green tour

an environmental center event

21st Central Oregon Green Tour

SAT, SEPT 24th 10:00–4:00

Photo by Kayla McKenzie Photography

FREE Tour of Green Buildings & Spaces in Central Oregon

Thank you to our presenting sponsor

EnergyTrust of Oregon, Inc.

envirocenter.org/tour

Table of Contents

Dear Central Oregonian:

The Environmental Center welcomes you to the 21st Green Tour!

Thirty-two years ago, The Environmental Center was born to advance a healthy, vibrant community to live, work and play. Today, we're a regional hub of environmental education, engagement, and action—local action that makes a world of difference, today and for future generations.

Why host a tour focused on better buildings? Because in Bend, buildings account for 54% of our carbon emissions. If we're going to reduce our community's contribution to climate pollution, we need to reduce energy use in our homes and businesses and turn them into sources of renewable, solar power.

So on September 24th, **our** neighbors across the region will welcome us into their homes to learn from their experience. This year, we're showcasing a wide variety of building types and green building practices, and a wide range of price points. You can visit a stunning net positive home on the Deschutes, a Passive House design with gray water system, Net Zero affordable homes and townhomes in Bend & Redmond, and a variety of energy efficient ADUs. Plus, this year we are featuring an urban garden with a Ground to Air Heat Transfer (GAHT®) for an energy efficient greenhouse! You'll see real-world examples of reducing energy use and increasing solar production—including an energy positive building (see page 22). Several sites offer examples of how our homes can help us adapt to a hotter and drier future. And you can even test drive an electric vehicle, another key technology for achieving a low-carbon future!

Now, more than ever, it's important for all of us to make a change under our own roofs—or on them! **We hope the 2022 Green Tour inspires you to use less energy and make the shift to solar.**

See you on the tour!

Mike Riley
Executive Director
The Environmental Center

Lindsey Hardy
Program Director, Energy & Waste
The Environmental Center

At The Environmental Center, We're Also...

Advocating for environmentally responsible policies, such as a Home Energy Score for Bend (read more on page 9) and more investments in safe walking and biking.

Embedding sustainable behaviors into the daily lives of families and businesses in Central Oregon, through programs like The Energy Challenge and the Rethink Waste Project.

Educating and empowering youth to be tomorrow's sustainability leaders, through hands-on classroom programs, outdoor learning and leadership development.

Engaging community members in collective action and celebration, through events like the annual Earth Day Fair and Sustainability Awards.

Learn more at **envirocenter.org**

The 21st Central Oregon Green Tour is Brought to You By

EnergyTrust of Oregon, Inc.

earthadvantage Better Buildings Now

NEAL HUSTON & ASSOCIATES ARCHITECTS INC.

The Bulletin EMPOWERING OUR COMMUNITY

SOURCE WEEKLY

Miller Lumber

Central Oregon Association of REALTORS® COAR YOUR VOICE IN REAL ESTATE

Stemach Design | Sunwest Builders | Dream Home Building & Design
North West AeroBarrier | RavenRock Wealth Partners

Thank You to Our Energy Program Sponsors

zero energy project

CITY OF BEND

EPS
EnergyPerformanceScore

EnergyTrust of Oregon

BUILT FOR SAVING ENERGY AND BETTER LIVING

NOT JUST ANY HOME EARNS AN EPS™

EPS is a rating system for energy-efficient homes that provide consistent comfort, healthy indoor air quality and low energy costs. They're built better so you can live better.

+

Talk to your real estate agent or builder about EPS and learn more at **www.energytrust.org/eps**.

Serving customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista.

WHAT IS A PASSIVE HOUSE?

Photo by Wasim Muklashy

Passive House is one of the world's leading standards in energy efficient construction.

PASSIVE HOUSE PRINCIPLES

1. ORIENTATION TO THE SUN
2. SUPER INSULATION
3. AIR-TIGHT CONSTRUCTION
4. HIGH PERFORMANCE WINDOWS
5. 24/7 ENERGY RECOVERY VENTILATION
6. FREE OF THERMAL BRIDGING

Passive Houses require little purchased energy year round, making conventional heating and air conditioning obsolete.

It is one of the best pathways to NET ZERO and NET POSITIVE buildings, minimizing the load renewables are required to provide.

Energy Modeling

Passive House designs go through an energy modeling process, computing: EPA appliance ratings (kwh/year), heat emissions from appliances and occupants, R-values of walls and ceilings, heat gain and loss from windows (etc) - to project annual energy load and determine the capacity of renewable energy generation (photovoltaic solar generation) needed to reach NET ZERO.

Passive House in Brief

The six principles of Passive House construction are: orientation to the sun for optimum solar heat gain, seamless super insulation surrounding the building envelope, airtight construction, 24/7 energy recovery ventilation, high performance windows, and construction free of thermal bridging. To these principles, one adds active solar generation to reach NET ZERO.

Passive House Institute U.S. (PHIUS) formed in 2007, committed to making passive principles mainstream here. To learn more, visit phius.org.

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SAT, SEPT 24th 10:00–4:00

ALL DAY-OF EVENTS ARE FREE AND OPEN TO THE PUBLIC

Check In/Get Fueled Up

The Environmental Center, 16 NW Kansas Ave, Bend

Grab a cup of coffee, day-of registration*, chat with TEC staff, pick up a guide, and more!

Go on Tour

See map on page 16 or view in Google Maps on our website.

Registered in advance? You are free to visit any site, in any order from 10am–4pm. Volunteers will be stationed at each site and at The Environmental Center to assist you. **Don't forget to cast a vote for your favorite site to be the winner of the People's Choice Award!**

Tour by Bike

Meet at The Environmental Center at 1:00pm to join a bike tour of sites 1–6 and 8 (~10 miles). Tour is guided by Bend Bikes on a pre-selected route. Bike tour will return to TEC in time for the after party by 4:00pm.

View maps at envirocenter.org/tour. Questions? Contact Kaitlin at Bend Bikes - 509.336.9779

Go Electric

The Environmental Center, 16 NW Kansas Ave, Bend

Take an electric vehicle for a spin! Forth Mobility will be on site to showcase the latest EVs.

Come Party!

The Environmental Center, 16 NW Kansas Ave, Bend

Join us for the **Green Tour After Party from 5-7pm** to thank our site hosts and volunteers and celebrate a successful event. We'll be honoring the favorite site on the Tour with the People's Choice Award, so be sure to cast your vote!

**if you registered in advance, it is not a requirement to check in at The Environmental Center*

FOOD AND BEVERAGE SPONSORS:

Strictly Organic Coffee Co. — A Sustainable Cup

Tranquilo Cerveceria — Bend, Oregon

SITE 1 Hartford ADU

EPS SCORE PENDING

Photo by Wasim Muklashy

1610 NW Hartford Ave, Bend

Builder/Owner: Neil Baunsgard
Designer/Architect: Audrey Allen

798 sq ft, 2 Bed, 1 Bath
Earth Advantage Goal: Platinum

Owner/Builder ADU Designed for Owner Occupancy

Built by one of our very own TEC staff members, this ADU was designed for them to live in, making space efficiency and storage critical in their planning. Their plan: once completed, the owners will move into the ADU and rent out the primary home on the property. For many people, the ability to have an ADU on a property brings an opportunity to greatly reduce living costs, provide a greater urban density, and decrease transportation needs. The ideal location of this westside ADU makes alternative forms of 'commuting' more available to occupants of this well thought out property.

Still in construction, you will be able to see some of the unique energy efficiency features of this ADU. With double stud wall framing, dense pack cellulose insulation, raised heel trusses for increased insulation in the attic, and triple pane windows, the envelope of this ADU will have a very high R-value when completed. As with every ADU addition, the size and shape of the parcel guides the decisions of square footage and whether to build a one or two story. In order to build an almost 800 square foot ADU and stay within the City's rules of conditioned space, the owners decided on a 2-story layout with 2BR/1BA above and kitchen/living room below. Careful consideration was given to preserving trees on the lot while building, which are providing shade during the hot summer months. The plumbing runs were thoughtfully designed with the floor plan for efficient short runs and a partial gray water system. The water from the laundry has a valve that will allow the owners to control when the laundry water is diverted to use for landscaping in the summer & fall months.

Be sure to ask: about the gray water system from laundry to landscaping. This is one of the simplest ways to save water in a household.

HELP US MOVE FORWARD THE HOME ENERGY SCORE

Can you imagine buying a car today without knowing the miles-per-gallon efficiency rating?

Especially these days, the MPG of a new car may have a significant impact on your willingness to purchase the car over another car in your price range. Right now, the City is considering a proposal to require the provision of a Home Energy Score (HES)–which will act like an MPG rating–for all homes sold in the City of Bend.

Why support a Home Energy Score program in the City of Bend?

