

VALUING HIGH-PERFORMANCE HOUSING:

Use the arrow keys on your keyboard to scroll through this 14-page document.



**A cost/benefit analysis of green and solar housing
at MOSIER CREEK HOMES, Mosier, Oregon**

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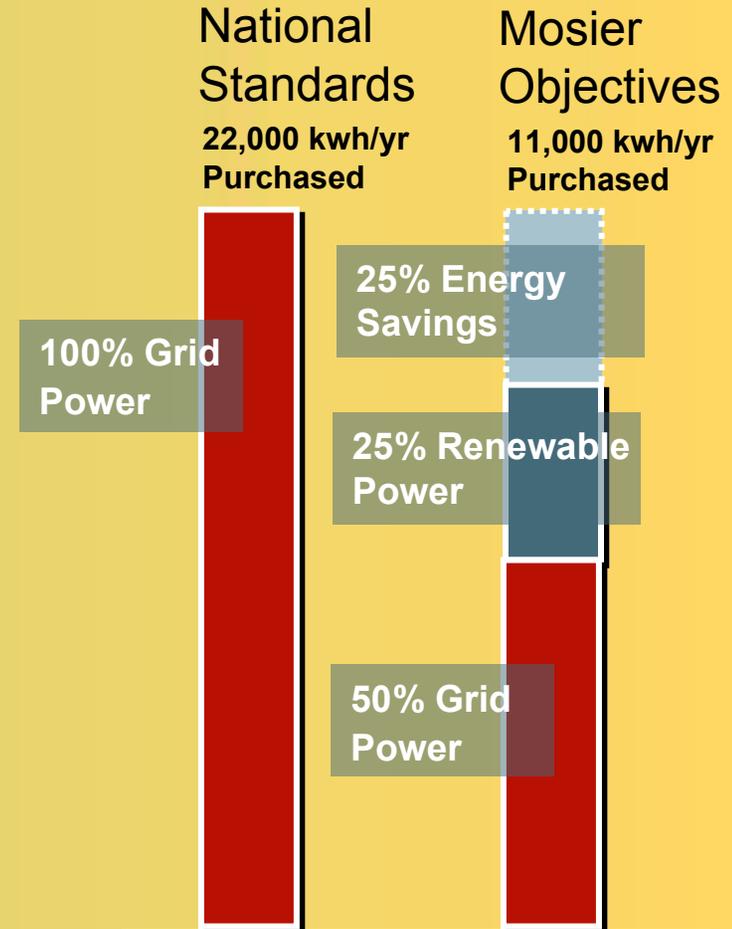
What is High Performance Housing?

- It's energy efficient
- It incorporates onsite renewable power



Mosier Creek Design Objectives

- The only source of energy in Mosier is electricity from the grid
- The majority of US grid power is coal fired or nuclear generated
- We targeted a 50% reduction in grid power through two methods.
- Achieve energy savings through conservation
- Generate renewable power onsite

