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Energy Analysis 2009

Island Housing Trust







Keeping Vineyard Houses Affordable

• Historically, housing prices on Martha's Vineyard have been 96% higher than the Massachusetts state average

• The cost of energy has increased 5%-10% in the past several years

• As a result, the cost of owning and operating a home on the island is significantly higher, increasing the burden for residents, even after the initial hurdle of ownership is cleared.

• New building materials, practices, and technology make it possible to reduce annual energy costs for Island residents, making housing more affordable





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Homes of the Island Housing Trust

There are several types of IHT houses...



- The first type are houses built with typical building materials and practices that use only fossil fuels.
- Examples: 150 State Road and Takemmey Path in Vineyard Haven



Homes of the Island Housing Trust

The second type of houses are built with high-performance windows, insulation and air sealing techniques to reduce energy energy consumption when heating and cooling the house. They still use fossil fuels, but less. Some of the houses at Jenney Way in

Edgartown fall into this category.





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Homes of the Island Housing Trust



- The third type of houses built by the Island Housing Trust include solar electric generation.
 - Some of the houses at Jenney Way in Edgartown have solar panels that produce electricity that offsets some of the cost of electricity. Propane is still used for heating these homes.
 - All of the houses at 250 State Road in West Tisbury have solar panels that are estimated to produce 70-85% of all the energy consumed annually.



In the quest for permanent affordability, it is imperative to look at the cost to homeowners of each of these three types of houses.

To analyze the average annual costs, we retrieved IHT residents' energy bills from NSTAR, Island Propane, and Vineyard Propane & Oil.

In addition to these, we looked into the costs of other energy production sources, such as wood use, pellet stove use, etc.

The data we found is presented in the next few slides





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Annual Total Energy Costs Per House Type 8 ÷ \$2,500 \$2,340 \$2,145 \$2,080 \$2,000 \$1,900 \$1,860 Typical \$1,700 \$1,560 Jenney Non-\$1,500 \$1,390 Solar \$1,240 Jenney Solar \$1,000 \$850 \$760 250 State Rd Solar \$530 \$500 \$0 1 Bedroom 2 Bedroom 3 Bedroom

All costs are calculated based on a house built to the same specifications as a typical house, an energy efficient house without solar panels, or an energy efficient house built with solar panels

+ Home Energy Ratings System

The HERS Index is a scoring system in which a home built to comply with the 2006 International Energy Conservation Code scores a HERS Index of 100, while a net zero energy home scores a HERS Index of 0.

This system was developed by The Residential Energy Services Network's (RESNET) to ensure the success of the building energy performance certification industry, set the standards of quality, and increase the opportunity for ownership of high performance buildings.

Information taken from the Energy Star website

Home Energy Ratings System

Typical House: 67-100

Jenney Way Non Solar: 54

Jenney Way Solar: 42

250 State Road Solar: 20

The declining HERS index reflects the integration of highperformance materials and techniques into our buildings, and the addition of on-site renewable energy generation.

Information taken from the Energy Star website

+ Possible Sources of Error

Methods, Data, Time

- Small sample size
 - As more houses are built to the same (or better) specifications as the houses at Jenney Way in Edgartown and 250 State Road in West Tisbury, more data will become available, and will decrease the chances of an outlier skewing the results.
- Projected numbers
 - Some of the numbers for Jenney Way, and all of the numbers for 250 State Road electric use and production are projected.

Time

- The price of a gallon of propane shifted significantly. Prices ranged from \$2.80-\$4.00 for the time period studied. Projected costs/ savings in the future uses today's price, but may change.
- The construction process introduces hundreds of gallons of water into a building; there is water in in nearly everything. As a result, many of the houses at Jenney Way are using de-humidifiers to eliminate moisture left behind from construction and electric use is artificially high.

+ Possible Sources of Error (cont.) Estimation, Data, Behavior

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Estimated numbers

Some houses used metered gas, which gives an exact monthly reading of gas consumed. Other households received deliveries of gas on an as-needed basis. By dividing the amount delivered by the number of months since the last delivery, an approximate use-permonth was established, but is not an exact monthly measure.

Data

Certain households had noticeable "blips" in the data for certain months due to vacation or similar, so the data for those houses was thrown out for the relevant month(s). As an already small sample size shrank, the data for those months became less reliable.

Behavior

The most important source of error is occupant behavior. Each homeowner uses different amounts of energy due to personal preference, affecting the data.

Annual Energy Consumption Summary



Jenney Solar

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250 State Road

37,000 BTU/ft²/year

10,000 BTU/ft²/year

The houses at 250 State Road are expected to use 82% less energy than the houses we were building just a few years ago.

Conclusion

In terms of long-term affordability, there is a clear indication that energy efficiency saves home owners money. Aside from the environmental benefits, "green building" helps maintain affordable housing on an island that desperately needs it.

A continuation of this study, coupled with routine collection of new data, guaranteed by the signing of release forms for all new buyers, will generate more accurate data over time.



Island Housing Trust



+ The End