It is a crucial step for climate action because Bend has set ambitious goals to reduce its contribution to climate change. Real progress towards meeting those goals requires making our homes more energy efficient–**getting more homes to go solar and in other ways reduce their energy footprint.** A big part of emissions from buildings are the fossil fuels that often provide a substantial portion of our energy. Another contributor is that many of our homes leak energy. Poor insulation; leaky windows, air ducts and building envelopes; and old, inefficient heating and cooling systems and appliances are just three examples.

What are the other benefits of a HES?

- Increased transparency in the homebuying process
- Informs consumers of the true costs of homeownership
- Provide home buyers with individualized efficiency improvement suggestions

A HES makes the full cost of home ownership visible during the buying process.

With a HES, buyers won't be surprised later by high energy bills. This supports affordable home ownership because unexpectedly high utility bills can quickly become unmanageable for homeowners on tight budgets. The HES shows buyers possible energy efficiency investments they could make at the time of purchase, opening the door to wrapping these costs into their home loan, with only a small increase in a monthly loan payment that is often less than a higher energy bill without the improvements.

Learn more about the proposed program for Bend and make a public comment in favor of the program today at **bendoregon.gov**.

SITE 2 Albany Net Zero ADU

EPS SCORE 0


Photo by Wasim Muklashy

1363B Albany Ave, Bend

Note: ADU access via Commerce Ave.

Builder: Roost Development
Designer: Perry Brooks

600 sq ft, 1 Bed, 1 Bath

Net-Zero Structural Integrated Panel ADU

What's so unique about this ADU? The SIPs panel construction! Structural Integrated Panels (SIPs) is a high performance building system, using panels that consist of an insulating foam core, sandwiched between two oriented strand boards (OSB). Imagine an ice cream sandwich—the ice cream is the foam interior and chocolate wafers are the OSBs. Each SIPs panel is constructed in a factory, fabricated to fit the design of the building. The advantages of using SIPs are many: less waste of materials, high R-value, easy & fast assembly, and reduced cost.

SIPs panels are not only highly insulating, but they are also strong. Combined with the "aerobarrier" sealing method, which seals the envelope of the building, the builder created an airtight building with an EPS score of ZERO! Roost Development also built the primary house next door, where a 11.9 kW solar array completes the package, making the property a Net Zero building. All electric, with energy star appliances, an ERV (Energy Recovery Ventilator) and ductless mini-splits, this ADU is quiet & temperate inside. Best of all, the Net Zero energy will save the owners a great deal of money in utility bills.

Be sure to ask about: What does a SIPs panel look like? Was it also used for the roof?

Photo Courtesy of ch x tld

WHY GO GREEN?

Healthier for your family

More comfortable

Costs less to own

Higher resale value

Climate Crisis mitigation

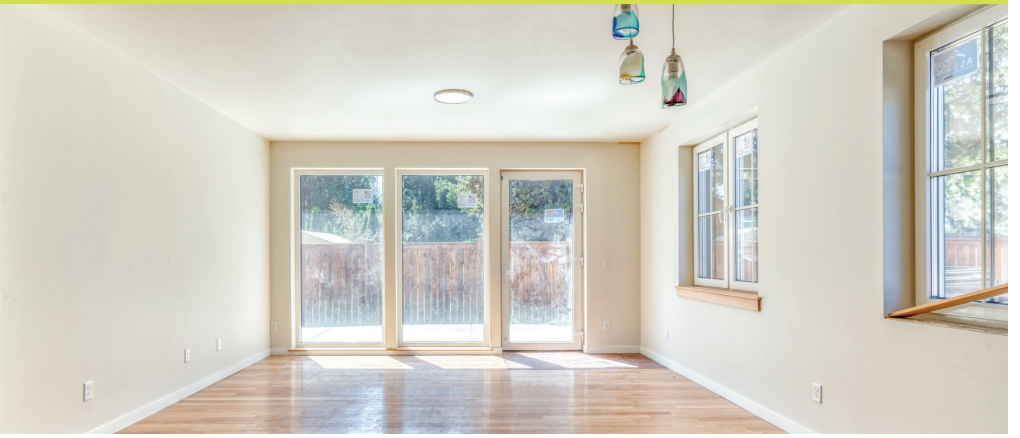
Learn how with

zero energy project

Elemental Green

SITE 3 Summer Shade Passive House

EPS SCORE 0



61639 SW Summer Shade Drive, Bend

Builder: SolAire Homebuilders
Designer: Matt Daby, M.O. Daby Design

1165 sq ft, 2 Bed, 2 Bath + Garage

There's Nothing "Passive" About This Energy Producing Passive House Design!

What is a Passive House? Passive House design is a leading standard world-wide in energy efficient building. The basic principle is to construct a home that is so energy efficient, that conventional heating and cooling systems become obsolete almost year-round. This high level of energy efficiency is achieved through the principles of 1) Thermal Control -eliminating thermal bridges, 2) Air Control – an airtight construction & recovery ventilation system, 3) Radiation Control – high performance windows to reduce heat gain & cold loss, and 4) Moisture Control – vapor barriers & mechanical ventilation systems. But the factor that differentiates the Passive House design from most others, is the principle of orientation of the house to the sun. With a south facing orientation, and properly sized eaves over the windows, the sun's trajectory can be used for optimal solar heat gain in the winter and reduced heat gain in the summer. Add south facing solar panels to the roof and now you can achieve a fully 'net zero' home with all of these principles combined.

The owners of 61639 Summer Shade are not new to this process. Their first certified Passive House was built in McMinnville, Oregon in 2016.
With a wealth of knowledge and a great team, they reconstructed their passion here in Bend. Complete with a gray water system from the bathrooms & laundry to the landscaping and a xeriscape garden, this home has all the elements of an efficient, durable, comfortable home with a low carbon footprint.

Make sure to ask about: the elements that went into the construction, including 11" staggered stud walls with blown-in insulation, 3 inches of "rock wool" insulation on the exterior, quadruple paned Alpen windows, an airtight envelope sealed with Aerobarrier, 9 inches of rigid insulation on concrete slab, a 10.8 kW solar array, all electric with heat-pump water heater, induction cooktop, ventless dryer, top freezer refrigerator and enough solar generation to run the house and charge their Chevy BOLT EV!

Photos by Wasim Muklashy

OPEN THE DOOR
TO ENERGY SAVINGS WITH EPS

Experience the beauty of energy efficiency at this year's Central Oregon Green Tour. You'll find homes built for quality, comfort and efficiency, with an EPS™ to prove it. EPS, brought to you by Energy Trust of Oregon, is an energy performance scoring system that gives you an inside look at the energy impact of a newly built home and how much it costs to operate.

With EPS, you can easily compare homes based on efficiency and find those that offer superior comfort and savings. Qualified homes are built to be at least 10 percent more energy efficient than required by current building codes. When you buy a home with an EPS, you know you're getting a higher level of performance.

"*They all have better insulation, they're properly sealed, they have highly efficient HVAC systems and windows, so there's improved efficiency and energy-cost savings*," says Scott Leonard, a senior project manager with Energy Trust. "*But the overall advantage of these homes is a higher level of comfort that you don't get otherwise*."

The benefits don't stop there. Leonard notes that EPS-rated homes deliver health advantages as well: "Requiring fresh air systems in EPS homes creates a healthier living environment for everyone in the home."

The Central Oregon Green Tour is a great opportunity to learn firsthand about the benefits of EPS homes. Here's a closer look at some of the key attributes you'll find when you step inside an EPS home on this year's tour:

1. An energy score that includes estimated utility costs, so you know what to expect before you buy.
2. Energy-saving lighting and efficient built-in appliances such as dishwashers and water heaters.
3. High-performance windows that help to deflect heat in the summer and retain it in the winter, with well-sealed window frames that make for a quieter home.
4. Special framing techniques that allow for extra insulation join forces with energy-efficient heating and cooling equipment to enhance comfort, improve indoor air quality and lower utility bills.
5. Tight construction helps prevent unwanted pollutants and drafts. Plus, mechanical ventilation systems bring fresh air into the home for healthier indoor air quality.

An EPS home can save you money and energy for years to come, so be sure to ask about EPS as you explore the featured tour homes, and remember to bring it up with your builder or real estate professional as your home search continues. Pick up a Smart Homebuyer Checklist on the tour to get the conversation started, and learn more about EPS at: www.energytrust.org/smarthomebuyer.

SITE 4 Kôr Community Land Trust

EPS SCORE PENDING

36 SW Roosevelt, Bend

Kôr will be on site with Hiatus Homes to share their plans for their Poplar development. The Poplar Community includes 7 goal net-zero energy homes designed as 2-story, 3-bedroom and 2-bath homes.

