

CHRISTIANSON PASSIVE HOUSE

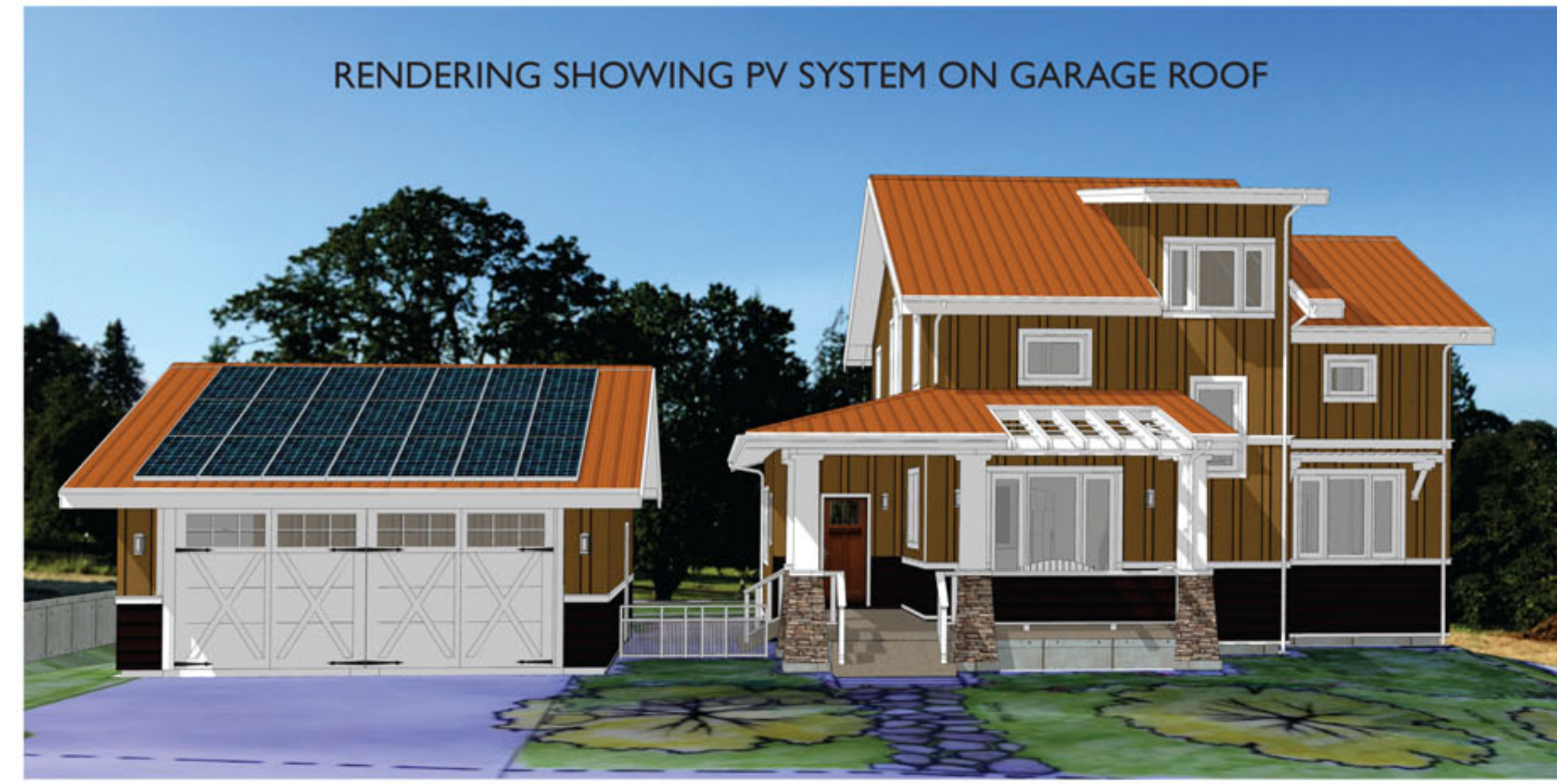
