BUILDING THE FUTURE:

# A BOLD VISION FOR CLIMATE JOBS IN OREGON

ILR Climate Jobs Institute

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# ACKNOWLEDGEMENTS

Cornell University's Climate Jobs Institute (CJI) would like to thank the Oregon AFL-CIO, the Oregon BCTC, and the building trades unions that participated in our state research and convening process. We appreciate their bold leadership and commitment to tackling climate change and inequities in the state.

**OREGON AFL-CIO**

**OREGON STATE BUILDING AND CONSTRUCTION TRADES COUNCIL**

**INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS LOCAL 48**

**INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS LOCAL 125**

**INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS LOCAL 932**

**INTERNATIONAL UNION OF OPERATING ENGINEERS LOCAL 701**

**IRONWORKERS LOCAL 29**

**LABORERS' INTERNATIONAL UNION OF NORTH AMERICA LOCAL 737**

**OREGON AND SOUTHERN IDAHO DISTRICT COUNCIL OF LABORERS**

**SHEET METAL WORKERS LOCAL 16**

**UNITED ASSOCIATION OF PLUMBERS AND STEAMFITTERS LOCAL 290**

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# ABOUT US

The Climate Jobs Institute at Cornell University's ILR School is guiding the nation's transition to a strong, equitable, and resilient clean energy economy by pursuing three aims: to tackle the climate crisis; to create high-quality jobs; and to build a diverse, inclusive workforce.

Through cutting-edge policy studies, deep relationships with on-the-ground partners, and innovative training and education programs, CJI provides information that policymakers, the labor and environmental movements, industry leaders, and others need to navigate this historic transition to a zero-carbon economy.

### CORE ACTIVITIES AND OBJECTIVES

CJI delivers high-quality research, innovative policy solutions, and top-notch educational programming that connects key stakeholders to design and implement climate plans.

### CJI'S MAIN AREAS OF WORK

**Applied Research and Policy Development for Legislators and Labor, Environmental, and Industry Leaders.** CJI crafts equity- and worker-oriented climate policies and analyses indicating how states can address climate change while maximizing high-quality job creation and economic development. The Institute's research and policy efforts result in reports, case studies, policy briefs, and visual tools and maps meant to guide the nation's transition to a clean, equitable economy.

**Technical Assistance.** CJI provides rapid response data and policy analysis on the labor, employment, and economic impacts of climate and clean energy issues. The Institute's technical assistance work offers legislators, policymakers, and others real-time support. This work also generates legislative briefings, policy briefs, blog posts, op-eds, and other written materials targeting legislators, local government officials, and leaders in labor, environmental movements, and industry.

**Training and Education.** CJI organizes a variety of educational convenings that strengthen stakeholders' knowledge, confidence, and motivation to tackle climate change and to build a large, equitable clean energy economy with high-quality jobs. Programs include the Institute's biannual Climate Jobs Summit; the design and delivery of member trainings; legislative briefings; educational delegations for legislators, labor leaders, and others; and an online Climate Jobs certificate.

**Workforce Development.** CJI provides a critical link between the future clean energy workforce we need and workforce development programs that meet these needs. The Institute also provides a pipeline from front-line Black, Indigenous, and people of color communities to paid on-the-job training and high-quality careers.

**Student Engagement.** CJI enriches the ILR and Cornell student experience by engaging undergraduate and graduate students in important aspects of the Institute's core work through fellowships, research assistantships, hands-on clinical experiences, internships, labor-climate undergraduate and graduate courses, and more.

# INTRODUCTION

# OREGON'S TWIN CRISES: CLIMATE CHANGE AND INEQUALITY

## OREGON & CLIMATE CHANGE

In recent years, the impact of climate change on Oregon – its natural environment, its economy, and most importantly, its people – has become hard to ignore. As temperatures in the state have risen, extreme heat, wildfires, and drought have all intensified.[1] Since 2020, Oregon has seen some of its hottest and driest years on record, averaging more than 20 days a year above 90°F while also undergoing "one of the most severe droughts in [its] history."[2] The state has also experienced ten billion-dollar disasters in that time evidence of the rise in extreme weather linked to the climate crisis.[3] Notably, only two years ago, Oregon saw a "record-breaking wildfire season" that burned through more than 1.8 million acres.[4] This comes merely four years after the devastating 2020 wildfire season, which itself burned more than 1.2 million acres burned, 5,000 homes destroyed, and is thought to have included "the most expensive disaster in Oregon's history" in the 2020 Labor Day Wildfires.[5]