Builder: Hiatus Homes
Designer: Ten Over Studio
Expected Completion Date: 2024

Innovative & Affordable Net-Zero Communities

Kôr builds net-zero, permanently affordable homeownership communities in Bend and is building more neighborhoods to ensure that it can better serve the lower-income housing needs of Central Oregonians. In the last year, Kôr has made significant strides to further its affordable housing pipeline. Kôr has a community in construction, expected to close in 2023; as well as two more communities in pre-development, totaling 42 homes in the coming years.

Kôr Community Land Trust is partnering with Hiatus Homes to develop its next affordable homeownership community on Poplar Street in SW Bend. These goal net-zero energy homes are designed as 2-story, 3-bedroom and 2-bath homes by Ten Over Studio. Hiatus Homes will support the non-profit both as their general contractor and by donating their Hiatus Roanoke plans to be repurposed for the Poplar community. Per Jackie Keogh, Kôr's Executive Director: "Leveraging market-rate designs through our new partnership with Hiatus Homes will not only provide our affordable homes with unmatched quality, but also significantly help keep our costs down to ensure we can sell these homes at an affordable price to the community." Hiatus Homes has proven that small, efficient, and design-driven developments have a positive community impact. This partnership represents an innovative public private partnership in both reducing the cost of affordable housing but also building affordable units with the same integrity as market-rate homes.

Make sure to ask about: How Kôr homeowners save at least $680 per year from the net-zero upgrades in their home, which make a huge difference for families to be able to invest in their future stability!

SITE 5 Hiatus Homes - Roosevelt

EPS SCORE PENDING


Photo by Wasim Muklashy

36 SW Roosevelt Ave, Bend

Builder: Hiatus
Designer: Hiatus/Collected
Development: 7 lots
Main House: 3 Bedroom 3 bath 1380 sq ft.
ADU: Loft bedroom 462 SF w/ 392 sq ft. Garage

Main House: 2 Bedroom 2 bathroom 900 sq ft.
ADU: Lofted Bedroom 462 sq ft.
Net-Zero Ready
Pre-Wired for Solar

EPS EnergyPerformanceScore

Keep it Simple, Keep it Efficient, and Keep it Beautiful

Hiatus Homes is part of a new movement in residential development. They are building small footprint, high quality, ecologically sound, and intelligently designed homes. Innovation in city codes, design, and building is providing a new type of buyer with an opportunity to change their life and help heal our climate.

Hiatus Homes builds small, efficient, affordable-by-design houses that are on average 30 plus percent more efficient than the typical new home.

After completing two successful housing developments (Hiatus Roanoke & Hiatus Behnam), they began work on their next iteration called "Hiatus Roosevelt." This new development consists of 7 lots, and features their new 3-bedroom, 3 bath design, which includes a detached ADU above a fully finished garage. These innovative homes also include engineered hardwood flooring, quartz countertops and a standing seam metal roof. The open floor plan features large windows, vaulted ceilings and an expansive full glass door that brings the outside in.

Make sure to ask about: How they recently eliminated gas appliances and are now all electric. Also, how solar panels allow these homes to achieve net zero energy efficiencies under standard use.

green tour

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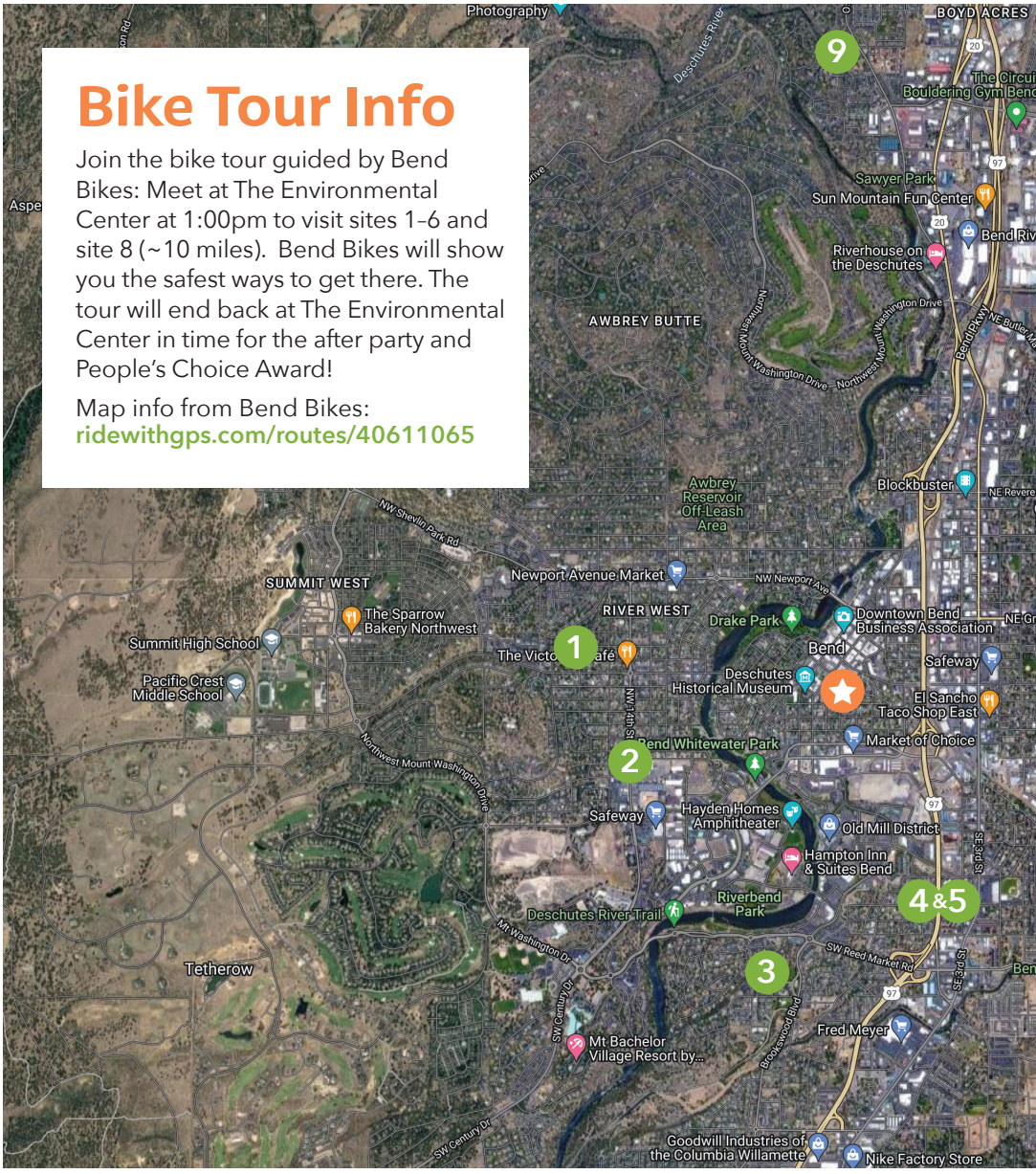


Bike Tour Info

Join the bike tour guided by Bend Bikes: Meet at The Environmental Center at 1:00pm to visit sites 1–6 and site 8 (~10 miles). Bend Bikes will show you the safest ways to get there. The tour will end back at The Environmental Center in time for the after party and People's Choice Award!

