparer will appreciate. Add a ceiling fan in the kitchen to further that comfort. As you know, a kitchen, like a bath, often is the room that makes people buy the house.



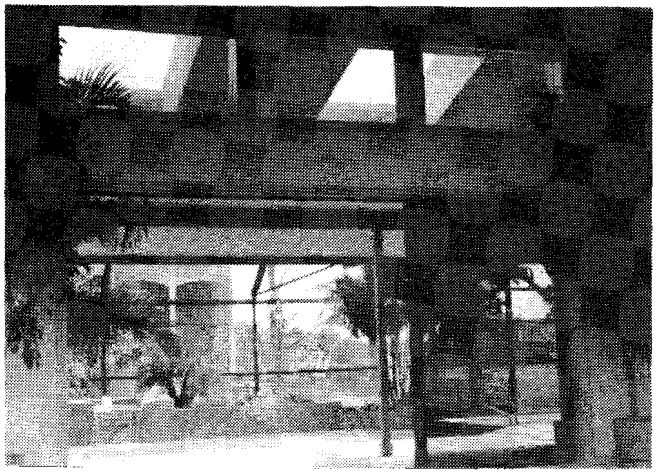
**Provide a shelf for a microwave oven.**

An alternative for hot-food preparation in summer is the outdoor barbecue, a popular amenity. Point out the greater convenience of a built-in outdoor grill. For upscale home buyers, suggest an entire outdoor food preparation area — sink, grill and storage space for dishes and utensils — that invites cooking out more often. The obvious energy saving is in not having to cool the heat created by cooking indoors. If you provide a shady location and an exhaust fan, the barbecuer may discover a new world of cooking comfort!

## 1. Energy-intensive amenities

As noted earlier, energy-intensive amenities are those which can significantly affect the home owner's utility bills. Here is how to reduce their impact through proper selection and application.

**Skylights.** The amount of heat entering through six skylights (8 square feet each) at noon in July is enough to cause a one-ton air conditioner to run the entire hour. Due to the high angle of the summer sun, skylights let in two to four times as much heat as do vertical windows. Stopping this heat is



**Skylights should be located on a porch rather than in the conditioned space.**

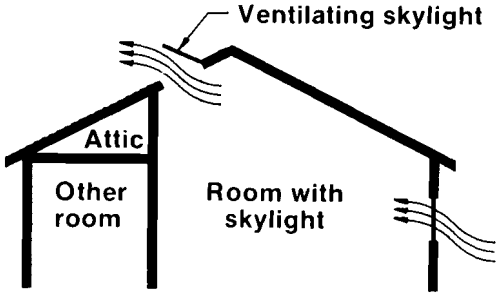
important. First, consider if the skylight can be replaced by vertical glass or eliminated. Next, consider reducing the size of the skylight, particularly if its benefit is limited because of location. A bathroom, for example, is most frequently used in early morning and before bedtime when the daylight may not even be available. Finally, provide skylight shade in the form of:

- interior shades, blinds or panels (available from skylight manufacturers and dealers) that can be controlled manually or by mechanical remote control, or
- skylight glazing with a low shading coefficient (see Chapter 7 for selection criteria).

A shaded skylight, in comparison to an unshaded one, can provide a more uniform source of light and reduce discomfort from the sun's rays and heat intrusion.

Consider including a skylight on a porch adjacent to a window (see photo) instead of in the house. The skylight will be attractive and will help light the home, but far less heat will enter the house. Furthermore, if a leak ever develops the porch will get wet, not the inside of the house.

If you are going to locate a skylight in a high ceiling or in a bathroom without a window, choose a ventilating skylight (one that can open) to take away the hot air that rises to ceiling level. Although rods are frequently used to open skylights, some manufacturers offer remote control devices which make it easier for the home owner. There is one instance where a ventilating skylight may create cross-ventilation in a




**Skylight openings can aid cross-ventilation.**

room otherwise without it: that is, when the skylight is on a roof section facing a different direction than the room window.