The climate crisis is having real consequences for Oregonians, including the loss of life. An estimated 411 residents a year have died due to wildfire smoke in the last 10 years; and analysis predicts this number will climb to 600 residents annually by 2050.[6] 2021's heat dome over the Pacific Northwest was responsible for the deaths of at least 102 people, and heat-related deaths have remained elevated (though much less so) ever since.[7] The climate crisis is also linked to a number of health issues, including heat exhaustion and heat stroke, cardiovascular disease, respiratory illness, and more.[8] Climate change is impacting Oregonians' wallets, too. According to Miller et al. (2024),[9] "[t]he average Oregonian could lose roughly $12,000 in personal income per year due to changes that have already been set in motion due to past greenhouse gas emissions. Oregonians will also likely see increases in the cost of food and other goods and services."[10] Hotter temperatures also mean more and more Oregonians need to rely on air conditioning more frequently, an expense that is out of reach for some.[11] And increasingly intense wildfire seasons have threatened affordable housing while also pushing up insurance premiums by at least 30% between 2020 and 2024 – with some policies reportedly rising 600%.[12]

### THE IMPACT OF CLIMATE CHANGE ON OREGONIANS

| 20+ | 5 | 411 | $120 |
|---|---|---|---|
| Days above 90°F since 2020 | Number of Billion-Dollar Disasters Since 2020 | Average Number of Residents Who Die Due to Wildfire Smoke Each Year in the Last Decade | Daily Cost to Minimum Wage Workers for Missing Work due to Wildfire Smoke |

Table: Cornell ILR Climate Jobs Institute's compilation of several sources

Source: (1) Monica Samayoa, "Oregon Is Experiencing More 90-Plus Degree Days," Oregon Public Broadcasting, July 16, 2025, https://www.opb.org/article/2025/07/16/oregon-heat-weather-hot-temperatures-summer-willamette-valley-southern/; (2) NOAA National Centers for Environmental Information, "U.S. Billion-Dollar Weather and Climate Disasters," 2025, https://doi.org/10.25921/STKW-7W73; (3) Keaton Miller et al., *The Economic Costs of Climate Change for Oregonians: A First Look* (Forum on Oregon Climate Economics, 2024), https://irp.cdn-website.com/0358d1eb/files/uploaded/economic-cost-of-climate-change-oregonians.pdf; (4) Keaton Miller et al., *The Economic Costs of Climate Change for Oregonians: A First Look* (Forum on Oregon Climate Economics, 2024), https://irp.cdn-website.com/0358d1eb/files/uploaded/economic-cost-of-climate-change-oregonians.pdf

## OREGON'S GREENHOUSE GAS EMISSIONS BY SECTOR, 2023

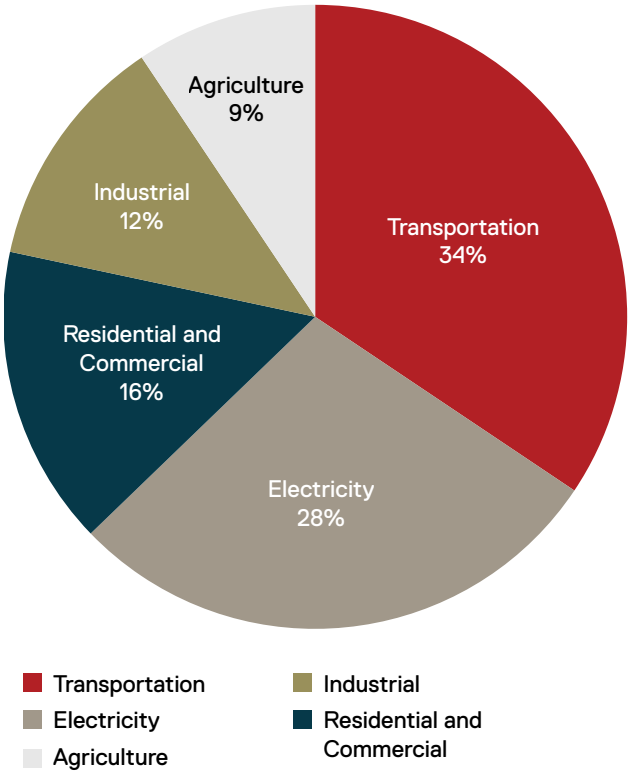



Chart: Cornell ILR Climate Jobs Institute's visualization of Oregon's Greenhouse Gas Emissions by Sector in 2023