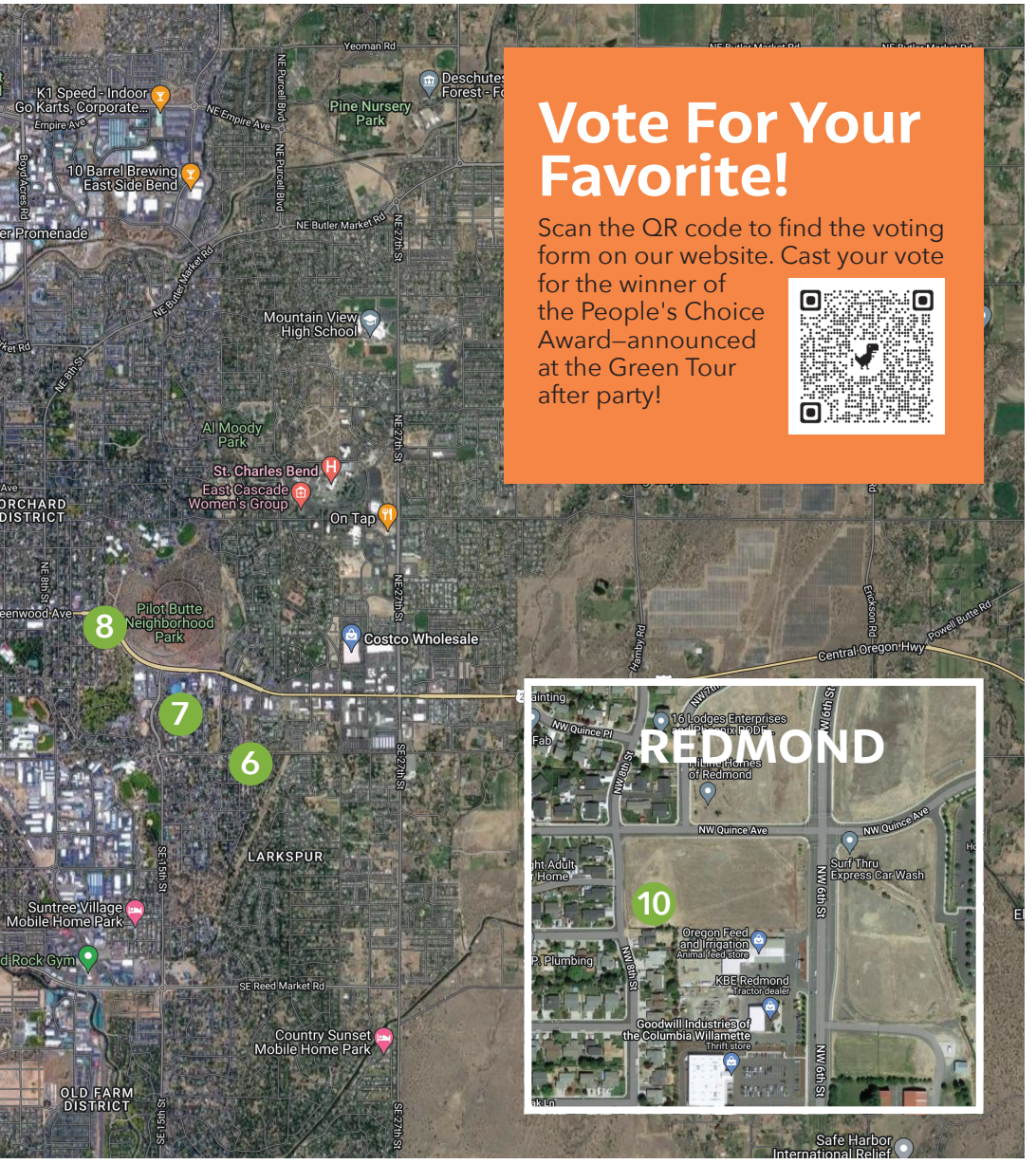
Map info from Bend Bikes:
ridewithgps.com/routes/40611065

1. **Hartford ADU**
   1610 NW Hartford Ave, Bend
2. **Albany Net Zero ADU**
   1363B Albany Ave, Bend
3. **Summer Shade Passive House**
   61639 SW Summer Shade Dr, Bend
4. **Kôr Community Land Trust**
   36 SW Roosevelt Ave, Bend
5. **Hiatus Homes - Roosevelt**
   36 SW Roosevelt Ave, Bend
6. **Cessna ADU**
   7 SE Cessna Dr #2, Bend
7. **Burgess ADU**
   1534 NE Burgess Pl, Bend
8. **Bend Urban Gardens**
   854 NE 12th St, Bend

FREE COFFEE & TOUR GUIDE PICK UP, ELECTRIC VEHICLE RIDE AND DRIVE

SAT, SEPT 24th 10:00–4:00

envirocenter.org/tour



9 **1 Riverstone: Honoring the Deschutes**
63183 Riverstone Dr, Bend

10 **Habitat of Bend/Redmond - The Quince Townhomes**
2302 NW 8th St, Redmond

The Environmental Center

Fuel up for your journey
Free coffee & tour guide pick up
16 NW Kansas Ave, Bend

Green Tour After Party and People's Choice Award
5:00–7:00 – Music, food, kombucha, beer

WHY YOUR NEXT CAR SHOULD BE ELECTRIC

Electric Vehicles are, Simply Put, Better. Quieter, Safer, Zippier. Not Just Better for Your Bank Account. Just Better.

Save Money
Charging an electric vehicle (EV) at home is like paying $.72 per gallon of gas. This would save the average Oregon driver over $2,000 a year in fuel costs alone.

Practically Maintenance-Free
With fewer moving parts, brakes that last twice as long and an oil free motor, you spend less time in the shop and more time on the open road.

New Rebates (Even for Used)
Both Oregon and the Federal Government are making EVs more affordable to more of the population. New incentives from the Feds and Oregon can provide up to $9,000 off a used EV and $12,500 off a new EV depending on the vehicle and your income.

Charge it Up
Most EV drivers simply plug in their car in their garage to start each day with a full "tank." Wanna go further? With nearly 1,500 public charging locations in Oregon, EV road trips are getting easier every year!

EVs Cut Global Warming Emissions
Driving an EV in Oregon produces 1.3 metric tons of emissions per year compared with 4.9 metric tons from the average new gasoline powered car.

They Go the Distance
Most modern EVs travel over 200 miles and some can go over 300+ miles. With fast charging this makes many long trips even better with electric.

Test Drive Today!

Learn more about the 40+ Electric car options available in Oregon at envirocenter.org/goelectric or by contacting Neil at Neil@envirocenter.org, 541-508-5434.

You can also meet current EV drivers and test drive an all electric VW ID.4 @ The Environmental Center from 10am-4pm!

SITE 6 Cessna ADU

EPS SCORE 33


Photo by Zach Bascom, Dry Sky Photography

27 SE Cessna Dr #2, Bend

Builder: Mike and Betsy Tucker
Designer: Shelter Studio

754 sq ft, 2 Bed, 1 Bath
Earth Advantage certification: Platinum

Designing for the Future - A Modern Retreat

Welcome to this thoughtfully designed modern retreat where beauty, functionality, and efficiency merge. The builder of this beautifully crafted ADU created an inviting unit next to his main residence with a long-term plan: What if he and his wife wanted to downsize and live in this ADU in the future? With this in mind, the builder took every consideration to optimize the use of space and create a sense of home and contentment.

In addition to the high R-Value of insulation throughout the structure, the envelope was sealed tightly using AeroBarrier as an air sealing method. Air exchanges on the blower door test achieved 1.5 ACH @ 50 Pascals. In this all-electric, highly insulated, and super sealed ADU, ductless mini-splits were used for efficient heating and cooling. In addition, a heat pump water heater and xeriscaping with a moisture sensing irrigation system conserve resources.

Inside the home, note the temperate, peaceful environment. Well-placed windows provide ample light while also maintaining privacy and creating a treehouse feel in the second-story loft space. Wood, tile, color accents, a vintage stereo and record player, local art, and more all come together to create a spacious, welcoming, and cozy vibe. Be sure to note the well-thought-out storage: built-in wood cubbies under the stairs, cabinetry, closets, and added storage areas throughout, providing ample storage for longer-term living.

Make sure to ask about: why 10" walls were used on the upslope side and how the outer layer of 1" rigid foam created thermal breaks. While you're at it, make sure to ask about their ventilation system.

SITE 7 Burgess ADU


Photo by Wasim Muklashy

1534 NE Burgess Pl, Bend

Builder: Tyler Davio
Architect: Ryan Starr, AIA, ADU Specialist

350 sq ft, 1 Bed, 1 Bath

Small, But Mighty: Optimizing Functionality of Space

The architect of this Accessory Dwelling Unit had two primary goals when he designed this cozy ADU: a seamless design blending perfectly with the primary home and a small, but highly functional footprint. He achieved both objectives. When looking at the home from the street, it's difficult to tell that there is an ADU at all. The roof lines, siding, height and exterior finishes were all designed to blend with the home so well that the unit would appear to be part of the home. And yet, this unit has no shared walls with the living space of the primary owner's home.

The small but highly functional design is a 1 bedroom, 1 bath with a full kitchen and laundry. A loft provides additional storage. When you visit this ADU, be sure to note the attention to detail. When designing small spaces, every inch needs to be carefully thought through for optimal functional uses.

2x6 walls with blown-in insulation, low flow fixtures, LED lighting, ductless mini splits for heating and & cooling are just some of the energy efficiency and water conserving features of this ADU. Of special mention, a "JOTO vent" system was used in lieu of a standard crawl space venting design. The JOTO vent is an innovative method designed in Japan to eliminate holes in the foundation walls for venting, which can create a weakness in the wall. The method was invented after Japan's major earthquakes and although we do not suffer many quakes in the Central Oregon area, the JOTO vent can be a solution for shallow crawl spaces and applications where space might be limited.

Make sure to ask about: What does the JOTO vent system look like and how does it function? How did the architect achieve this harmonious design? What are they key design elements that are used to integrate old and new structures to create a seamless design?

SITE 8 Bend Urban Gardens


Photos by Wasim Muklashy

854 NE 12th St, Bend - *Vegetable Gardens & Geothermal Greenhouse*

Owner: Ashley Joyce

Bend Urban Gardens: Empowering Aspiring Vegetable Gardeners to Grow Food in Their Yards

When considering a fully sustainable home and community, growing fruits and veggies in your yard can serve as a landscape and carbon emission reduction plan by reducing food miles! This year's Green Tour includes an urban garden, showcasing the possibilities of year-round harvesting in Central Oregon.