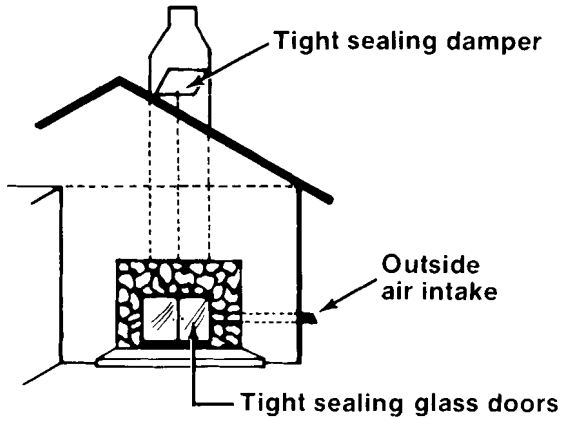
If you use plastic glazed skylights, make sure they have been treated to withstand ultraviolet light.

Follow manufacturer's installation instructions and seal the unit thoroughly to prevent water or air leakage. The skylight should be as air-tight as possible: Industry standards are 0.5 cfm/ft of skylight perimeter, but be sure to choose skylights that *far exceed* this industry standard. High-quality roof work around the skylight is important.

**Fireplaces.** Most fireplaces are poor heat providers, wasting more heat than they give to a house. Air is drawn from other rooms and used for combustion of the fire. The rising combustion gases serve as an air pump, drawing additional conditioned air into the fireplace and up the chimney. It then escapes out the chimney, causing unconditioned outside air to be sucked into the home. Due to the extra ceiling penetrations and the chimney or flue itself (most

dampers do not seal tightly and double-walled flues have an open vent space), fireplaces are a major, year-round source of air infiltration.

If wood heating is desired, an air-tight wood stove is a far better heater than a conventional fireplace. Also better than a conventional fireplace is a heat-recirculating fireplace which draws room air in through a heat exchanger and returns it to the room.




**An energy-efficient fireplace has tight-sealing components.**

Many new factory-built fireplaces have borrowed technology from the woodstove industry and are more efficient than masonry units. The fire will last longer and less wood will be needed. Most factory-built units also cost less than custom masonry units.

If a conventional masonry or factory-built fireplace is used, provide tight-fitting, high-temperature glass doors for the fireplace and a combustion air inlet from the outdoors. That way, warm inside air won't be lost, and the glass will re-radiate the fire's heat and provide warmth to the room occupants. Use non-flammable spray foam and caulk to seal around the chimney penetration at the ceiling and around air intake areas. To minimize flue cavity air leakage: (a) use a triple-walled flue and a firestop insulated with unfaced mineral insulation, or (b), if a double-walled flue is used for a fireplace cavity in contact with an exposed inside wall, separate the fireplace and flue from the conditioned space by an insulated partition wall which is sealed against air infiltration. Choose dampers doors that seal tightly. Seal joints between the masonry and other house materials when the fireplace is on an outside wall.

**Freezers.** If you are offering a freezer as an option, select an energy-efficient one as listed in the AHAM directory (see Chapter 10). It has to keep food frozen all day, and therefore consumes a lot of electricity. The extra cost of an efficient unit usually can be regained in just one year's time. It is best to place freezers where they will stay cool, away from windows, ovens, refrigerators and other sources of heat. If installed in an air-conditioned space, the freezer should have a duct from the air conditioner located near it to improve efficiency — but tell the home owner the duct grill should be closed in winter.

**Swimming Pool Pumping.** Pool pumps frequently are oversized, not as efficient as possible, and set to run for too long a period of time. You, your pool contractor, and the home buyer can take a few simple, inexpensive steps to reduce pumping costs by as much as 75% (around $180 per year for the average pool owner).