Source: Oregon Global Warming Commission, *Biennial Report to the Oregon Legislature: 2023* (Salem, OR: Oregon Global Warming Commission, 2023), https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/64275b98de28d74ea4a96dc3/1680300956035/2023-Legislative-Report.pdf

Oregon's workers in particular face unique threats due to the climate crisis. For some workers, climate change even threatens their livelihoods. For instance, minimum wage workers risk losing up to $120 a day for every day they miss work due to wildfire smoke.[13] And Oregon's farmers and farmworkers – who are responsible for 13% of the state's overall gross domestic product [GDP] – have already suffered significant crop loss related to climate change, including a 35% loss of the cherry harvest in 2023.[14] For others, it is their health that is on the line. For instance, the 10% of Oregon's workforce employed in natural resource industries are particularly vulnerable to climate disruptions.[15] Workers who clean up after wildfires face major occupational hazards, exposing themselves to dangerous chemicals from pesticides, propane, or plastic; while the firefighters who help quell the flames in the first place face their own set of health risks.[16] Meanwhile, agricultural workers and construction workers alike face injury and death as a result of extreme heat.[17] In fact, agricultural workers are particularly at risk from climate threats: though they are covered by the state's extreme heat protections, in practice, they may not be able to afford wage losses that come along with refusing to work in dangerous conditions.[18] Yet, as Oregon prepares to build infrastructure aimed at reducing emissions and adapting to a changing climate, Oregon's workers are also key to unlocking the climate crisis.

Luckily, Oregon has long been a leader on climate action. To tackle the largest source of emissions, Oregon has adopted a goal to reduce transportation emissions 80% by 2050.[19] This goal is supported by policies such as the Clean Fuels program, which aims to reduce the carbon intensity of transportation fuels 37% by 2035, and the adoption of Advanced Clean Cars II and Advanced Clean Trucks rules, which set targets for the sale of zero-emission vehicles in the state.[20] H.B. 2021, which amended the state's Renewable Portfolio Standard, requires electric utilities to provide 100% zero-emission electricity by 2040.[21] For buildings, Oregon has adopted a target to install 500,000 heat pumps in the next five years, and large commercial buildings will be required to comply with energy performance standards by 2028.[22] Oregon also recently reinstated its Climate Protection Program (CPP), which sets a declining cap on greenhouse gas (GHG) emissions for certain facilities including fossil fuel suppliers, industrial facilities, and direct natural gas sources, ultimately reducing emissions 80% by 2050.[23] And finally, Oregon has an economy-wide goal of reducing GHG emissions 80% by 2050.[24] Even Oregon's cities have taken on the mantle of climate leadership. For instance, through the creation of the Portland Clean Energy Community Benefits Fund, Portland has been able to allocate nearly $2 billion into projects aimed at reducing emissions, building clean energy, and decarbonizing transportation.[25]

Yet in spite of these ambitious climate policies, Oregon's GHG emissions have largely remained flat over the last decade.[26] This stagnation is most apparent when examining the state's energy system. Though over half of Oregon's net electricity generation comes from clean sources, this is largely driven by an abundance of hydroelectricity as opposed to investments in technologies such as geothermal, utility-scale solar, and onshore and offshore wind.[27] For instance, Oregon ranks only 16th in the country for installed wind capacity and 26th in the country for installed solar capacity, in spite of the state's significant potential for energy generation from both sources.[28] And though Oregon has the third-highest potential for geothermal of any state in the country, geothermal only accounts for 1% of its net electricity generation.[29] Worse still, the proportion of electricity sales derived from wind, solar, and geothermal grew only 6% between 2015 and 2024.[30] By contrast, in 2024, 38% of Oregon's in-state utility-scale generation was from natural gas.[31]

This stagnation has consequences not just for meeting emissions reduction goals and safeguarding Oregon's natural environment and communities from further climate harm, but for the creation of clean union jobs as well. Oregon's workforce – including its union workforce, which constitutes up to 9% of all clean energy jobs – has been crucial to installing, operating, and maintaining these critical clean energy projects, alongside the transmission and distribution infrastructure that carries energy into homes, schools, and workplaces.[32] In fact, Oregon's clean energy sector as defined by the U.S. Department of Energy sustained over 67,000 in-state jobs in 2023.[33 a] In-state electricity generation supported 11,185 jobs, 83% of which were from solar, wind, and hydropower; fuels employed 5,720 jobs, mostly in agriculture and forestry (65.7%) as well as professional services (19.1%); and transmission, distribution, and storage supported 13,159 jobs. Nearly 80% of electric generation jobs and 91% transmission jobs were utilities, construction, and manufacturing positions.[34] As a result, the potential for significant emissions reduction and the creation of a robust, union clean energy economy remains unfulfilled, moving forward only in fits, starts, and an abundance of policy that lacks forward momentum.