Ashley Joyce is the owner of Bend Urban Gardens, a local foodscaping business that empowers aspiring veggie gardeners. Stop by to see their raised garden beds (constructed out of locally milled restoration juniper and salvaged incense cedar), innovative mini hoop house designs, drip irrigation system, and electric vehicles and at-home Level 2 charging station.

Ashley moved to Bend when she was eleven years old. Later, as an exchange student, she milked cows and saw vegetables growing in the gardens of her host families. She never grew a vegetable in her life, though, until after graduating from college. She then apprenticed on organic vegetable farms before earning a Certificate in Ecological Horticulture. In 2009, she moved home to Bend and spent nearly nine years teaching nutrition, cooking, and gardening as an educator with OSU Extension Service.

Ashley is now in her 12th growing season in Central Oregon. Her garden was featured on the 2015 High Desert Garden Tour and she is excited to welcome visitors to the updated Bend Urban Gardens Demonstration Garden.

Make sure to ask about: their backyard greenhouse featuring a Ground to Air Heat Transfer (GAHT®) system, sometimes referred to as a climate battery. The design serves as a heating and cooling system, using the energy of the sun and the soil underground, allowing for year-round food harvesting with a much lower environmental impact of a traditional HVAC system.


Ashley Joyce , owner of Bend Urban Gardens

SITE 9 1 Riverstone

EPS SCORE 0

Photo by Kayla McKenzie Photography

63183 Riverstone Dr, Bend

Builder: Copperline Homes
Architect: Tozer Design, LLC
2,551 sq ft, 3 Bed, 2.5 Bath
Solar Contractor: E2 Solar

Solar installation size: 13.14 kW
Green Building certification: Petal Certification candidate, Living Building Challenge 3.1

Beauty, Equity, and Energy Efficiency—Petals on the River

1 Riverstone is an excellent example of how you can have it all: beauty, energy efficiency, and low carbon footprint. Completed in May of 2022, the owners of 1 Riverstone built their home following the values and deep green goals of the Living Building Challenge (LBC), the world's most aspirational and rigorous green building standard. "The Living Building Challenge is a philosophy, certification, and advocacy tool for projects to move beyond merely being less bad and to become truly regenerative."

For the owners and their architects Al Tozer and Cecile Cuddihy, Biophilic Design—a practice that encourages buildings to connect with the ecology of the place, and the occupants to connect with the natural environment - guided the design process. Research has shown that the more we can connect people with nature, the better humans respond and function.

Perched alongside the Deschutes River, 1 Riverstone makes you feel you are one with the environment. As you enter the home, you'll notice how window and door placement connects the occupants to place. In each room, Loewen wood-framed windows, with low U-value, are thoughtfully positioned to frame river views and flood the interior with natural light. The operable windows allow breezes and sounds of the river to flow through the home, bringing nature inside. Wood-paneled ceilings in the great room carry through to exterior soffits, reinforcing the theme of indoor/outdoor connectivity. Off the kitchen—beyond a dramatic 12 ft. wide pocket door—a large bamboo deck blends into the landscape—Dasso Decking (FSC + Leed Certified).

Staggered stud framed walls and a combination of HFO spray foam insulation and formaldehyde-free blown-in fiberglass resulted in R-35 walls. 1 Riverstone non-vented ceilings range from R-49 to R-64 and the floor insulation rates at R-38. Air sealing was completed by Northwest AeroBarrier resulting in a tested 0.17 ACH50. This high performance envelope makes the home not only more temperate in the interior environment but also much quieter than the average home.

Make sure to ask about: In the LBC design + build process, there are 7 categories, called "Petals," serving as performance goals to pursue in achieving certification. Seeking Petal Certification—requiring a project to achieve 3 of the 7 Petals—1 Riverstone focused on the Energy, Equity, and Beauty Petals. As you tour this landmark home, note these features.

LIVING BUILDING CHALLENGE℠

LIVING BUILDING CHALLENGE is a certification program that defines the most advanced measure of sustainability in the built environment possible today and acts to diminish the gap between current limits and ideal solutions. It comprises seven performance areas, or 'Petals', sub-divided into a total of twenty imperatives.

PLACE– Limits to Growth, Urban Agriculture, Habitat Exchange, Human Powered Living
The intent of the Place Petal is to clearly articulate where it is acceptable for people to build, how to protect and restore a place once it has been developed, and to encourage the creation of communities that are once again based on the pedestrian rather than the automobile.

WATER – Net Positive Water, Ecological Water Flow
The intent of the Water Petal is to realign how people use water and redefine 'waste' in the built environment, so that water is respected as a precious resource.

ENERGY – Net Zero Energy
The intent of the Energy Petal is to signal a new age of design, wherein the built environment relies solely on renewable forms of energy and operates year round in a pollution-free manner.

BEAUTY – Beauty+Spirit, Inspiration+Education
The intent of the Beauty Petal is to recognize the need for beauty as a precursor to caring enough to preserve, conserve and serve the greater good. As a society, we are often surrounded by ugly and inhumane physical environments. If we do not care for our homes, streets, offices and neighborhoods then why should we extend care outward to our farms, forests and fields?

HEALTH & HAPPINESS – Civilized Environment, Healthy Interior Environment, Biophilic Environment
The intent of the Health Petal is to focus on the major conditions that must be present to create robust, healthy spaces, rather than to address all of the potential ways that an interior environment could be compromised.

MATERIALS – RED List, Embodied Carbon Footprint, Responsible Industry, Living Economy Sourcing, Net Positive Waste
The intent of the Materials Petal is to induce a successful materials economy that is non-toxic, transparent and socially equitable. Throughout their lifecycle, materials are responsible for many adverse environmental issues including illness, squandered embodied energy, pollution, and resource depletion. The Imperatives in this section aim to remove the worst known offending materials and practices.

EQUITY – Human Scale+Humane Places, Universal Access to Nature & Place, Equitable Investment, Just Organizations
The intent of the Equity Petal is to correlate the impacts of design and development to its ability to foster a true sense of community. A society that embraces all sectors of humanity and allows the dignity of equal access is a civilization in the best position to make decisions that protect and restore the natural environment.

IN THIS YEAR'S GREEN TOUR, there will be an example of a newly built home that follows the principles of the Living Building Challenge. 1 Riverstone was designed by Al Tozer and Cecile Cuddihy and built by Copperline Homes. The owners of this home chose 3 primary petals: beauty, equity and energy. Please stop by this beautiful example of a regenerative home honoring nature, and learn more about biophilic design while gazing over the Deschutes River.

SITE 10 Habitat - The Quince Townhomes

EPS SCORE 17


Photo by Explore Marketing

2302 NW 8th St, Redmond

Builder: Bend Redmond Habitat for Humanity
Designer: GL3

1150 sq ft, 3 Bed, 2 Bath
Earth Advantage certification: Platinum

Affordable Housing with a View!

Bend-Redmond Habitat for Humanity is part of a global, nonprofit housing organization, dedicated to eliminating substandard housing locally and worldwide through constructing, rehabilitating and preserving homes; by advocating for fair and just housing policies; and by providing training and access to resources to help families improve their shelter conditions. Habitat for Humanity was founded on the conviction that every man, woman and child should have a simple, durable place to live in dignity and safety, and that decent shelter in decent communities should be a matter of conscience and action for all. Since 1989, Bend-Redmond Habitat has served 200 families with homeownership and repaired 145 homes, providing more than 1000 children and adults with safe, secure and healthy homes.

The "Quince Townhomes" in Redmond is one of the newest developments for Habitat, comprising 10 townhome units and 9 ADUs. Each unit has a 3.2 kW solar array and achieved Earth Advantage Platinum. The townhomes are each 3 bedroom/2 bath, approximately 1150 square feet. The townhomes are owned by the qualifying homeowner and the ADUs are being held by Habitat and rented at below market rates.

Make sure to ask about: the many energy efficient features to note in these beautifully constructed homes, including: R28 wall with 2 x 6" construction, 1" exterior rigid insulation, R-60 blown in insulation in the attic, ductless mini splits and an Energy Recovery Ventilator, low flow fixtures, all electric, and xeriscaping on the areas surrounding each unit.

GREEN BUILDING DIRECTORY

ENERGY EFFICIENCY AND HOME PERFORMANCE

Central Electric Cooperative

Phone: 541.312.7742
Contact: Thomas Elzinga
Email: telzinga@cec.coop
Web: cec.coop

Central Electric Cooperative serves over 37,000 accounts in Central Oregon and we promote, educate and assist our member customers in meeting their energy efficiency and quality of living goals. CEC offers a wide variety of programs specific to residential energy efficiency of which includes income qualified, no-cost offerings.

Earth Advantage

Phone: 503.968.7160 ext. 46
Contact: Matt Douglas
Email: mdouglas@earthadvantage.org
Web: earthadvantage.org

Earth Advantage® is a 501(c)(3) nonprofit focused on helping to create an informed and humane residential real estate marketplace.