**Monthly Circulating Pump Operating Costs***

| Pump Size | Daily Running Time | | | |
|---|---|---|---|---|
| | 2 Hrs. | 4 Hrs. | 8 Hrs. | 24 Hrs. |
| 1/2 hp | $3.50 | $7.00 | $14.05 | $42.15 |
| 3/4 hp | $4.80 | $9.60 | $19.20 | $57.60 |
| 1 hp | $5.50 | $11.00 | $22.05 | $66.15 |
| 1 1/2 hp | $8.10 | $16.15 | $32.35 | $97.05 |
| 2 hp | $9.50 | $19.00 | $38.05 | $114.15 |

*** Based on electrical rates of $.08 per kWh.**

For the quietest and most efficient operation, have your pool contractor install a small pump, large pipes and large filter, following guidelines below.

**Recommended Pump, Filter and Pipe Sizes for Pools**

| Pool Size in Gallons | Pump Size | Flow Rates (Gal. per Min.) | | Filter Area | | | Pipe Size |
|---|---|---|---|---|---|---|---|
| | | Medium Head | High Head | Sand | DE | Cartridge | |
| Less than 12,000 | 1/3 hp | 35 | 30 | 2.6 | 26 | 67 | 1½-inch |
| 12,000-20,000 | 1/2 hp | 60 | 50 | 2.6-4.3 | 26-43 | 67-111 | 2-inch |
| 20,000-30,000 | 3/4 hp | 80 | 65 | 43.-6.4 | 43-64 | 111-167 | 2½-inch |
| 30,000-50,000 | 1 hp | 95 | 80 | 6.4-10.6 | 64-106 | 167-278 | 3-inch |

The piping sizes refer to lines that contain total pump flow, such as the lines from the main drain and skimmer to the pump and from the pump to the point where three or four smaller lines distribute water back to the pool. The sizing of small pipe lines should be based on flow as shown below.

**Recommended Maximum Design Flow Rates for Various Pipe Sizes**

| Pipe Size | Maximum Flow |
|---|---|
| 1-inch | 9 gpm |
| 1 ¼-inch | 18 gpm |
| 1 ½-inch | 28 gpm |
| 2-inch | 55 gpm |
| 2 ½-inch | 85 gpm |
| 3-inch | 140 gpm |

To further reduce resistance to efficient flow, your contractor should use 45-degree elbows and sweep 90-degree elbows or flexible pipe instead of sharp 90-degree elbows.

The total cost for the energy-efficient improvements at the time of pool construction is less than $100, and the monthly savings can far exceed the additional monthly payment.

Circulation of pool water is important for mixing of water and chemicals and keeping the pool free of debris (by drawing water out through the skimmer, floor vacuum and the filter). Pool pumps typically have been set to circulate the water for 6 to 12 hours a day. However, a Florida Atlantic University study indicates that most people are happy with the cleanliness of their pool when the pump run time is reduced to 3 or 4 hours a day or less.

Reduced circulation time really does not increase the chances of having a dirty pool. Consider the facts:

- As long as the water is circulating when chemicals are added, the water and chemicals will be mixed.
- Algae growth is not reduced by high circulation rates. The right balance of chemicals in the water and brushing the walls of the pool are the only solutions.
- Debris that enters a pool either sinks to the bottom and has to be removed by a vacuum, or floats and is readily removed by the skimmer.
- After less than an hour, pumping power is usually wasted in recirculating clean, debris-free water.

It is best to inform your pool contractor (who may not be as knowledgeable as you now are) and home buyer of the above facts. Have the pump time-clock set to run two times a day for an hour and a half, or three times a day for an hour. The frequent running will keep the surface free of floating debris. Additionally, it is recommended that pool owners run the pump when the utility is not trying to meet peak power demand; electricity costs will stay lower if utilities do not have to build more power plants to meet increased demand. Suggested pool pump running times are noted below. Pass these on to your home buyer.