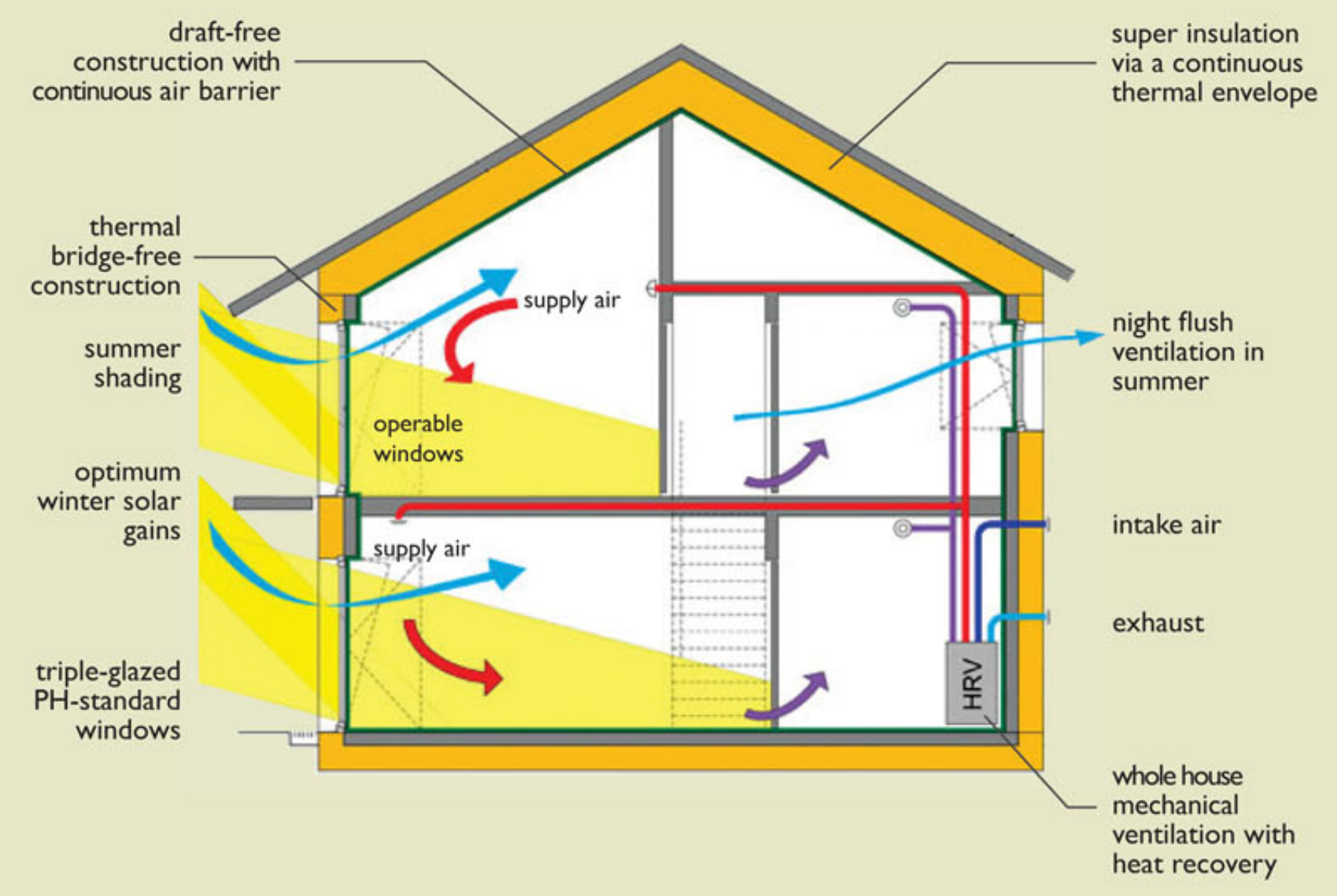
CORVALLIS, OR
OWNER: CARL & JULIE CHRISTIANSON

