



Oregon Department of Energy

Building Codes and

High Performance Homes

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October 17, 2007

Building Codes

- ◆ Developed in the mid 1970s
- ◆ Types:
 - Residential
 - Commercial (non-residential)



- ◆ Regulated measures
(building envelope, mechanical, and lighting)
- ◆ Does not regulate measures such as appliances, plug loads, elevators, escalators, and industrial/processing equipment loads

Building Codes

Residential:

- ◆ Existing code meets or exceeds 2006 IECC
- ◆ Proposal to reduce energy use by 15 % over present energy code (Needs to pass public hearing)
- ◆ New Code effective April 1, 2008

Commercial (non-residential):

- ◆ About 10% better than ASHRAE Standard 90.1-1999 (last USDOE certified code)
- ◆ Equivalent to ASHRAE 90.1-2004 for purposes of LEED certification in Oregon

New Oregon Residential Building Code

Primary New Requirements:

- ◆ Energy Star windows
- ◆ High efficiency lighting (CFL)
- ◆ R30 floor

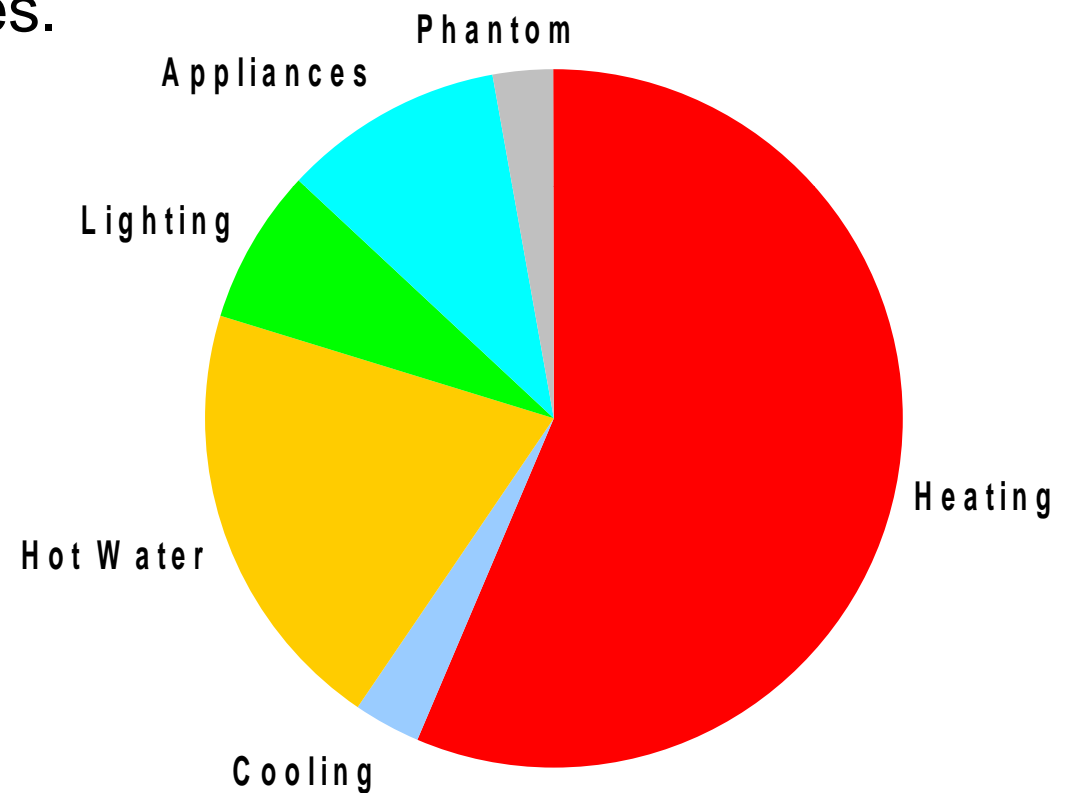


Plus One More Energy Feature:

- ◆ Performance tested duct sealing
- ◆ High efficiency heating system
- ◆ Renewables

Homes are Energy Contracts

- ◆ Homes we build today are long term contracts for energy and resources.
- ◆ Dollars spent on high performance homes keep our energy dollars working locally.