**Suggested Pool Timeclock Set Points**

| Circulation | Interval | On | Off |
|---|---|---|---|
| One cycle per day | Cycle 1 | 11 am | 2 pm |
| Two cycles per day | Cycle 1 | 9 am | 10:30 am |
| | Cycle 2 | 9 pm | 10:30 pm |
| Three cycles per day | Cycle 1 | 9 am | 10 am |
| | Cycle 2 | 1 pm | 2 pm |
| | Cycle 3 | 9 pm | 10 pm |

**Pool Heating.** Pool heating can be costly to the home buyer, both in the initial investment and in future energy costs.

The first step in heating a pool economically is to use a transparent pool cover. The cover blocks the loss of heat by evaporation but still permits the sun to heat the water. Heating a pool without a cover has been compared to heating a house without a roof. A pool cover alone can add two months to the swimming season.

Pool water is an ideal application for solar heating. When solar collectors are used to heat water to high temperatures (150°-200°F), their efficiency is reduced because of the heat loss to the outdoor air. However, swimming pools need to be heated only to 75°F to 90°F. The main disadvantages of solar collectors are an initial cost of around $2500 and the large roof area they require. The following table lists approximate area requirements for most solar collectors, based on the ratio of collector area to pool surface area for south-facing collectors. North-facing collectors will not receive direct sun in winter and are not recommended.

**Ratio Values (Collector Area/Pool Surface Area) for Florida Pools**

| Covered, unscreened pool | | | | |
|---|---|---|---|---|
| | Months of swimming | | | |
| Region | 9 | 10 | 11 | 12 |
| N. Florida | .47 | .68 | .80 | .94 |
| C. Florida | .37 | .55 | .65 | .75 |
| S. Florida | .25 | .40 | .50 | .60 |
| **Covered, screened pool*** | | | | |
| | Months of swimming | | | |
| Region | 9 | 10 | 11 | 12 |
| N. Florida | .80 | 1.0 | 1.10 | 1.25 |
| C. Florida | .70 | .85 | .95 | 1.05 |
| S. Florida | .55 | .68 | .75 | .83 |

* Screens block some of the sun's direct rays.

The heat output of a solar pool collector can be calculated as follows:

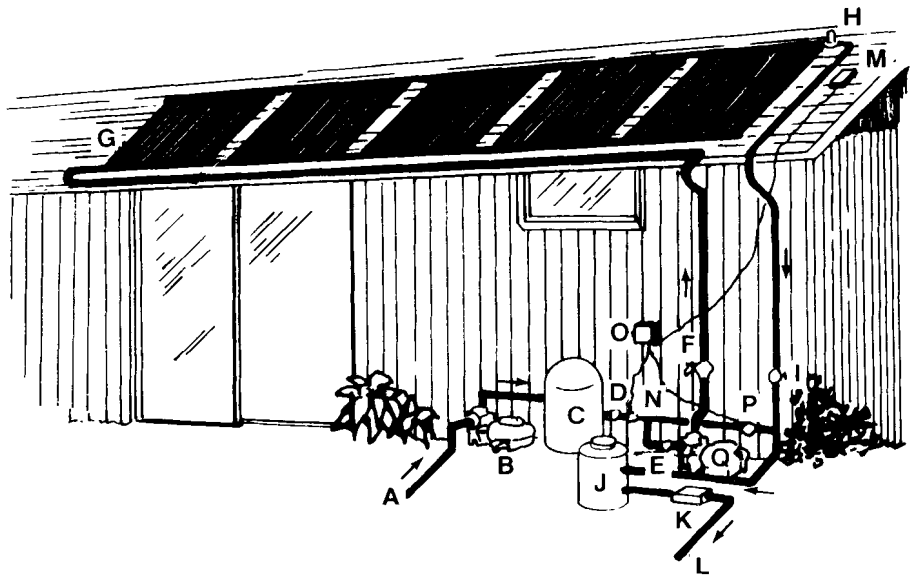
Energy (in Btu) = Collector rating (Btu/ft$^2$) x collector area (ft$^2$) x number of days system is utilized per year (see table in the next column).