What is Passive House?

Passive House certification provides homeowners the assurance that their home will have **very low energy usage**, with the added benefits of excellent thermal and acoustical **comfort**. Certification requires a high level of coordination between the architect and the builder throughout the entire design and construction of the building.

The process begins during design, with detailed study of the impact that building form, materials, and details will have on energy use. Techniques such as **super-insulation, air sealing, avoidance of thermal bridges, and high-performance windows** are used to ensure minimal energy loss during both the heating and cooling seasons.

Efficient mechanical systems (typically consisting of a heat pump and a heat recovery ventilator) ensure that the home will stay comfortable with minimal energy use. With over 1 million square feet of Passive House projects completed worldwide, Passive House certification has consistently produced the highest performing buildings in a wide range of project types and climate zones around the world.



First Passive House in Corvallis, Oregon

As both the family living in this beautiful new home and the owners of a local construction firm, the homeowners wanted to be able to showcase their work to potential clients, as well as encourage other builders in the Corvallis area to aim for a higher level of sustainability.

The Contemporary Craftsman style custom Passive House that they built has a carbon footprint that is 5 times smaller than that of a typical house built in Oregon of a similar size. This footprint is even smaller thanks to a PV system that generates energy in excess of the home's annual power needs.

7-1/4" stud walls, enhanced with a 2" layer of sustainable cork insulation, exceptionally efficient windows and doors, PV panels, heat pump water heater, Energy Star appliances, LED lighting, highest efficiency HRV system, and loads of natural daylighting keep the home's **annual energy bills to \$0.0**.

The owners intended this house to be their forever home. A lot of thought went into the design to maximize the use of the space, by incorporating architect/author Sarah Susanka's design principles, as well as some of the concepts developed by architect Ross Chapin. On the energy side, this all-electric Net-Zero home is constructed to last well beyond the owners' lifetimes, with extremely **durable** finishes. The reduction of energy use that is inherent to Passive House design and construction made it possible to achieve net-zero energy through roof-mounted solar power alone.

Super Insulation: R-103.7 Roof / R-32.2 Wall / R-66.4 Floor; code requires only R-38 Roof / R-21 Wall / R-30 Floor. (Performance modeling in PHPP software.)

Airtight Construction: Blower door tests show this house has **0.41 Air Changes per Hour (ACH50)**. High Performance Home Oregon allows a maximum of 5 air changes per hour (5 ACH50), over 12 times the leakage rate of this Passive House!