## OREGON & INEQUALITY

Everyday working Oregonians are not only facing the climate crisis, they are facing an inequality crisis as well. The state's cost of living is at an all-time high, and the average Oregonian earns just above a living wage to support themselves – as long as they have no partner, children, elders, or other dependents.[35] In fact, "[i]n 2023, more than one-fourth (28%) of all jobs paid less than $20 per hour, and the majority (57%) of all jobs in Oregon paid less than $30 per hour."[36] In fact, the 10 of the 20 most common occupations in Oregon pay less than $20 per hour.[37] Yet while the average Oregonian makes only 15% more now than they did four decades ago, wages for the top one percent have grown 345% in that time.[38]

Like climate change, inequality impacts working Oregonians' ability to not only survive but thrive in their state. This is perhaps most clear in the state's housing crisis: Oregon has the country's third-highest rate of homelessness per capita and the highest rate of unsheltered children.[39] This is directly linked to stagnant wages and income inequality in the state. According to the State's own research, median sales prices outpace wage increases seven to one, meaning that "[f]or every $1 dollar Oregonians earned in wage increases, the median sales price of a home increased by $7.10."[40] Renters have been similarly hard-hit by skyrocketing housing costs and wage stagnation, as "more than 50 cents of every new dollar earned [is] going to rent hikes."[41] Oregonians are struggling to make ends meet in other areas, too. For instance, Oregon households spend an average of 56% of their income on housing

a Including transmission and distribution jobs. The U.S. Department of Energy defines a clean energy job differently than be defined at the state level, which is usually more expansive. This definition includes all r*enewable electric power and hydropower generation, nuclear electric power and fuel, microgrids and grid modernization, non-fossil storage, all biofuels, plug in hybrid vehicles, battery electric vehicles, hydrogen fuel cell vehicles, all energy efficiency, and traditional transmission and distribution*

### A SNAPSHOT OF INEQUALITY IN OREGON

| $52,328 | 28% | 15% | 345% |
|---|---|---|---|
| Living Wage Before Taxes for a Single Oregonian Adult in 2025 | Percent of Jobs in Oregon That Paid Less Than $20/Hour in 2023 | Income Growth for the Median Oregonian between 1980-2021 | Average Income Growth for the Top 1% of Oregonians between 1980-2021 |

Table: Cornell ILR Climate Jobs Institute's compilation of multiple sources describing Inequality in Oregon

Source: (1) Living Wage Calculator, Massachusetts Institute of Technology, "Living Wage Calculation for Oregon," February 10, 2025, https://livingwage.mit.edu/states/41; (2) Oregon Secretary of State, "State of Oregon: Blue Book - Oregon's Economy: Wages," 2025, https://sos.oregon.gov/blue-book/Pages/facts/economy-wages.aspx; (3) Tyler Mac Innis, "Oregon's Rich Have Never Been Richer," Oregon Center for Public Policy, November 7, 2023, https://www.ocpp.org/2023/11/07/ultrarich-inequality-income/; (4) Tyler Mac Innis, "Oregon's Rich Have Never Been Richer," Oregon Center for Public Policy, November 7, 2023, https://www.ocpp.org/2023/11/07/ultrarich-inequality-income/

and transportation costs combined.[42] Moreover, 28% of households are considered energy burdened – meaning that they spend more than 6% of their income on energy costs – and the total energy affordability gap for Oregonians in 2024 was over $275 million.[43]