Elemental Green

Contact: Sheridan Foster
Email: info@elemental.green
Web: elemental.green

Whether you're building from scratch, decorating, or doing some minor renovations, we're here to help. Browse our website to discover the perfect products for your home, get inspired from other people's projects, and learn why and how sustainable solutions are the best option.

Energy Trust of Oregon

Phone: 1.866.365.3526 (x9 for Spanish)
Contact: Nicole Reeves
Email: eps@energytrust.org
Web: energytrust.org

Energy Trust of Oregon is an independent nonprofit organization dedicated to helping utility customers benefit from saving energy and generating renewable power. EPS™, brought to you by Energy Trust, is a scoring system that helps define a home's energy consumption, utility costs and carbon footprint. It's also a pathway for building and selling homes that deliver superior comfort, durability and efficiency.

Pacific Power

Phone: 1.888.221.7070
Email: wattsmart@pacificpower.net
Web: pacificpower.net

At your service for 100 years. At Pacific Power we believe in our promise of public service: an obligation to deliver safe, reliable electricity at a reasonable price in the cleanest, most environmentally sustainable way we can.

Zero Energy Project

Contact: Sheridan Foster
Email: info@zeroenergyproject.com
Web: zeroenergyproject.com

Zero net energy homes produce as much energy as they use. They are the homes of the future—available today. They improve your family's health and comfort while they cost less to own than standard homes. Get your life on the path to zero today.

DESIGNERS AND BUILDINGS

Jim Guild Construction, LLC

Phone: 541.388.3569
Contact: Jim Guild
Email: guildbuild@gmail.com
Web: saginawsunset.com

The Saginaw Sunset community is about the home building envelope, energy efficiency, renewable energy and air quality. It's about water conservation, harnessing solar power and preserving old-growth trees within the community. And it's about being an urban infill development—staying in the heart of Bend instead of expanding the City's Urban Growth Boundary (UGB).

Neal Huston & Associates Architects Inc.

Phone: 541.389.0991
Contact: Neal Huston
Email: info@nealhuston.com
llh@nealhuston.com
Web: nealhuston.com

NHA creates high quality designs which meet or exceed client expectations and functional requirements while executing a broad range of architectural styles. NHA provides full-service architectural design, space planning, interior design, master planning, 3D modeling and sustainable design expertise.

GREEN BUILDING DIRECTORY

DESIGNERS AND CONTRACTORS

Stemach Design + Architecture

Phone: 541.647.5661
Contact: Stacey or Rachel Stemach
Email: stacey@stemachdesign.com
rachel@stemachdesign.com
Web: stemachdesign.com

Stemach Design implements thoughtful, innovative design based on the core values of economic, environmental and equitable sustainability. We are dedicated to projects embodying careful, coordinated designs that have positive impacts on each project's surroundings.

Solaire Homebuilders

Phone: 541.383.2140
Contact: Kate Eskew
Email: kate@solairehomebuilders.com
Web: solairehomebuilders.com

Since 1995, Solaire Homebuilders has been building high-performance, energy efficient custom homes throughout Central Oregon. We specialize in Net Zero Energy homes which are visually stunning and include many energy saving features. Whatever home style you desire, the Solaire team has the skills to make it a reality. With many firsts to our credit, including Central Oregon's first Net Zero energy home and its first Earth Advantage and LEED Platinum homes, our experienced staff can help you maximize the energy efficiency, comfort, and air quality of your new home.

Sunwest Builders

Phone: 541.548.7341
Contact: Kevin Link, Pre-Construction Services
Email: kevinl@sunwestbuilders.com
Web: sunwestbuilders.com

SunWest Builders specializes in a broad range of bid and negotiated building projects, including high-end custom homes as well as mixed use buildings, resort facilities, restaurants, churches, educational and medical facilities, assisted living facilities, manufacturing and industrial buildings. We are experienced with building green and sustainably designed buildings and have built Earth Advantage and LEED certified buildings.

INTERIOR AND BUILDINGS

Miller Lumber

Phone: 541.382.4301
Contact: Charley Miller
Email: charley@mlumber.com
Web: mlumber.com

The Miller Lumber Company, supplying lumber and building materials to all of Central Oregon since 1911.

NorthWest AeroBarrier

Phone: 310.938.2754
Contact: Peter Grube
Email: info@NW-AB.com
Web: northwestaerobarrier.com

You can't control what happens in the air outside your home but you can control what gets in. Whether it's smoke, allergens, or hot & cold air, AeroBarrier's automated process seals leaks so you can control your environment while enhancing comfort, health & efficiency.

Dream Home Building and Design LLC

Phone: 310.938.2754
Contact: Mike Ardeljan
Email: info@dreamhomebend.com
Web: dreamhomebuildinganddesign.com

Stunning homes that perform as well as they look. Dream Home builds certified passive homes that are healthy, comfortable, efficient and safe for years to come. We spend as much attention on the things you can't see as the things you can so you and your family can rest easy in a home you're proud of.

Cement Elegance

Phone: 541.383.2598
Contact: Lori Prier
Email: lori@cementelegance.com
Web: cementelegance.com

Since 1997, Cement Elegance has been designing and fabricating decorative architectural and utilitarian concrete products for residential and commercial use. We handcraft unique, durable, lightweight pieces–sinks, firepits, furniture, countertops, fireplace surrounds, and more.

GREEN BUILDING DIRECTORY

REAL ESTATE

Mike Tucker
Windermere Real Estate

Phone: 503.939. 6155
Email: mike@highdesertdwelling.com
Web: highdesertdwelling.com

I specialize in GREEN real estate, home technology, great design and unique spaces. I delight in helping my clients find value and those hard to find special homes.

Certifications: GREEN; Energy Trust of Oregon Trade Ally.

The Central Oregon Association of REALTORS®

Phone: 541.382.6027
Contact: Casie Conlon
Email: info@coar.com
Web: coar.com

The Central Oregon Association of REALTORS® (COAR) is your voice for real estate in Central Oregon. A trade association serving the professional needs of its 2500+ members, COAR is dedicated to enhancing and protecting the real estate industry.

Pro Property Photos

Phone: 503.893.5145
Contact: Wasim Muklashy
Email: wasim.muklashy@gmail.com
Web: propropertyphotos.com

Wasim is your premier Bend property photographer. He has been a photographer all his life and applies his fine art technique & experience to focus on architecture, interior design and real estate photography with a focus on sustainability and green living.

LENDERS/ADVISORS

RavenRock Wealth Partners

Phone: 541.550.3293
Contact: Robert Reininger
Web: raymondjames.com/ravenrockwealthpartners

We take the time to get to know your lifestyle, goals and values, so that we can deliver a plan designed to propel you toward the future you've envisioned for yourself and your family. Securities offered through Raymond James Financial Services, Inc., member FINRA/SIPC.

Umpqua Bank

Phone: 541.312.4813
Contact: Jackie Westover
Email: jackiewestover@umpquabank.com
Web: umpquabank.com

Umpqua Bank has loan programs available to assist homeowners in financing sustainable, green, and environmentally friendly materials and concepts into their home and property.

SOLAR

E2 Solar

Phone: 541.388.1151 ext 105
Contact: Kelli Hewitt
Email: sales@e2solar.com
Web: e2.solar

E2 Solar is a women-owned, small business dedicated to providing central Oregon the very best in clean, sustainable energy. Our custom-designed solar systems offer a reliable and affordable energy solution for any home or business.

Sunlight Solar

Phone: 541.322.1910 ext. 301
Contact: Joe Mazzarella
Email: joe.mazzarella@sunlightsolar.com
Web: sunlightsolar.com

With over 20 years of solar installation experience in Central Oregon, we bring you high-quality, turn-key installations for residential and commercial projects. We are passionate solar advocates that take pride in supporting our community's transition toward a renewable energy future.

Solar Light Inc.

Phone: 541.306.4141
Contact: Melody Morrow
Email: melody@soloarlightinc.com
Web: solarlightinc.com

Locally owned & operated w/ over 12 years of bringing light to Central Oregon homes & businesses with Solatube Tubular Skylights. Also offering Solar Star Attic Fans & Solatube whole house fans.

GREEN BUILDING DIRECTORY

TRANSPORTATION

Bend Bikes

Contact: LeeAnn O'Neill
Email: info@bendbikes.org
Web: bendbikes.org

Bend Bikes is a grassroots nonprofit that advocates on behalf of people who bike. We believe people of all ages and abilities should feel safe and comfortable biking to work, school, and the grocery store on a connected bike network.

Bend Electric Bikes

Phone: 541.410.7408
Contact: Kathy
Email: kathy@bendelectricbikes.com
Web: bendelectricbikes.com

Since 2008, Bend Electric Bikes has been selling and servicing electric and cargo bikes that help locals get around town. Whether you ride for fun, as your primary mode of transportation, or for the planet, Bend Electric Bikes can help you learn more about what's possible with an e-bike.