As an example, a 30- by 15-foot screened, covered pool in Orlando that is to be swimmable 12 months of the year has an area ratio of 1.05. The required collector area is 1.05 x 30 ft x 15 ft = 472.5 sq. ft. The number of days of heater operation is 210. The annual energy output of a collector that delivers 850 Btu/sq. ft is 850 x 472.5 x 210 = 84 million Btu (84 MMBtu).

**Approximate Days of Heater Operation**

| | Months of swimming | | | |
|---|---|---|---|---|
| Region | 9 | 10 | 11 | 12 |
| N. Florida | 150 | 180 | 210 | 240 |
| C. Florida | 120 | 150 | 180 | 210 |
| S. Florida | 90 | 120 | 150 | 180 |

The energy cost of other pool heating options are listed on the next page. An efficiency of 60% is assumed for gas and oil furnaces. Actual fuel purchase price may be different in your area. The yearly cost of operating these heaters will be the cost in $/MMBtu times the number of Btu required. For the Orlando pool described above, the energy required is 84 MMBtu. The current yearly cost for propane is $22.81/MMBtu x 84 MMBtu = $1916. Depending on the pool and heat choice, the initial cost of the solar pool heater can be made up in savings in one to six years.




A. Pool water in
B. Pump
C. Filter
D. Check valve
E. Gate valve 1
F. Drain valve
G. Solar collectors
H. Vacuum breaker & auto relief
I. Gate valve 2
J. Fossil fuel heater (if existing)
K. Chlorinator (if existing)
L. Warm water returns to pool
M. Sensor 1
N. Sensor 2
O. Automatic control box
P. Electric or vacuum valve (collector bypass)
Q. Booster pump (if needed)

**Solar swimming pool heating system components.**

**Costs of Different Fuels**

| Fuel | Purchase price | Cost* in $/MMBtu | Cost* in $/therm+ |
|---|---|---|---|
| Natural gas | $0.60/ therm | $ 9.96 | $0.99 |
| Propane & LPG | $1.25/gal | $22.81 | $2.28 |
| Electric heat pump (COP=3) | $0.08/kWh | $ 7.81 | $0.78 |
| Fuel oil | $1.15/gal | $13.69 | $1.37 |

* These costs reflect the efficiencies of gas and oil heaters.

+1 therm = 100,000 Btu.

**Spas and Jacuzzis.** Spa (hot-tub) temperatures are 95°-110°F. Most spas have covers which help retain the heat. However, using the electric heater supplied with most spas may cost $10-$30 a month, depending on heater size and temperature set point. There are two methods of reducing this operating cost:

- Use a less costly form of heat.
- Reduce the spa water temperature when not in use.

If a spa or Jacuzzi will be used regularly, the sun is the least expensive source for heating it. If it will be used no more often than twice a month, a conventional heating source (propane, electric) will be more cost effective because of the higher first cost of solar systems. For a home buyer who wants hot spa water available regardless of weather, it is best to have a backup to the solar system (this is not necessary with large swimming pools).

The performances of solar pool collectors are rated in a free Florida Solar Energy Center publication, "Thermal Performance Rating (Pools) GP-16."

## 2. Energy-saving amenities

**Porches.** Covered screened porches are an option that many home buyers desire. For their maximum enjoyment, consider incorporating these features:

- a vented radiant barrier roof above the porch
- a ceiling fan
- cross-ventilation of the porch
- access from more than one room
- easy access from the kitchen.

Also, depending on site and floor plan, a porch can be an attractive sales feature when it is on the side of a house. A screened back porch and open-air front porch can provide shade on those two facades. A second-floor porch or balcony offers a different view; this can help sell the two-story home. A porch on the east side provides not only shade to the house but an enjoyable shady haven from west sun on hot afternoons and early evenings.