Importantly, both Oregon's climate and inequality crises do not impact all equally – women, Black, Indigenous, and People of Color (BIPOC), and low-income groups are most impacted by both. For instance, such groups are often considered members of frontline communities, those "hit first and worse by climate change."[44] According to the Oregon Health Authority (2024), "[r]ates of health care visits for air quality-related respiratory illness among American Indian/Alaska Native, Black/African American and Native Hawaiian/Other Pacific Islander communities that were double or near-double the statewide rates."[45] BIPOC and low-income groups also see higher rates of heat-related illness and death in the state.[46] Studies of Portland have shown significant discrepancies in heat between formerly redlined and non-redlined neighborhoods, as well as higher rates of air-polluting facilities in said communities, meaning higher emissions concentrations and more exposure to health-harming toxins.[47] Turning toward economic inequality, the rate of poverty for nearly all non-White racial groups is higher than that of White Oregonians, with Black residents and American Indian or Alaska Native residents facing the highest rates at 26.4% and 17.9%, respectively.[48] Rates of homeownership for non-White households are between 10-29% lower than for White households; and median household income by race/ethnicity show similar disparities: all racial/ethnic groups bar Asian households have a lower median income than their White counterparts.[49] Meanwhile, women in Oregon earn 78 cents for every dollar men earn.[50] The fact that most families with infants and toddlers live in childcare deserts may contribute to the gendered wage gap, as women are more likely to shoulder the burden of childcare resulting in a "motherhood penalty" in earnings for women with children.[51]

## A NEW WAY FORWARD: CENTERING WORKERS IN THE FIGHT AGAINST THE CLIMATE CRISIS

Oregon's labor movement has begun to lay the foundation to address both of these crises simultaneously. With the passage H.B. 2021 (2021), H.B. 4059 (2022), H.B. 3031 (2023), and most recently H.B. 4080 (2024), Oregon's labor movement has helped secure integral gold-star labor standards on covered projects across the clean energy economy.[52] The passage of H.B. 2021 (2021) and H.B. 4059 (2022) together represented a watershed moment in the buildout of a union green

economy in Oregon, paving the way for the more ambitious standards put forth in H.B. 3031 (2023) and H.B. 4080 (2024).[53] H.B. 3031 (2023) is particularly notable as it contains model language for labor standards on any legislation in Oregon, raising the floor for high road jobs as the state moves forward with its green transition and beyond.[54] This high bar was further codified through the passage of H.B. 4080 (2024), which took this established precedent and applied it to the emerging industry of offshore wind.[55] In other words, these four bills are helping deliver on the promise of high-quality jobs with family sustaining wages not just for the green economy's present, but for its future.

Altogether, the standards won by these policies include:

- **Wage requirements,** ensuring workers are paid no less than the prevailing wage rate for their trade, including fringe benefits;[56]
- **Benefits requirements,** which guarantee that workers are offered employer-paid healthcare and retirement benefits;[57]
- **Registered apprenticeship requirements,** mandating that contractors:
  a) Participate as a training agent in a registered apprenticeship program; and
  b) Ensure that 15% of work hours are performed by apprentices in apprenticeable occupations, or otherwise demonstrate good faith effort in aiming to meet said requirement.[58]
- **Targeted outreach, recruitment, and retention of underrepresented groups** including women, minority individuals, and veterans, with a goal that 15% of work hours are performed by individuals from these groups.[59] Additionally, adopt policies to prevent workplace harassment and discrimination of these and other underrepresented groups; as well as policies to promote workplace diversity, equity, and inclusion;[60]
- **Protection from labor abuses** by (a) requiring a demonstration of compliance with federal and state wage and hour laws including prevailing wage laws for the past three or seven years, depending on the project type, and (b) maintenance of license and good standing to perform the work for renewable energy projects specifically;[61]

Credit: IUOE Local 701

- **Protection of workers' health and safety** by requiring a demonstration of compliance with state rules and requirements regarding occupational safety and healthy for the past three or seven years, depending on the project type;[62]
- **Buy American requirements,** which stipulate that developers or contractors purchase or use steel, iron, coatings for steel and iron, and manufactured products that become part of a permanent structure be produced in the United States on contracts $250,000 or more;[63]
- Or, in lieu of the above, provide the relevant state agency/ies a copy of a **project labor agreement** (PLA).[64] Under H.B. 4080 (2024) developers and contractors may provide a copy of a workforce development agreement, which, in addition to a PLA, requires labor peace agreements for all non-construction work and agreements to utilize or develop project-related domestic supply chains.[65]

These legislative wins, paired with Oregon's existing prevailing wage rate law – which defines the State's prevailing wage requirements on public works contracts as well as enforcement of these requirements – are the key to combatting the climate crisis while also reducing the state's inequality crisis. In short, these successes raise the floor for workers in the clean energy economy instead of furthering the race to the bottom. These policies form the bedrock of the workforce and contractor labor standards attached to the recommendations in

