## Fuel Cost Comparison for Space Heating

**Example:** oil at $1.25 per gallon is equivalent to electric resistance heating at just under 5¢ per KWh.

| | | | | | | |
|---|---|---|---|---|---|---|
| WOOD ($/DRY CORD) | 60 | 100 | 140 | 180 | | |
| GAS ($/THERM) | .20 | .40 | .60 | .80 | 1.00 | 1.20 |
| FUEL OIL ($/GALLON) | 1.00 | 1.40 | 1.80 | 2.20 | | |
| HEAT PUMP IN 4000 DD CLIMATE ($/KWH) | .04 | .06 | .08 | .10 | .12 | .14 |
| HEAT PUMP IN 8000 DD CLIMATE ($/KWH) | .04 | .06 | .08 | .10 | .12 | .14 |
| ELECTRIC RESISTANCE ($/KWH) | .04 | .06 | .08 | .10 | .12 | .14 |
| COST OF DELIVERED HEAT ($/MMBTU) | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
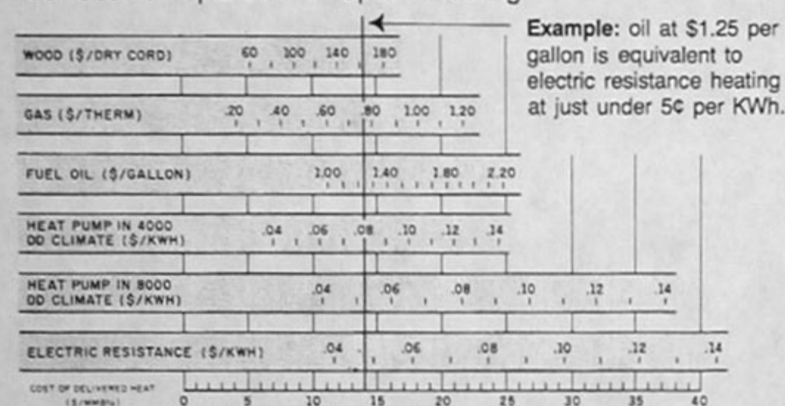
**Figure 2.** Locate the cost of fuel along the appropriate bar and read vertically to compare with other fuels. Assumed seasonal efficiencies are wood: 0.5; gas: 0.6; oil: 0.65; heat pump: 1.7 in 4000 degree days; 1.1 in 8000 degree days; electric resistance: 1.0.

standard ceiling grid.

Generally, the surface-mounted panels have a higher temperature and a quicker response time, making them especially suitable for supplemental heating of spaces used intermittently such as bathrooms. The behind-the-drywall or embedded systems have lower temperatures (fewer watts per square foot), and take a little longer to heat up, though still no more than a typical convective system.

## Pros and cons

All radiant systems hold the advantage of being unobtrusive—and in many cases altogether invisible. They waste no valuable floor space—a factor increasingly important as living spaces get smaller. Also, they are quiet and clean and require little or no maintenance.

Another advantage they share is that they save energy compared with comparable convective systems, that is, compared against one using the same fuel. The energy savings result primarily from the lower air temperatures in radiantly heated rooms. Also there are no duct or pipe losses, which can be substantial in air and hydronic systems.

The savings depend largely on how far you can set back the thermostat. One manufacturer cited 5°F as a conservative figure. Another said 3-5°F. In cold climates, this can result in a 20- to 25-percent savings. One engineer familiar with these systems says a 10- to 15-percent savings is more typical. Further savings can result if the system is zoned, as they typically are. Rooms not being used are set back or shut off altogether.

Another frequently cited advantage is that radiant heating feels special—like being warmed by the sun. This is hard to verify. What seems clear is that well-insulated, tight homes, tend to feel warmer and more comfortable because they are free of drafts and frigid inside surfaces.

The primary disadvantage of electric systems is that they use electricity—in many places the most expensive fuel—even if they use a little less of it. Also, radiant heating often requires extra insulation. For example, if a ceiling system is used between floors, the ceiling must be insulated so the radiant element heats the rooms below, not the joist space above. Similarly, a slab that is radiantly heated should be insulated underneath, whereas simple perimeter insulation could suffice otherwise.

## Costs

Heating systems have first costs, maintenance costs, and fuel costs. As for first