High Performance Homes

Features:

- ◆ Indoor Air Quality
- ◆ Daylighting
- ◆ Low Energy Use
- ◆ Sustainable Materials
- ◆ Community and Livability Focus



Oregon High Performance Home

Shell:

- ◆ Roughly 30% more efficient than 2008 energy code

Renewables / Net Zero:

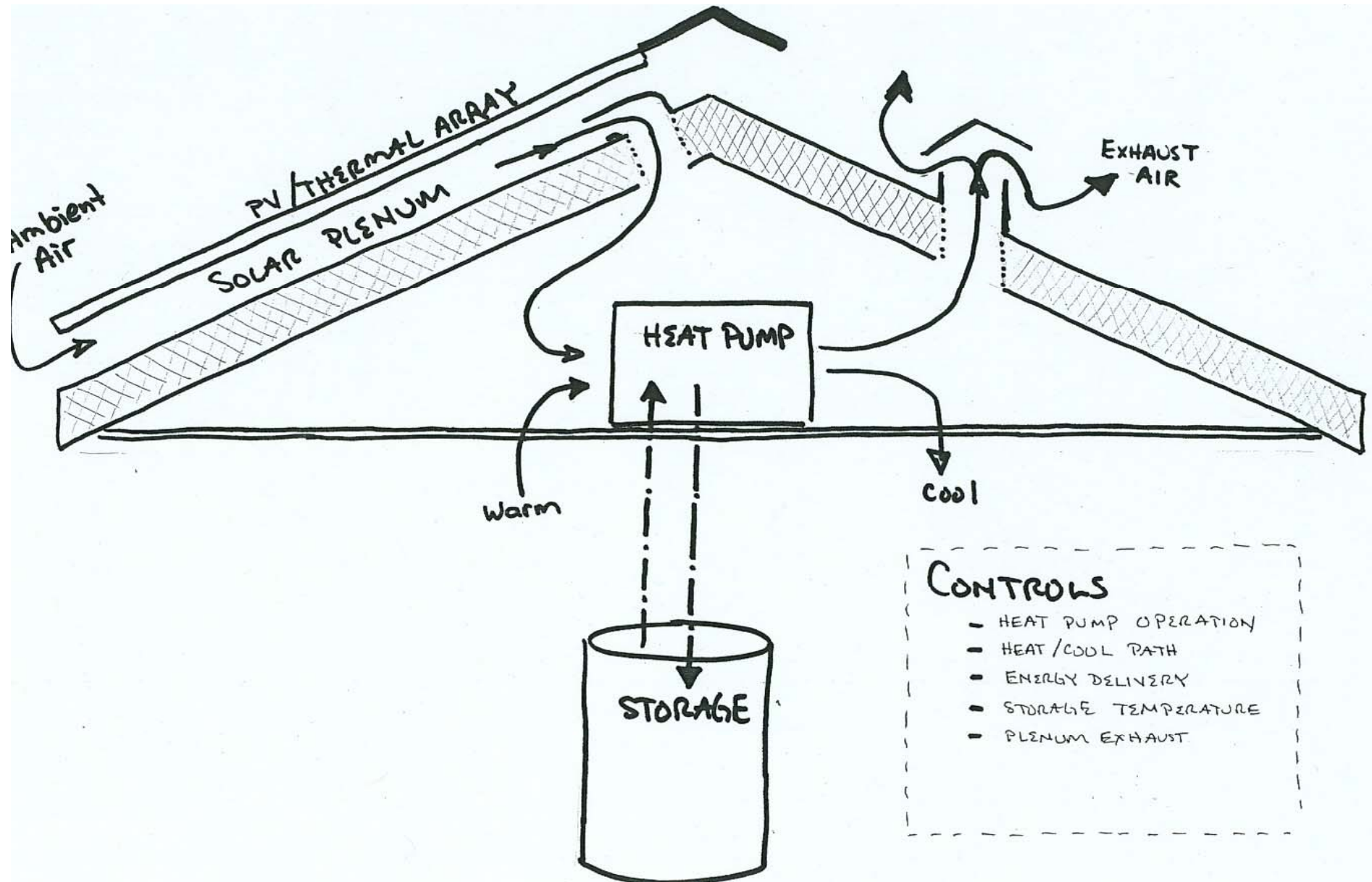
- ◆ Includes onsite renewables
 - Passive Solar and Daylighting
 - Solar Water Heating
 - Solar Electric
 - Geothermal
 - Wind
 - Renewable-Energy Fuel Cells