Forth Mobility

Phone: 347.306.0988
Contact: JR Anderson
Email: jranderson@forthmobility.org
Web: forthmobility.org

Forth is a nonprofit organization dedicated to increasing equitable access to electric transportation through demonstration projects and progressive policy. Our work focuses on electric cars, charging and emerging modes such as micromobility, electric school buses and electric tractors.

GLOSSARY

Accessory Dwelling Unit (ADU) A secondary house or apartment with its own kitchen, living area and separate entrance that shares the lot of the primary, larger house.

Advanced Framing Technique that significantly reduces the amount of material used to frame a building. Includes strategies such as studs placed 24 inches on center; fully insulated corners; insulated headers; engineered wood products; and roof or floor trusses.

Aerobarrier A high-tech sealing/caulking method used to seal the envelope of a building and reduce air exchanges to the lowest levels achievable.

AFUE Annual Fuel Utilization Efficiency. Widely-used measure of the fuel efficiency of a heating system that accounts for start-up, cool-down, and other operating losses that occur during real-life operation.

Air Changes per Hour (ACH) The total volume of air in a space that is exchanged over in hour.

ASHRAE 62.2 A standard for residential mechanical ventilation systems established by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers. Among other requirements, the standard requires a home to have a mechanical ventilation system capable of ventilating at a rate of 1 cfm for every 100 square feet of occupiable space plus 7.5 cfm per occupant.

Back-Drafting Indoor air quality problem in which potentially dangerous combustion gases escape into the house instead of going up the chimney. Commonly referred to as Carbon Monoxide concerns.

Biophilic Design a practice that encourages buildings to connect with the ecology of the place, and the occupants to connect with the natural environment

Blower Door Test Used to measure air tightness and identify areas of air infiltration in a home. This multi-part system uses a large fan that fits in your door frame to create negative pressure and pull air through your home.

Building Envelope A building's shell, including exterior walls, windows, doors, roof and the bottom floor.

Butterfly Roof Design A form of roof characterized by an inversion of a standard roof form, with two roof surfaces sloping down from opposing edges to a valley near the middle of the roof.

Carbon Footprint Amount of carbon dioxide and other greenhouse gases that is emitted into the atmosphere through energy use, transportation, and other means.

Cellulose Insulation Insulation made from wood fiber, primarily recycled newspaper, treated with nontoxic chemicals to retard fire, mold and insects.

Clerestory A window or row of windows placed high on a wall, often above the main roof line; used for introducing daylight into a room.

Conditioned Space An enclosed space supplied with conditioned air from a heating and/or cooling system.

Depressurization Occurs within a house when the indoor air pressure is lower than that outdoors. Exhaust fans, including bath and kitchen fans, or a clothes dryer can cause depressurization, and it may in turn cause back drafting as well as increased levels of radon within the home.

Double-Glazed Window A window with two panes of glass separated by an air space. Compared to single-glazed windows, double-glazed windows significantly reduce heat and sound transmission.

Double-Stud Wall Construction system in which two layers of studs are used to provide a thicker-than-normal wall system so that a lot of insulation can be installed; the two walls are often separated by several inches to reduce thermal bridging through the studs and to provide additional space for insulation.

Ductless Mini-Splits A type of small-capacity high efficiency heat pump with a closely-associated outside compressor and inside evaporating coil.

Energy Efficiency Using less electricity or fuel than a conventional technology to perform the same task.

Energy Efficiency Ratio (EER) A measurement of energy efficiency for air conditioners. The EER is computed by dividing cooling capacity, measured in British Thermal Units per hour (BTUH), by watts of power.

Energy Performance Score EPS™, brought to you by Energy Trust of Oregon, is an energy performance score that helps you assess a home's energy consumption, energy costs and carbon footprint.

Energy Recovery Ventilator (ERV) A ventilator that recovers energy from the exhaust airstream and transfers it to the incoming airstream. Heat is transferred from the warmer to the cooler airstream and moisture is transferred from the wetter to the dryer airstream. ERVs are used in very cold climates to retain indoor humidity.

ENERGY STAR® A program sponsored jointly by the U.S. Environmental Protection Agency and the U.S. Department of Energy that promotes energy-efficient products, homes and technologies for consumers and businesses. Energy Star qualified products and new homes are often ten to thirty percent more efficient than their conventional counterparts.

EnergyGuide Label A yellow sticker required by U.S. law on certain new household appliances, including air conditioners, furnaces, clothes washers, dishwashers, refrigerators and freezers. The label provides information on the amount of energy the appliance will use in one year.

Exhaust-Only Ventilation Mechanical ventilation system in which one or more fans are used to exhaust air from a house and make-up air is supplied passively. Exhaust-only ventilation creates slight depressurization of the home; its impact on vented gas appliances should be considered.

FSC Certified Wood The FSC certification from the Forest Stewardship Council tells whether a wood product is from a forest that is sustainably managed, including protecting fragile ecosystems, preventing illegal logging, and restricting clear-cutting.

Fuel Cell Electrochemical device in which electricity is generated by chemically reacting hydrogen with oxygen; electricity, water vapor, and heat are the only products. Unlike a battery, which stores a limited fuel supply used to create electricity, a fuel cell draws on an ongoing supply of fuel to produce electricity continuously.

Graywater Household wastewater that doesn't contain sewage and can be reused for toilet flushing. Graywater typically comes from showers, lavatories, and clothes washing machines.

Green Mortgage Type of mortgage in which the lending institution raises the allowable loan amount for an applicant's earnings level because the applicant's green home has lower monthly operating costs and may even reduce the applicant's transportation costs. See energy efficient mortgage.

Ground to Air Heat Transfer (GAHT®) or Climate Battery The design serves as a heating and cooling system, using the energy of the sun and the soil underground, allowing for year-round food harvesting with a much lower environmental impact of a traditional HVAC system.

Halocarbon Class of man-made chemicals, including chlorofluorocarbons (CFCs), hydrocholorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs), whose heat-trapping properties are among the most damaging of the greenhouse gases. Halocarbons are most commonly used in refrigeration, air conditioning, and electrical systems, and as blowing agents in some foam insulation products.

Heat Exchanger Device that transfers heat from one material or medium to another. An air-to-air heat exchanger, or heat-recovery ventilator, transfers heat from one airstream to another. A copper-pipe heat exchanger in a solar water-heater tank transfers heat from the heat-transfer fluid circulating through a solar collector to the potable water in the storage tank.

Heat Island Effect The tendency of large areas of roofs, asphalt, concrete and paved surfaces to absorb the heat, making urban areas considerably hotter than nearby rural areas.

Heat Pump Heating and cooling system in which specialized refrigerant fluid in a sealed system is alternately evaporated and condensed, changing its state from liquid to vapor by altering its pressure; this phase change allows heat to be transferred into or out of the house. See air-source heat pump and ground-source heat pump.

Heat Recovery Ventilation (HRV) System An air-to-air heat exchanger captures heat from indoor air that's about to be vented from a home and transfers that heat to fresh air that's being drawn in from the outside. Exhaust and supply airstreams cross but do not mix. Heat is transferred from warmer to cooler airstream. There are two core types: Cross flow cores and Counter flow cores.

HFO Spray Foam an insulation system designed for use in commercial and residential applications. Use in lieu of more traditional forms of insulating materials such as fiberglass, cellulose or other loose fill products.

Hydronic Radiant-Floor Heating System A heating system in which warm water circulates through tubes embedded in a concrete floor slab or attached beneath the subflooring. The floor absorbs heat from the tubes and slowly releases it to the room, providing gentle warmth.

Indoor Air Quality The level of air pollutants inside a building. Indoor air pollution sources include certain building materials and furnishings; certain cleaning and personal care products; dust mites; pet dander; mold; radon; pesticides; and outdoor air pollution. Inadequate ventilation and high humidity levels can also contribute to indoor air quality problems.

Induction An Induction stovetop uses electricity rather than gas. However, rather than a standard electric cooktop, Induction uses electromagnetic waves to heat cookware. With electromagnetism, the system is highly efficient, known to boil water 50 percent faster compared to their gas and electric counterparts.

Infill Development Building on empty or underutilized lots in cities or older suburban areas, instead of building in a previously undeveloped area.

Infiltration The uncontrolled movement of outdoor air into a building through cracks and other defects around plumbing, floor cavities, soffits, chimneys, ducts. Accompanied by an equal outflow of air from indoors to the outdoors.

Insulated Concrete Form (ICF) Plastic foam shaped into hollow blocks, panels or planks and used as a form to create a concrete wall. After positioning the foam forms, rebar is typically inserted into the cavities to reinforce the walls, and then concrete is poured in. Once the concrete cures, the foam remains in place to insulate the walls.