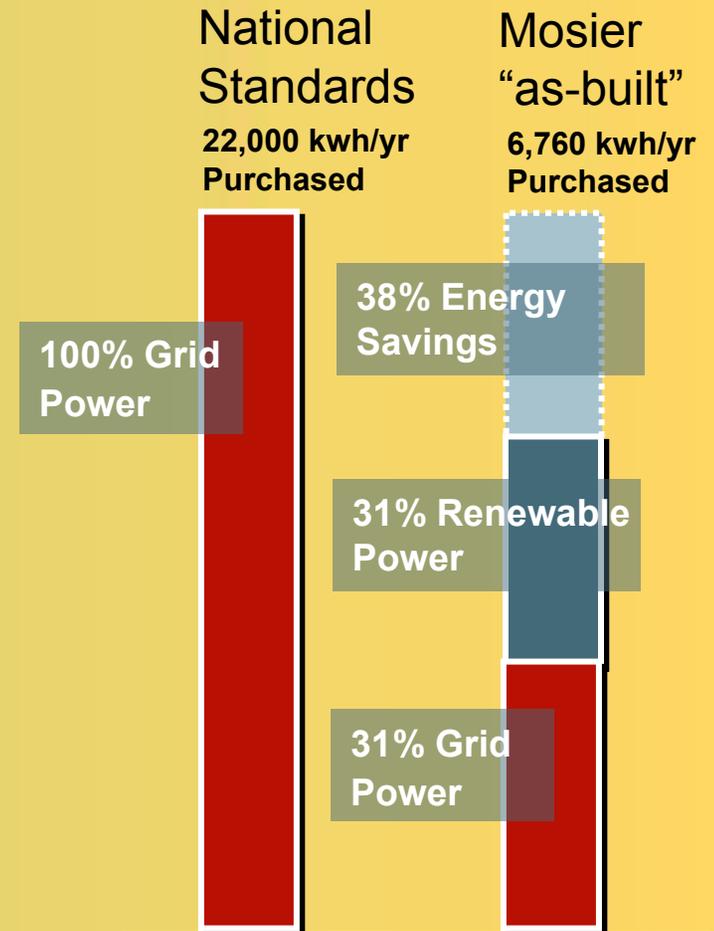


Mosier Creek _ From Design Objectives to “As-built” Performance



Mosier Creek “as-built” Performance

- Mosier Creek was completed this past June, 2007
- Its metered draw from the grid is 69% less than the National Standard and 38% less than our target.
- The cost to achieve this was \$4,900 per residence.
- This cost represents slightly more than 1% of the \$365,000 sale price for a 1,600 sq. ft. – 2 and 3 bedroom / 2 ½ bath town home.



How was this accomplished?

1. Build green :

By building to the LEED-H criteria we use 38% less energy to operate than the same home built to the UBC and National Energy Code standard.

2. Generate power:

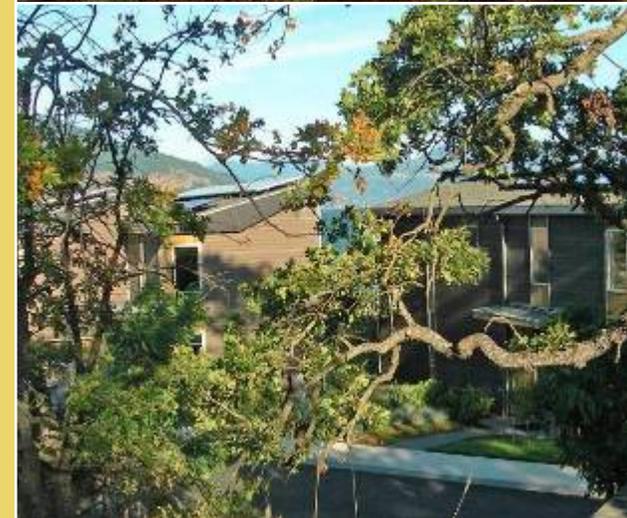
Solar thermal (water) and photovoltaic (electric) arrays on each roof: generate 50% of each (LEED-H) unit's power needs.



What are the costs to build LEED?