Rose House

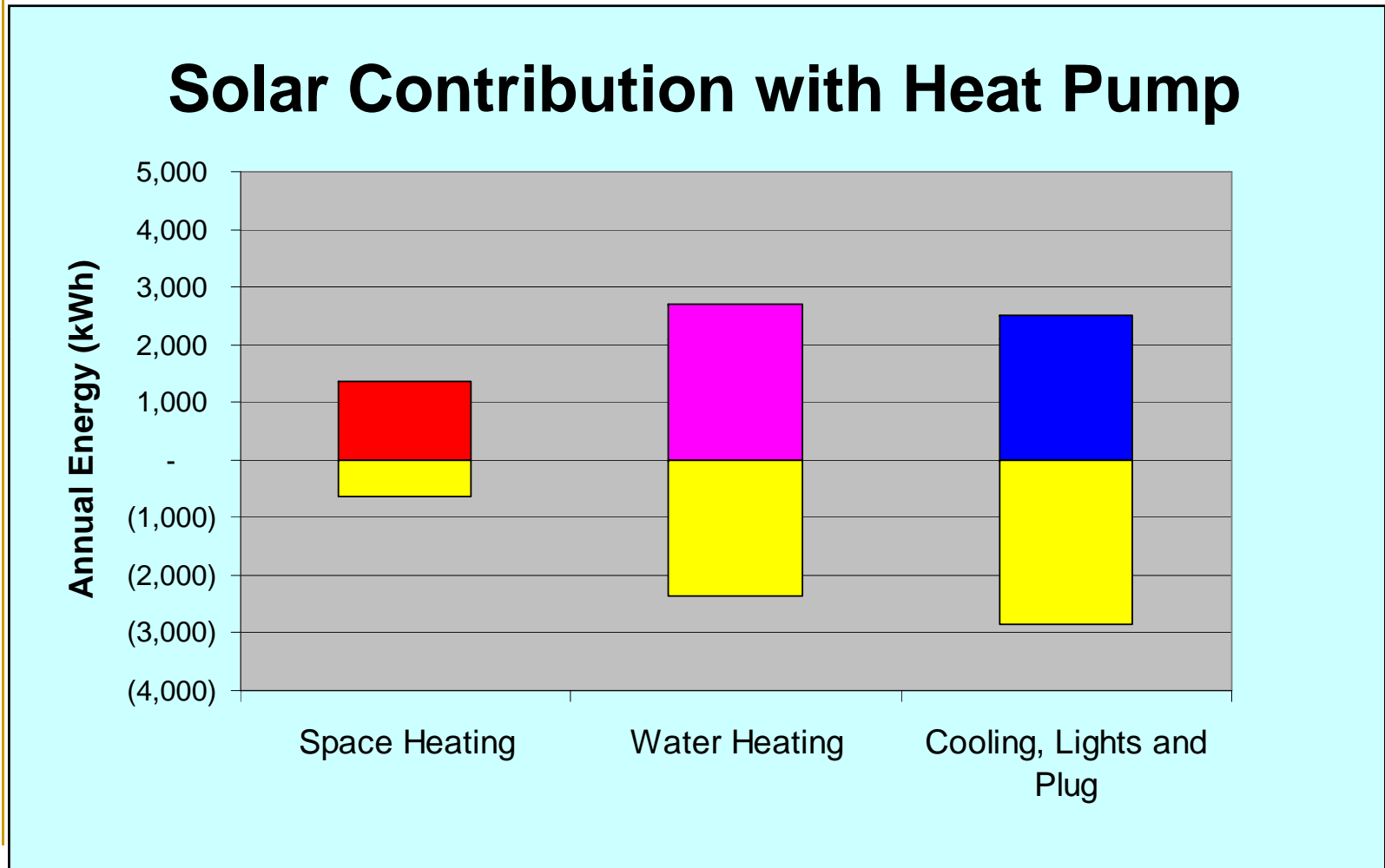




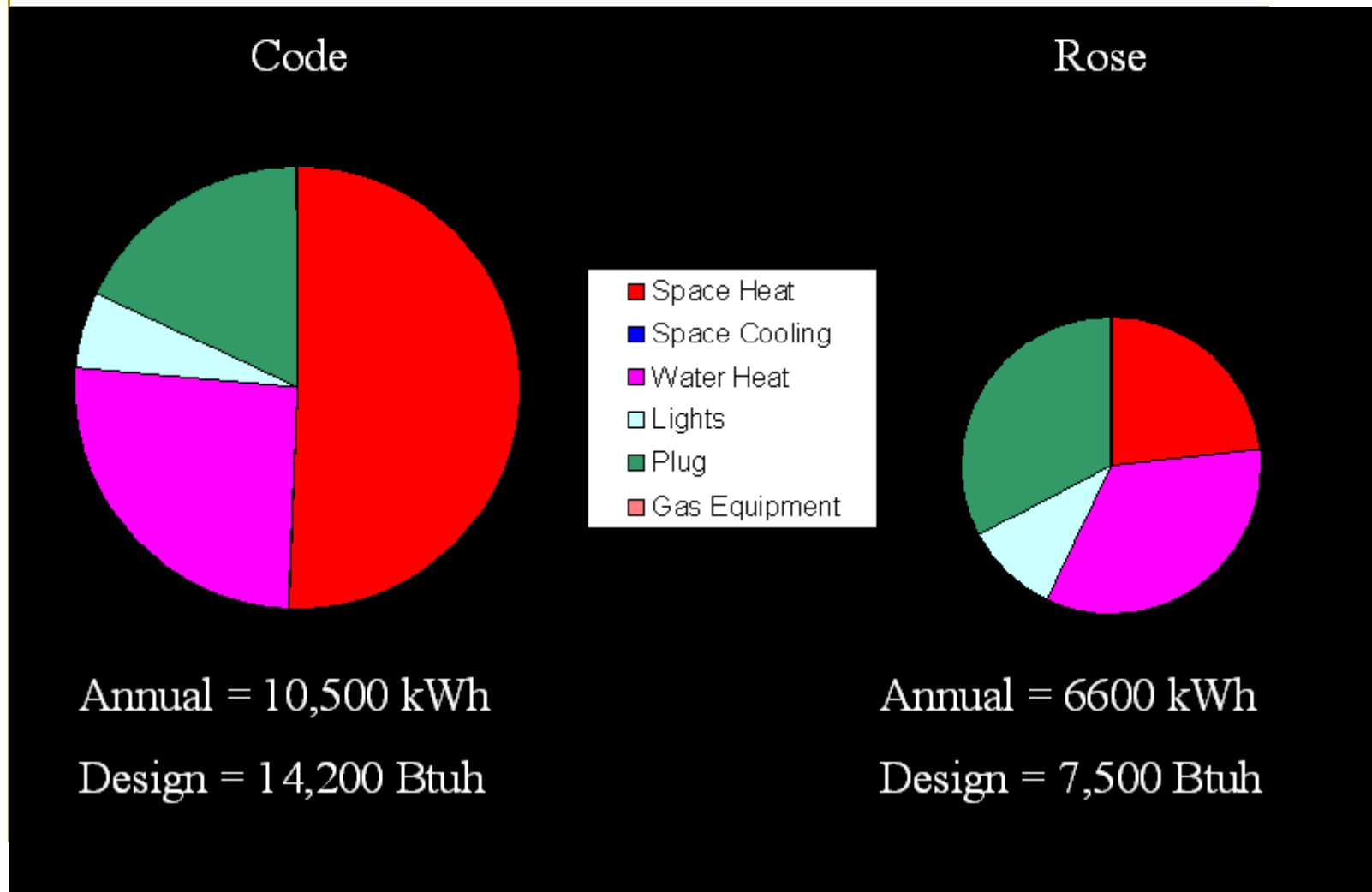
Rose House: Solar Heat Pump Concept



Rose House



Rose House: Gross Loads Before Solar



Rose House: Findings

- ◆ Solar plenum works
 - 5 to 40 degree rise in air temperature
- ◆ Daylighting is a high value
- ◆ Good plumbing is very important
- ◆ Ventilation air can be used for heating
 - 4 row coil works great
 - ERV is very effective

