

## Energy Efficiency

The stated goal of the Verde Village project is to provide the most energy efficient homes constructed in Oregon. By combining proper solar orientation, an improved thermal envelope, solar heating, night flush cooling, high efficiency HVAC systems, heat recovery utilization, and efficient appliances, all Verde Village homes will be designed to perform 50% better than a typical code compliant building. In addition, through the installation of a photovoltaic system, the homes will be capable of generating as much energy as they use on an annual basis, making them “Net Zero Energy.” The design of high performing homes starts with proper solar orientation and the best thermal envelope. Insulation levels will approach double the code minimum. Good construction materials and techniques will reduce infiltration. Windows will be high performing and also better than code requirements. These are solar homes and winter heating systems will be augmented by the sun. The windows will be designed to provide good “daylighting” of all the spaces, reducing the use of electric lights. Lights that are constructed in the homes will be compact fluorescent. The homes will be night flush cooled in the summer months to minimize the use of air conditioning (AC) and, therefore, further reduce the electrical loads. Appliances will be energy efficient and will include extracting washers. These washers will save on both electricity and water use.

### Energy Efficient Features

- Solar Orientation/Solar Space Heating: Homes are designed such that the long elevation is no more than 15 degrees from due south to provide solar heating that meets approximately 20% of each homes heating needs
- Solar Hot Water: Each home will have a solar hot water heating system that will provide approximately 50% of the energy needed to heat water. .
- Flooring: Each home will have a slab on grade foundation with radiant heating. The concrete will store the heat from the sun to heat the homes. The concrete will be stained or, as an alternate, can have a tile finish
- High Efficiency Heating: The homes will utilize a Ground Coupled Heat Pump that are tied into a system of deep wells to provide winter heating, hot water heating and some summer cooling. This is currently the most energy efficient system available
- Efficient Wall Construction: The homes will be designed with double stud walls over FASWALL<sup>®</sup> or DURISOL<sup>®</sup>. They will be sided with cement board siding or as an alternate stucco over a stone veneer wainscoting at the first floor. The walls will have an R-value of approximately 30.
- The homes will meet or exceed Earth Advantage requirements.
- Structural Insulated Panels System (SIPS) Roofs: The roofs will be stainless steel standing seam roofing over SIPS panels that will provide a very energy efficient and durable roof that supports rain water collection.
- Heat Recovery Ventilation: A heat recovery ventilation system will be installed to provide fresh air without compromising energy efficiency
- Lighting: All lighting will use either fluorescent or compact fluorescent lamps except where dimmable lighting is desired.
- Energy Efficient Appliances: Energy efficient appliances will be incorporated throughout the project. This includes efficient dishwashers and front loading, water extracting clothes washing machines.
- Photovoltaic (PV) Electric Systems: Each unit will be provided with a PV system that is either 3 kilowatts in size or will provide at least 50% of the electric use of the unit, whichever

is less. All units will have the infrastructure to provide enough PV balance such that the panels provide enough electricity to balance the homes energy use on an annual basis (Net Zero Energy).

- Night Flush Cooling: The homes will be designed such that they can be cooled at night to eliminate the need for air conditioning through the use of mass (concrete floor), improved thermal envelope and operable windows.

#### Water Efficiency Features

- Water efficient toilets: 1.1 gpf toilets will be installed resulting in a 30% water savings per flush over a typical toilet.
- Water efficient showerheads and faucets: 1.5 gpm fixtures will be installed resulting in a 25% water savings over typical showers and faucets.
- Rainwater capture: Cistern(s) will be incorporated into the project that will capture rainwater for domestic use including flushing toilets and irrigation. The homes will be plumbed such that when codes and technology allow this water can be used for domestic potable water use.
- Water and energy efficient washers: Water and energy efficient dishwashers and front loading, extracting clothes washing machines are standard appliances.

#### Other Features

- Tile Bathrooms: Bathrooms will be designed using tile
- FSC certified wood: All wood used in the homes will be sustainably harvested. Plywood and composite wood will be formaldehyde free.
- Paints, sealants, adhesives: Paints, sealants and adhesives will be used that have no or very low levels of Volatile Organic Compounds (VOC)