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## **Design, build and sell better housing in order to conserve energy costs - by Thomas House**

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The end result of lower energy costs and higher efficiency is energy conservation, right? Actually, no. Just the opposite, in fact.

Almost 200 years ago, economist and mathematician William Stanley Jevons formulated the counterfactual that these conditions, at that time, consume far more energy than the dwindling coal supply facing industrial England.

“It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth.” - William Stanley Jevons

Today - as architects, developers, and engineers are well aware - energy demands are very high despite gigantic advances in both energy sources and technological efficiency.

Refrigerators are bigger, ranges have six (or eight) burners and two ovens, and electrical outlets have multiple-receptacle power strips and surge protectors scattered about.

Your kitchen counter? Yeah. Full of electrically-powered appliances and gadgets. (And now that gas prices are low, SUV's are back, too.)

Architects and engineers can't do much about SUV's, but we are on near-intimate terms with energy usage and conservation.

To be effective, any reduction in energy usage has to be – from the owner's and renter's point of view – passive and invisible. There has to be zero impact of lifestyle or freedom of choice.

And here's the good news: the United States has stabilized its rate of consumption, which would please William Jevons – though it nevertheless rises annually at about 1% per year.

So developers: choose your architects and engineers wisely, though most are now onto this game, thanks in no small measure to LEED initiatives, which instill profound sensitivity into our technical consciences and provide career-advancing certifications for practitioners.

Though the utopian ideal, a completely off-the-grid, widespread projects with zero carbon footprint, is still very far off, here are some of the things to look for in our work.

And no, we aren't going to say turn down the thermostat, get an electric car (which still uses fossil fuels), or buy a 400-foot house.

We are saying to design, build, and sell better housing.

The first principle is basic, and not exactly a secret: the building envelope is sealed every which way - including cladding, sheathing, insulation, and fenestration. It is possible to produce a unit where the doors are hard to close when the windows are shut. Such construction will use less heat or air conditioning, and the occupant is unlikely to ever know. (They're going to dial the heat up to 76? The a/c down to 68? Not likely!)

If you don't do anything else, do this, because all by itself, this basic principle is entirely passive and

has no impact on the occupants' lives (other than keeping their utility bills low). Developers: be sure everyone in your chain is appropriately credentialed - architect, engineers, and contractors.

Since not all square feet are equal, creatively and efficiently designed space can reduce the overall footprint of a project (or of units within a project) - as the Jevons effect can result in enlarging space rather than keeping the benefits in the bank. Look for the balance point is tricky business indeed, but design creativity is an asset that can accrue financially – and passively.

Other low-impact tricks of the trade are to situate fenestration to maximum advantage (in New England, south-facing windows can result solar gain).

The next-level design interventions are resource conservation. Again, our opinion is that the design and engineering create the conditions for success.

Plumbing (and landscaping) for water conservation must provide for improvements in efficiency with, ideally, no discernible impact on owner/occupant living standards. Low flush toilets, flow restrictions, and landscape design need to comfortably and seamlessly integrate into the buyer's life expectations - and meet (or exceed) their aesthetic expectations.

Grid considerations are more difficult to control – and at the point of collection may have more aesthetic impact. For example, solar panels (or shingles) or a Tesla battery, are notoriously hard to conceal. But as a built in, they are still passive. And as a means of reducing peak consumption from the grid, the cost reduction are a feature.

We consider that efficiency has benefits in reducing both resource consumption and owner/occupier costs.

And we are convinced that the way to achieve these ends is not to call for increased stoicism, but to consciously (and conscientiously) design, engineer, and develop better facilities that produce the desired results in desirable projects.

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