High Performance Homes

Benefits Per Home for Oregon

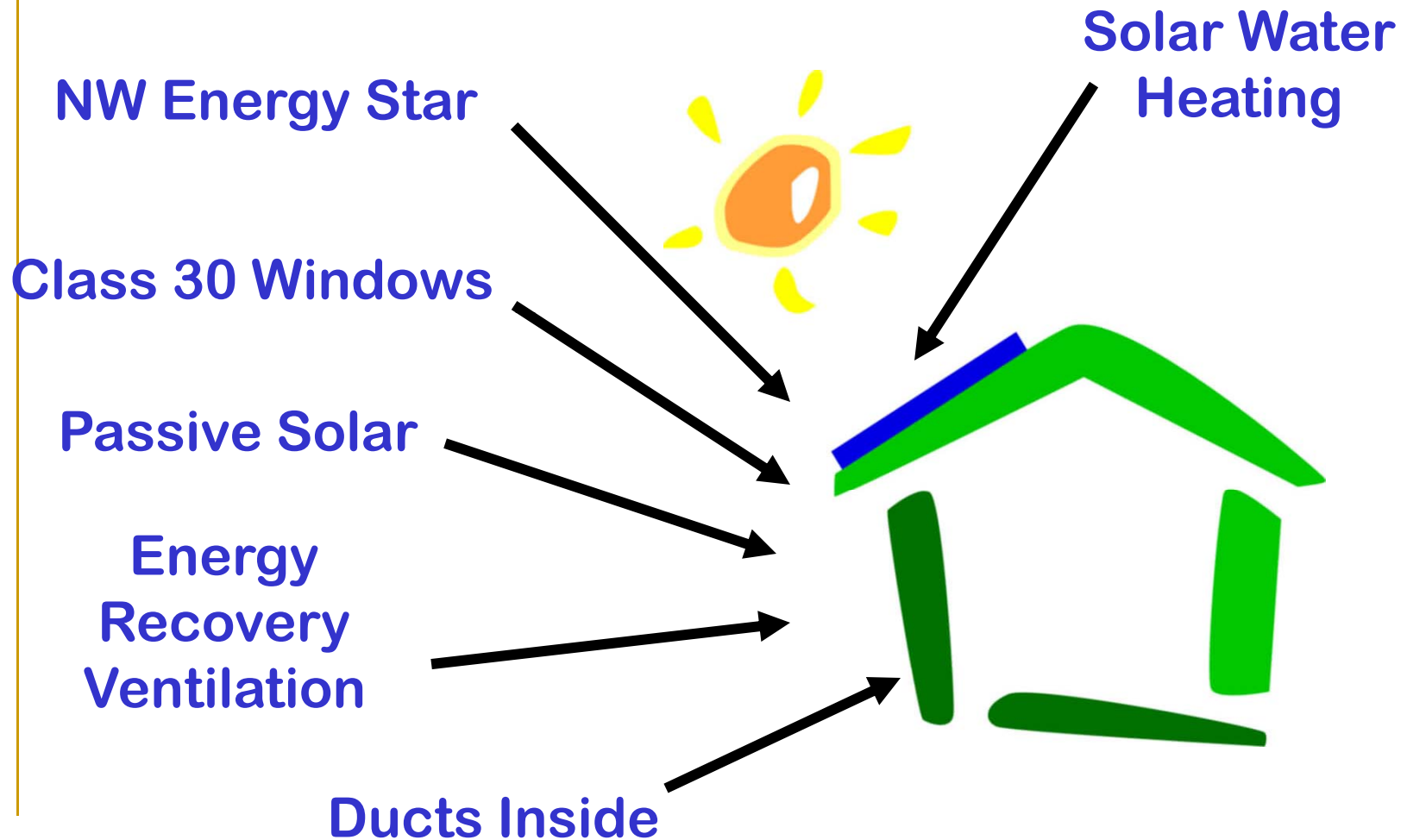
- ◆ Reduce Oregon's dependence on energy (\$18,000 saved in example over 30 years)
- ◆ Support local businesses
- ◆ Advance technology
- ◆ Leverage up to \$6,000 of federal tax credits

High Performance Homes

Benefits over a 30-year mortgage for an average 2000 square-foot home in Redmond, Oregon:

- ◆ Global Warming → 400 tons CO₂ saved
- ◆ Energy Cost → \$36,000 saved
- ◆ Comfort → superior
- ◆ Air Quality → continuously fresh
- ◆ Resale Value → secure
- ◆ Local Economy → improved

Example HPH: Features



Japan



Japan



Resources

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Example HPH: Price (Net Zero)

Federal + State Incentives:

- ◆ HPH shell → \$2,000 Federal Tax Credit
- ◆ HPH Oregon → \$3,000 Business Energy Tax Credit
- ◆ Renewable → \$9,000 Business Energy Tax Credit
- ◆ Solar Thermal → \$2,000 Federal Tax Credit
- ◆ Solar Electric → \$2,000 Federal Tax Credit
- ◆ Utility Incentives → \$3,000 in IOUs / \$1,000 in Coops

Most cases: Oregon HPH home will get \$12,000 in state tax credits + \$4,000 in federal tax credits + \$1,000 - \$3,000 in utility incentives.