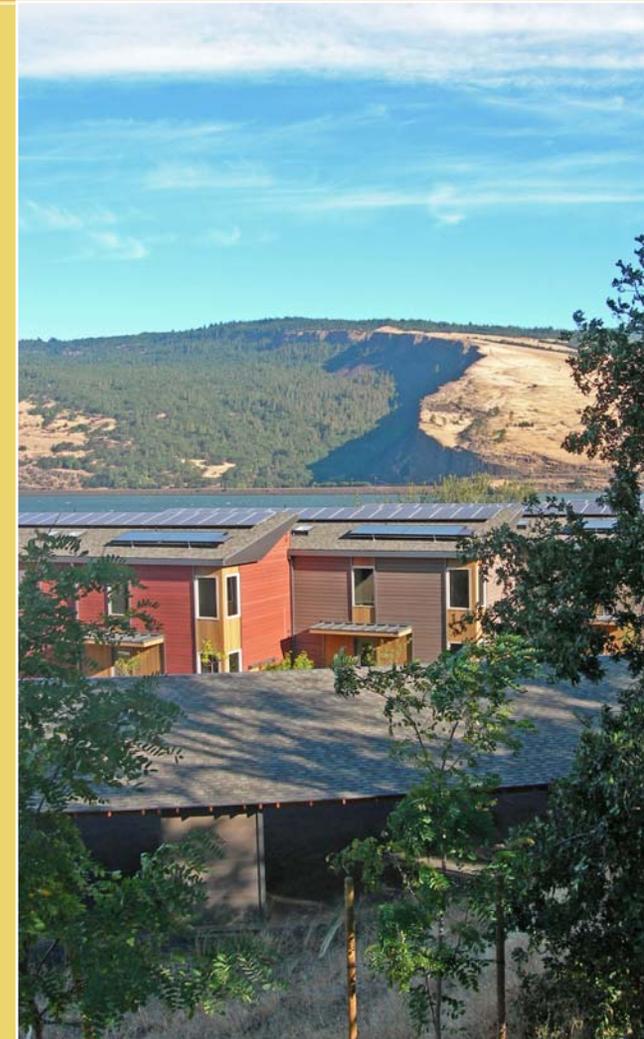
\$4,300/unit

Materials : local and non-toxic	\$250/unit
Construction Waste : Recycle & Separate: Wood / Sheetrock / Metals / Debris	\$500/unit
Framing : change in technique	\$250/unit
Insulation : more of it - correctly applied	\$650/unit
HVAC and Energy Star Equipment	\$1080/unit
HVAC : duct seal and testing	\$450/unit
Landscape : sub-grade irrigation	\$450/unit
LEED-H : Facilitator/Inspector/Certification	\$670/unit



What does \$4,300 for LEED buy the Home Owner?

- **Operational Savings**
\$101/mos. or \$1,214/yr.
- **Certification of a healthy living environment**
Built w/out toxic materials and having good ventilation without threat of mold
- **Customer Pride:**
Every prospective buyer learns how and why purchasing at Mosier Creek decreases the output of CO₂ emissions by *150 tons/home over a 30 year period. Over that same period the reduction in CO₂ by their 34 home community is *4,300 tons.
*(as determined by USGBC KWH formula).



What does it cost to add solar?

PUGET SOUND Business Journal

Business Leaders Get It.

Tax breaks make solar homes more affordable

By Thomas Greer
Staff Writer

Seattle developer Peter Erickson, known for creative projects ranging from beachfront to big cities to historic restoration, is breaking new ground with another reason: a cluster of solar-powered, low-maintenance and state-of-the-art homes that are both high-end and high-efficient.

With backing from private investors and a plan structured in maximum state and federal tax incentives, Erickson has created homes that are both high-end and high-efficient.

Larry Brown of Seattle chose one for his vacation home, to retire on his boat on the Columbia River environment that he loves while keeping the current and future energy costs down.

"I know it's expensive, I can possibly keep for the rest of my life and not be as concerned about the cost of heating and cooling it," he said. "The sun's out going to go away, and it's going to get more to use it."

Of the Mosier Creek project's 16 units, the 12 three-bedroom townhomes will cost roughly \$250,000, and the 12 smaller flats will be about \$130,000. Brown said his own company recently with other investments in the area east of Portland, which is known for its wind, solar and natural beauty.

Erickson describes the project as "a terrific high-performance housing." For the price, a home gets a home that meets 30 percent more energy than the national standard and achieves 20 percent to 30 percent of the energy from solar power.

Located in both energy-efficient homes and solar power has grown rapidly in the Pacific Northwest in recent years. Since 2009, more than 4,000 new homes have been certified as "Solar Green" by the Mosier Facilities Association of King & Snohomish Counties, a local certification for energy-efficient and sustainably friendly dwellings.

And more businesses and residents are getting interested in solar energy and installing it on roofs.

In total, Mosier Creek will cost about \$10 million, Erickson says. The Lotus Fund Inc., is funded by a California hedge fund to be the project. Building the homes involved several extra costs. Mosier Creek is part of a pilot program



"The sun's not going to go away, and it's not going to cost more to use it."