**A screened porch with hinged doors to the house and ceiling fans can be a comfortable, energy-saving amenity for home buyers.**

**Built-in Microwave Ovens.** As noted in the marketing section, typical cooking appliances are inefficient. Conventional ovens (gas or electric) are only 10% efficient, which means that 10% of the energy goes for heating the food and 90% is wasted. Even worse, that wasted heat must be removed by the air conditioner. Microwave ovens are 50% efficient. Stoves are less efficient than microwaves. Cooking one potato in a pressure cooker on a gas stove will cost 1.5 times as much as cooking it in a microwave. However, cooking large quantities — eight potatoes for example — may be less expensive in an oven or pressure cooker. The stove's wasted heat must be removed either by an exhaust fan or the air conditioner.

Although a microwave unit is more energy-efficient than stoves and conventional ovens, its heat must still be vented. Follow the manufacturer's instructions in regard to air space required for ventilation of the unit. If you are providing a built-in microwave oven, select one designed for that purpose: It will have the exhaust on the

front of the unit. Locate an oven where people can conveniently move food in and out of it. Choose a height between waist and shoulder level; no one wants to lift heavy, hot food out of an oven higher than that. An alternative some home buyers may prefer is an above-counter shelf that can accept a microwave unit they already own or may purchase.

**Built-in Outdoor Cook Areas.** Providing an outdoor grill, generally on a porch, has become a popular offering of custom home builders. A vent should be used to exhaust the smoke if charcoal or gas is burned. Consider expanding the cooking area to include a sink and cabinet space for washing and storing of the cooking utensils.

**An outdoor food preparation center can reduce kitchen heat.**

**Other Energy-Saving Features.** As mentioned in Chapter 9, ceiling fans and whole house fans can be energy savers. Consider installing a ceiling fan in every room. Include the kitchen, since it is frequently the hottest room of the house and needs air circulation the most. Also, use timer switches for a whole-house fan and for bath exhaust fans with automatic vent dampers.

Other concepts described in this book can be offered as energy-saving upgrades. A landscaping upgrade (see Chapter 3) could include three to ten shade trees. A window treatment option (see Chapter 7) could provide vertical blinds on all windows, and canvas awnings on east and west windows. Show these features in a model home or have photographic displays in your sales office.

## Summary

The amenities you add to a home can help you sell it quickly. Most of these extra features should be offered as options. Many can either use or save energy, and deserve your special attention. Steps should be taken to minimize the energy consumption or penalty of such amenities as skylights, swimming pools, spas, freezers and fireplaces. Encouragement should be given to the use of porches, fans, microwave ovens and outdoor cooking areas — all of which help reduce the energy demand of the home.

## For further information

1. "Residential Skylight Primer," Ross McCluney, *Sunspeak*, May 1984.

2. "Movable Insulation for Skylights," Larry Medinger, *Fine Home Building*, Aug./Sept. 1985.

3. "Solar Control Strategies for Skylights," Magie Riechers, *The Construction Specifier*, July 1984.

4. "Skylight Problem Solvers," Judy Tretheway, *WES*, April 1984.

5. "Easy-to-Install Fireplaces," *Practical Homeowner*, September 1987.

6. "Efficient Design," Roger Messenger and Shirley Hayes, *Pool & Spa News*, January 26, 1987.

7. "Swimming Pool Circulation System Energy Efficiency Study," R.A. Messenger and S.J. Hayes, Final Report, Florida Atlantic University, Department of Electrical and Computer Engineering, Center for Energy Conservation, 1984.

8. "Solar Heating of Swimming Pools: A question and answer primer," Charles J. Cromer, Florida Solar Energy Center, FSEC-EN-6.

9. "Yet Another Way to Cook a Potato," *Energy Auditor & Retrofitter*, Sept./Oct. 1985.