Integrated Building Design A collaborative design process that takes into account the interrelatedness of all parts of a building. It involves designing a building from the outset so that all its components, equipment and systems work together to provide maximum comfort, healthfulness, energy and resource efficiency, and cost effectiveness.

Inverter A device used to convert DC electricity (such as that produced by a photovoltaic system) into AC electricity to power standard household equipment and appliances.

JOTO Vent System JOTO vent is an innovative method designed in Japan to eliminate holes in the foundation walls for venting, which can create a weakness in the wall.

Kilowatt-Hour (kWh) A unit of electric energy equal to 3600 kilojoules or 3412 BTUs (relates to usage).

Latent Load Cooling load that results when moisture in the air changes from a vapor to a liquid (condensation). Latent load puts additional demand on cooling systems in hot-humid climates. Latent heat is measured by wet bulb temperature. Sensible heat is measured by dry bulb temperature.

LED Light Bulbs LEDs (Light emitting diode) are extremely long-lasting (up to 25 years) and are 85% more efficient than standard bulbs.

LEED Certified LEED (Leadership in Energy and Environmental Design) is the most widely used green building rating system in the world. Available for virtually all building types, LEED provides a framework for healthy, highly efficient, and cost-saving green buildings.

Living Building Challenge (LBC) The Living Building Challenge is a philosophy, certification, and advocacy tool for projects to become truly regenerative. In the LBC design + build process, there are 7 categories, called "Petals," serving as performance goals to pursue in achieving certification.

Low-E (Low-Emissivity) Window A very thin metallic coating on window glazing that allows daylight to enter a building but reduces the flow of heat. The appropriate type of low-e glazing for a home will depend on the climate and the window's orientation.

Natural Cooling Cooling a building through passive means rather than mechanical systems such as air conditioning. Natural cooling strategies include shading, cross ventilation, and the use of thermal mass to moderate temperatures inside a space.

Net Metering This is an agreement with you utility that allows you to feed excess directly to the utility grid any electricity that is generated in excess of your demand. This causes the electricity meter to spin backwards and give you a credit for the excess energy that you can later use to offset your electricity demand.

Net Positive A building that on average produces more energy from renewable energy sources than it imports from external sources.

Net Zero or Net Zero Energy (NZE) Building A building that creates at least as much energy as it uses. Homes are designed to take advantage of passive solar design, and focus on reducing energy demand with super-insulation and an air-tight envelope. On-site electricity generation, such as photovoltaic (PV or solar) panels, is essential to achieve net-zero energy use. Use in areas with no utility access are "off grid".

On-Demand Hot Water System to quickly deliver hot water to a bathroom or kitchen when needed, without wasting the water that has been sitting in the hot-water pipes, which circulates back to the water heater.

Pascal A unit of measurement of air pressure.

Passive Solar Design Passive solar design takes advantage of a building's site, climate, and materials to minimize energy use. A well-designed passive solar home first reduces heating and cooling loads through energy-efficiency strategies and then meets those reduced loads in whole or part with solar energy.

Phantom Load The small amounts of electricity consumed by many appliances and equipment—such as TVs and stereos with remotes, ovens with digital clocks, cell phone chargers and answering machines—even when they're not in use.

Photovoltaic (PV) Cell A material that converts sunlight directly into electricity. Electricity generated from sunlight is known as Solar electricity.

Polyvinyl Chloride (PVC) Also known as vinyl. A family of plastics with a wide range of forms and uses. PVC is used extensively in building products, consumer goods and industrial applications. PVC contains or releases many dangerous chemicals and there is no safe way to manufacture, use or dispose of PVC.

Post-Consumer Recycled Content Products that have been used and discarded by a consumer and are then reprocessed as raw material for a new product.

R-Value A measure of a material's resistance to the passage of heat through it. The higher the R-value, the more effective the material is as insulation.

Radiation The transfer of heat from a warm object to a cooler object by means of electromagnetic waves passing through air or space. When you stand in the sun, your skin is warmed by radiation.

Radon A radioactive gas derived from the natural decay of uranium. Radon is emitted by some soils and rocks, and can enter a home through cracks and holes in the foundation or through well water. Exposure to radon can cause lung cancer.

Rainwater Harvesting Collecting rainwater from a catchment area, such as a roof, and storing it in cisterns or other containers to use for watering a yard or garden, or for other purposes.

Raised Heel Trusses A raised-heel truss is identical to a conventional truss except that it is raised higher, with a "heel" that extends up from the top of the wall and elevates the truss at the building's edges. This type of design allows for more insulation above the exterior walls.

Rapidly Renewable Materials Natural and non-petroleum-based building materials that are made from agricultural products that are typically harvested within a 10-year or shorter cycle.

Reclaimed Material A material that's put to a new beneficial use after it's no longer needed for its original use, such as wood removed from an abandoned building and used to construct a new building.

Regenerative Regenerative buildings are designed and operated to reverse damage and have a net-positive impact on the environment. At the macroscale, buildings can serve as carbon sequestration sites.

Renewable Resource A material that can be replenished in a relatively short period of time after it is harvested or used, i.e. bamboo, cork, wind, sun, biomass.

Rock Wool Insulation Rockwool is the brand name for stone wool. Stone wool creates an incredibly effective insulation with sound-absorbing and fire-resistant properties. It installs like any batt insulation in the wall cavity, but it can be either flexible or rigid, delivering a full scale of solutions to match your needs.

Sealed-Combustion Appliance A gas-burning fireplace, furnace or water heater with a sealed combustion chamber. Fresh air is supplied directly to the combustion chamber from outside, and harmful combustion by-products are exhausted directly to the outside, keeping them out of the home. Same as Direct Vent.

Seasonal Energy Efficiency Ratio (SEER) Indicates an air conditioner's energy efficiency. The higher the SEER, the more efficient the air conditioner.

SIPs Construction (Structural Integrated Panels) high performance building system, using panels that consist of an insulating foam core, sandwiched between 2 oriented strand boards (OSB).Each SIPs panel is constructed in a factory, fabricated to fit the design of the building. The advantages of using SIPs are many: less waste of materials, high R-value, easy & fast assembly and reduced cost.

Solar Heat Gain Coefficient (SHGC) An indication of how much of the sun's heat will enter through a window. An SHGC of 0.40, for example, means that forty percent of the sun's heat gets through the window.

Solar Thermal or Solar Water Heating Systems The use of concentrated sunlight to heat or preheat water for domestic use and /or space heating. A closed system of Flat-plate or Evacuated-tube solar collector moves hot water from roof to store in a tank in the building.

Solatube A circular skylight that's much smaller than typical skylights, designed to illuminate interiors with daylight while keeping out excessive heat. It consists of a small, roof-mounted dome attached to a tube lined with reflective material. Light is reflected down the tube, and is transmitted into the room through a translucent ceiling fixture.

Stack Effect The air flow established in a building from air infiltrating low and exiting high. The pressures created are greatest at the highest and lowest points in the building.

Staggered Stud framing Staggered-stud framing keeps the two sides of the wall from touching, eliminating the thermal bridge of the studs. The base and top plates of the walls attach studs to both sides of the base and top plates in an alternating pattern.

Stormwater Retention Generally refers to the collection of stormwater, with no discharge point. Water is collected and then is allowed to percolate into the ground or evaporate.

Stormwater Runoff Water that flows off of buildings and paved surfaces and over land during a rainstorm.

Tankless Water Heater A water heater that saves energy by heating water as it is needed, rather than storing hot water in a tank. Also known as an instantaneous or demand water heater.

Thermal Bridge A highly conductive material within a building envelope, such as a steel or wood framing member, that allows heat to bypass the insulation.

Thermal Imaging Camera A camera that provides an image showing radiation in the infrared range of the electromagnetic spectrum. A thermal imaging camera is a useful tool for detecting hot or cold areas on walls, ceilings, roofs, and duct systems.

Thermal Mass The ability of a material to absorb and retain heat. Materials with a high thermal mass, such as rocks, earth and concrete, have the capacity to absorb heat during the day and release it when temperatures cool.

U-Factor Indicates how easily heat will pass through a construction assembly, such as a window. The lower the U-factor, the lower the rate of heat flow so the more efficient the material is.

Ventilation The movement of air through an area for the purpose of removing moisture, air pollutants, or unwanted heat.

Volatile Organic Compound (VOC) A class of organic chemicals that readily release gaseous vapors at room temperature. VOCs occur naturally in many materials, and can also be manufactured and added to materials and products. VOCs are released ("offgassed") into a home by common furnishings and building materials, including many types of particleboard, paint, solvents, carpets and synthetic fabrics.

Whole-House Fan A powerful fan mounted in a ceiling opening, used to pull air through the home and exhaust it out of the attic and through the roof vents.

Xeriscape Landscaping design that conserves water by using native or drought-tolerant plants, mulch, and limited or no irrigation.

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at The Environmental Center

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