Larry Brown, purchaser, Mosier Creek townhomes

that gives residences LEED certification, a designation from the U.S. Green Building Council that stands for Leadership in Energy and Environmental Design. The LEED program encourages high performance, sustainable buildings, and the certification has in the past been applied mostly to commercial or government projects.

Making the solar LEED-certified townhomes cost about 2 percent to 3 percent, Erickson said. The solar equipment cost about \$20,000 per home, Erickson said — \$22,000 for the photovoltaic system that produces electricity and about \$1,000 for a water water heater.

Making the homes green cost for Erickson, his investors and the homeowners involved adding up an estimated \$10 million investment. For the first time, Erickson's company will own the solar panels and operate as a small utility of its own, taking into account tax breaks that are available for commercial utilities but not for homeowners. Using those incentives, he'll be able to sell power to the homeowners for about 20 percent less

Mosier Creek townhomes on the Columbia River are set to be built by Seattle developer at financing 30 percent less energy than the national standard and saving at least 20 percent of their energy from sustainably powered solar power.

for solar, he said.

SOLAR: Seattle developer's 'high-performance housing'

SOLAR POWERED



from about \$1 per kilowatt-hour in 2009 to roughly 23 cents per kilowatt-hour today, according to the National Renewable Energy Laboratory, one of the best and Department of Energy. But without subsidies, 23 cents is still a pretty steep price with a national average of 6 cents.

A combination of federal state and federal tax incentives is helping costs drop significantly. Solar consultant Doug Kasper, who worked with Erickson on the project, figured that over the course of 20 years, a typical flat panel photovoltaic system, Mosier Creek's owner would save roughly 11 cents per kilowatt-hour. Even if the system had only 20 years, the owner would still roughly 15 cents per kilowatt-hour, said

Bobylev, principal of Glendale, Ore.-based Creative Solar Consulting LLC.

Inspired by the incentives and customer interest about the environment and energy independence, solar energy has grown at a blistering pace — so fast, in fact, that there's a shortage of silicon, the material infused from which solar panels are made. Erickson was shocked to discover that prices increased by 7 percent from November 2009 to January 2010. Finally, he knew he had to act and bought all the

silicon panels he needed.

All 22 townhomes in Mosier Creek are green, and it has photovoltaic systems installed. Erickson expects to break the homes for about \$10 million, and to finish the 12 smaller flats by early 2011.

Erickson said he has learned a lot from Mosier Creek. Because of the potential for significant energy savings, he would like to see LEED certification requirements become part of the building code.

"There are so many things wrong with the way we build things, it's a shame to be the last," he said. "Someone will build a house that is LEED certified."

