fuel use in Btu's is often normalized for building area and heating degree days. Auxiliary heat requirements from 1 to 3 Btu/(°F-day ft²) are now being reported from top-performing monitored houses. To interpret these figures, the assumptions, measurement techniques, and conditions (internal gains, thermostat set points) must be known. The building's shape and size also affect this measure, since these parameters affect the ratio of floor area to the surface area of the building's shell. If height is held constant, larger buildings will tend to perform better than smaller ones—at least on a square-foot basis.

Incremental costs

Since costs ultimately decide the fate of most building projects, economic analyses should be done carefully. Few people buy a pair of shoes strictly on the basis of cost efficiency (dollars spent vs. steps taken). Appearance, comfort, and fit are just as important. In the housing market, people are purchasing homes and living space, not just heating systems. The gross cost of adding glass and mass should not be counted as the incremental cost of solar if the homeowner enjoys the added views, light, and masonry surfaces. If a greenhouse is used as living space, the added space should be factored into any cost or performance per-square-foot calculations.

In passive and superinsulated homes, the real cost of the "solar" or "conservation" package is the incremental cost added to the project to attain a certain energy savings. For a multi-use conservation or solar feature, the calculation of an incremental cost must take into account the costs of the building components replaced by energy-related components. For example, a masonry storage wall may replace a conventional wood-frame/drywall partition or it may replace a wall with elegant (expensive) hardwood detailing. Similarly, the real cost of adding an airlock entry might equal the simple cost of adding a trimmed doorway and weatherstripped door—if the owners wanted a mudroom anyway. Choosing a reference cost for a wall that is never built is somewhat arbitrary. If the homeowner desired a brick accent wall anyway, the incremental cost of adding thermal storage might be nothing, involving merely putting the wall in the right place.

As a general rule, any passive solar feature will appear more cost-effective if it replaces an essential building component and adds an architectural amenity to the home. At the least, it should not represent an architectural cost, that is, an eyesore.

Payback analysis

Partly as a response to energy-saving marketing, clients often focus on the payback of a solar project to the exclusion of more traditional concerns. The comfort, enjoyment, and added space that is provided may equal or surpass that of the den they added or bathroom they remodeled last year at a similar cost. More importantly, the economic value added to the house is roughly equal to the dollars spent on the project—whether solar or not. In a very real sense, the payback is immediate and recoverable upon the sale of the house. Looked at this way, the energy savings that accrue, whether they are the result of reduced fuel bills or a freely-heated space, could be considered frosting on the cake—and in this case, a gift that keeps on giving.

Conclusion

Whether you're a designer, buyer, or seller of solar homes, it behooves you to understand the numbers you use. For marketing purposes, a projection of fuel costs addresses the energy issue squarely. It's a rare consumer who is not painfully aware of the cost of keeping warm. Some builders have gone so far as to guarantee an upper limit on fuel bills, agreeing to kick in any overage. Lending institutions are beginning to mix a home-energy-use factor into their mortgage brews, thereby qualifying lower income borrowers for energy-efficient homes. For the designer, thermal and solar performance numbers are indispensible tools for achieving desirable and predictable results—to know what's achievable and what makes sense economically. And finally, for the consumer, when all is said and done—education is the best defense, or as we say in commerce, "caveat emptor."