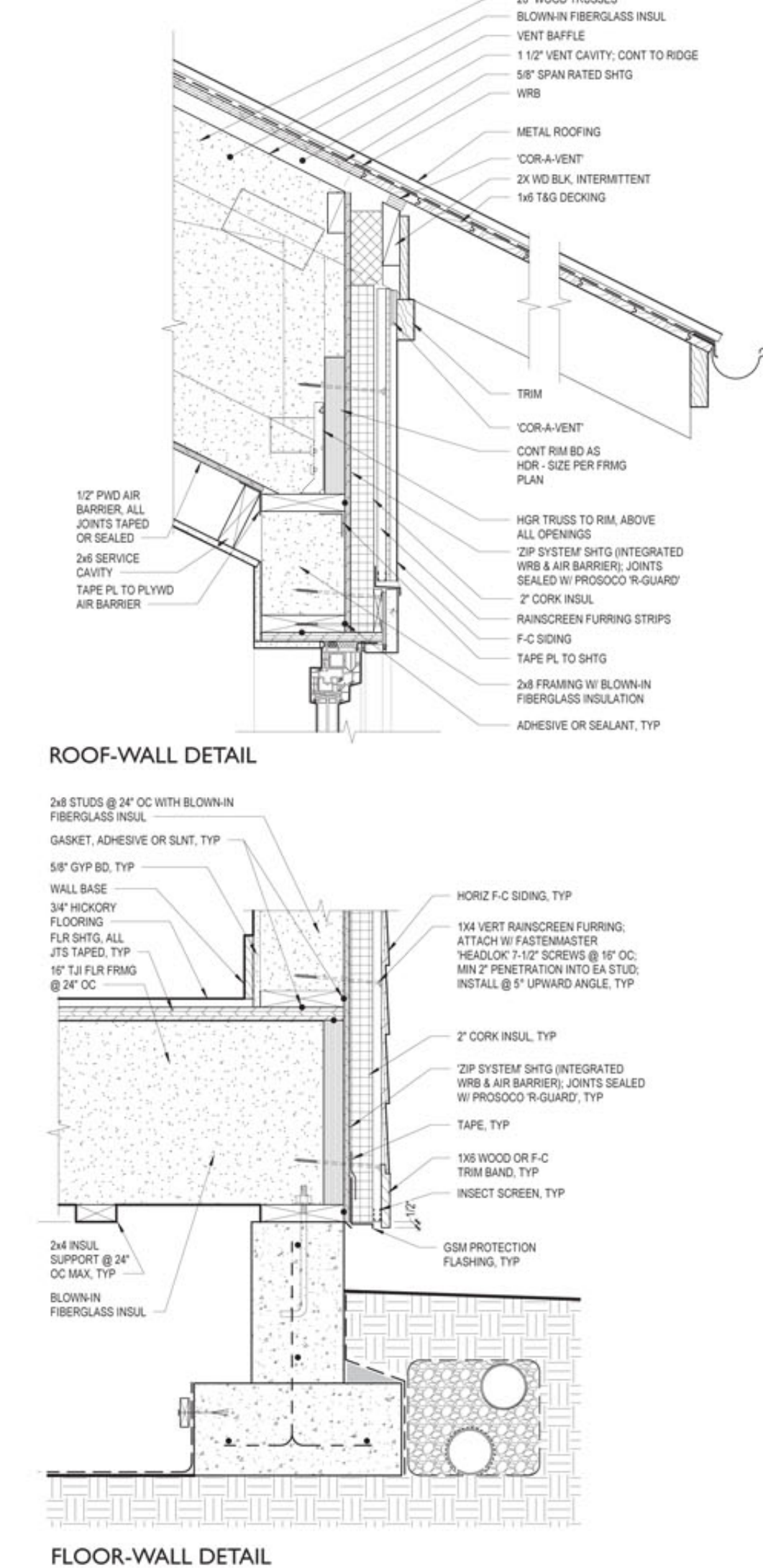
High Performance Windows and Doors: Triple-pane windows with U-0.14 (R-7.14). Oregon code allows windows up to U-0.35 (R-2.85).

Thermal Bridge Free Construction: 2x8 wall framing plus 2" cork continuous insulation outside of the framing and careful detailing ensure that **heat loss is nearly eliminated**.

Heat Recovery Ventilation: Continuous or intermittent filtered fresh air supply. Warm exhaust air moves through fins that transfer existing house heat to incoming cool fresh air with **92% heat recovery efficiency**.

Ultra-Low Energy Use: PHius+ certification requires that a Passive House consume a maximum of 4.6 kBtu/sq.ft. per year for heating (in the Corvallis Climate).

Carbon Emissions avoided: approximately **19 tons of CO2 per year**.



Description

- Total Floor Area: 1938 S.F.
- Climate Zone: 4C

Assemblies

- Floor R - 66.4 (Blown-in fiberglass)
- Walls R - 32.2 (Blown-in fiberglass + cork continuous exterior insulation)
- Roof R - 103.7 (Blown-in fiberglass)

Mechanical

- 6 kBtu Mitsubishi Mini Split With 2 InDoor Heads
- Nest Thermostats
- ZEHNDER Comfoair 350 HRV
- Kitchen Hood (Ducted-Exhaust Only)
- GE Geospring 50 GAL Heat Pump Water Heater
- PV System 8.8 kW

Windows

- ZOLA Thermo uPVC
- Overall U = 0.14 Frame U = 0.193
- Glass U = 0.09
- SHGC = 0.53 VT = 73%

Energy Performance

- Energy Performance Score (EPS) = 0
- Monthly Energy Cost = \$0.0
- Annual Savings = \$1700 +

Certifications

- PHius + 2015 Certified
- PHius + Source Zero Certified Project
- Earth Advantage Platinum Certified
- Dept of Energy Zero Energy Home
- Energy Star v.3 Certified



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PASSIVE HOUSE RATER