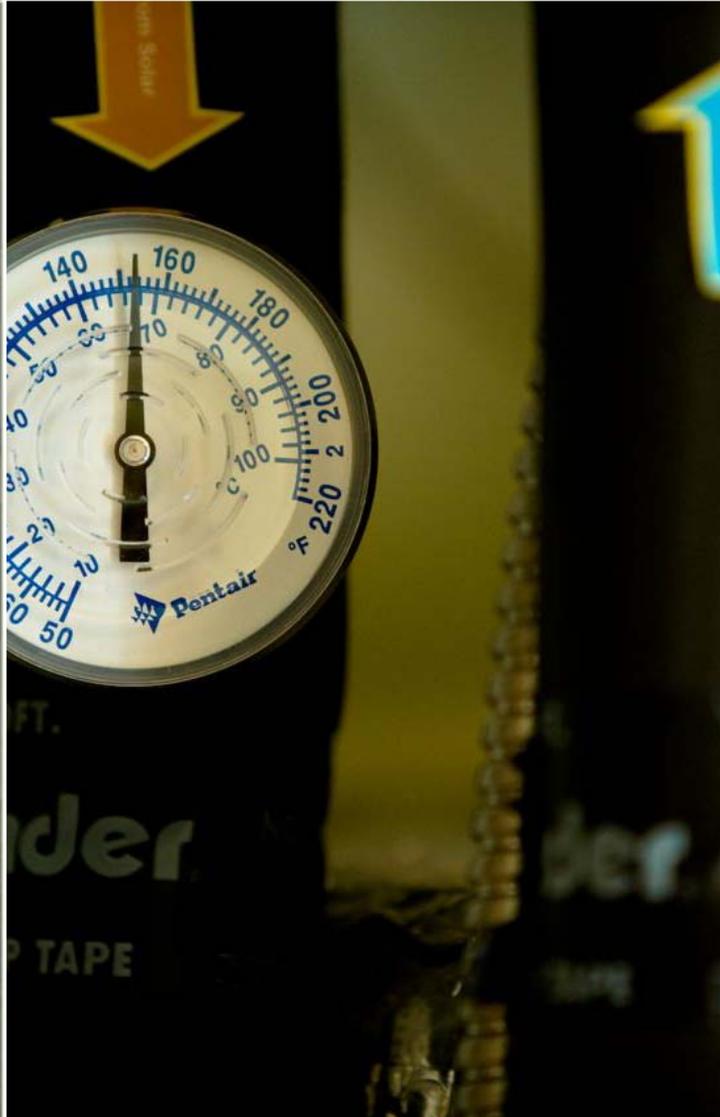
Photo courtesy of Mosier Creek

than they'd use to buy power from their utility. At the end of that time, however, you will have the option to buy the solar energy systems themselves at a significantly reduced rate.

Costs of solar power have dropped dramatically over the past two decades,

- **Added Cost to Sale Price : \$600/unit**
For the soft costs/unit for solar engineer, legal and accounting, etc.
- **Installed Cost : \$28,000/unit.**
For solar equipment with a 30 year life generating 50% of each home's energy needs.
- **Less Energy Tax Credits of \$21,000**
By having the development LLC (a for-profit business) own and operate the solar equipment for 5 years, it was able to sell state and federal tax credits to high income investors (banks, etc).
- **Re-Sale: \$7,000 :**
At the end of 5 years, the LLC will offer the Home Owners the ability to purchase the solar equipment for approximately \$7,000.

What's the benefit of solar to the home owner?



- **Savings:**
For the first 5 years their solar power is sold to them by the LLC at the Grid Price less 15%.
- **Lifetime Control of Operating Costs**
At the end of 5 years the Home Owner can buy the solar equipment with a 25 yr. remaining life and with a 20 year warranty for approx. \$7,000.
- **No risk:**
If the Home Owner decides that buying half their energy needs for the next 25 years isn't worth \$7,000 (which amortizes in 8 years from savings based on 2007 rates) he or she can elect to pay the grid price.

Mosier Creek : Energy Comparison Summary

Assume two identical 1,600 sq.ft / 2 storey town homes.

“Baseline” unit is built per UBC and National Energy Code	kwh/yr	Energy Consumption	Annual Per kwh \$0.104
Power From Grid	22,000	100%	\$2,288

Mosier Creek: LEED-H and Solar	kwh/yr	Energy Consumption	Annual Per kwh \$0.104
LEED-H Savings Over UBC National Standard	(8,440)	(38%)	(\$878)
Power from Grid	6,670	50%	\$703
Power from Solar Hot Water (Free to owner)	2,600	19%	0%
Power from Solar Electric (15% off grid price)	4,200	31%	\$371
Mosier Creek Home Owner Energy/Expense	13,560	100%	\$1,074

Monthly Savings \$101

Why LEED-H and Solar as the developer?

- **Small incremental cost:**

The cost/unit (assuming 25 units or more) of \$4,300 for LEED and \$600 for solar is minor in the overall budget.

- **Marketing Power.**

It buys an unequaled competitive edge. Given comparable units--one LEED and Solar / the other built to the UBC and National Energy Code , the green developer can sell a product that is...

- 47% less costly to operate ...
- Certified healthy ...
- Has Customer Pride ... Regardless of ones perspective on global warming the environmental moral dynamic has sold a lot of Prius automobiles.

- **No Risk :**

If a Home Owner doesn't want to buy their solar equipment at the end of 5 years, the developer joins the ranks of other profitable PUDs and sells power to the grid.





www.mosiercreek.com