## UNION APPRENTICESHIPS HAVE STRONGER ENROLLMENT AND GRADUATION RATES FOR UNDERREPRESENTED GROUPS

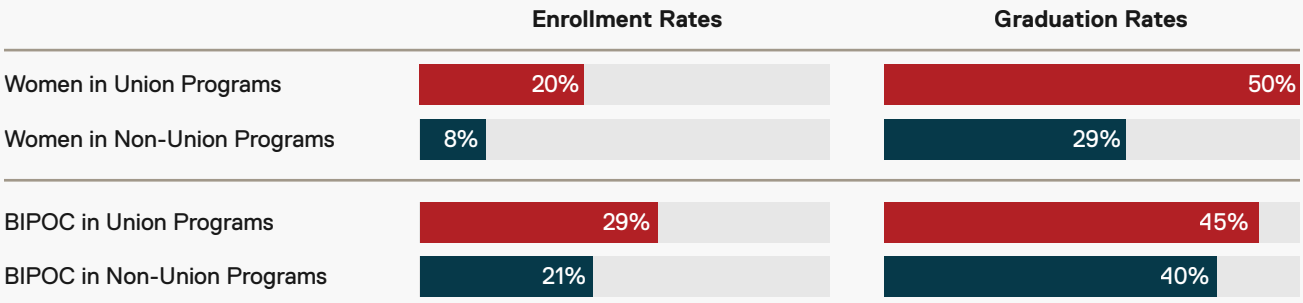



Table: Cornell ILR Climate Jobs Institute's visualization of Petrucci's (2021) research examining apprenticeship programs in the greater Portland metro area using data from 2011-2020

Source: Larissa Petrucci, *Constructing a Diverse Workforce: Examining Union and Non-Union Construction Apprenticeship Programs and Their Outcomes for Women and Workers of Color* (Eugene, OR: University of Oregon Labor Education and Research Center, 2021), https://bpb-us-e1.wpmucdn.com/blogs.uoregon.edu/dist/a/13513/files/2021/11/Constructing_A_Diverse_Workforce.pdf

this report. First and foremost, research demonstrates that the adoption of robust prevailing wage rate laws is associated with key benefits for workers, employers, and the state alike. For workers, strong prevailing wage rate laws are correlated with an increase in wages by 8% – with greater increases for lower-income workers – a higher likelihood of being covered by a private health insurance plan, and up to 33% reduced likelihood of falling below the poverty line.[66] [b] Moreover, both workers and employers benefit from strong prevailing wage rate laws through strengthened workforce training (as demonstrated by the greater enrollment in apprenticeships and faster completion rates of such programs) and safer worksites.[67] Simultaneously, employers and the state benefit from such laws through improved worker productivity per worker – states with prevailing wage laws see improvements ranging from 14 to 33%.[68] Finally, Oregon's prevailing wage rate law has helped increase bid competition for public workers; and strengthening said law could help grow state revenue from construction workers' income taxes by $10 million.[69]

At the same time, strengthening union jobs overall in the clean energy economy – accomplished in part through robust labor standards that help to level the playing field for union signatory contractors – is itself essential to ensuring equity, justice, and opportunity are central to Oregon's continued energy transition.[70] Starting with workforce training, when examining apprenticeship in Oregon, union programs are shown to have better outcomes than their non-union counterparts.[71] When comparing apprentices in union and non-union programs in the greater Portland metro area between 2011 and 2020, union programs saw a graduation rate of 58%, versus 36% for non-union programs; and apprentices in union programs were 20% more likely to graduate their programs.[72] Furthermore, apprentices who reached journey-level status had higher average wages in union programs ($37/hour) than non-union programs ($31/hour); and 60% of apprentices in union programs were enrolled in trades with hourly wages of $40 versus 31% of apprentices in non-union programs.[73] While imperfect, union apprenticeship programs also proved to be better tools for addressing race and gender inequities than non-union programs. Union programs not only saw higher rates of enrollment for women and BIPOC individuals than non-union programs; they were also associated with better outcomes for these groups.[74] The breakout box *Understanding Registered Apprenticeship: the Union Difference* below covers the impact of union apprenticeships on these underrepresented groups.

b Stepick and Manzo (2021) note that " this result is only significant at the 90-percent level of confidence" (p.22)

## UNDERSTANDING REGISTERED APPRENTICESHIP: THE UNION DIFFERENCE

Credit: SMART Local 16

Through Registered Apprenticeship programs (RAPs) workers, unions, and employers collaborate to build a quality workforce pipeline into a given industry. In RAPs, job seekers obtain paid work experience with a mentor, progressive wage increases, classroom instruction, and a portable, nationally-recognized credential.[75] In many states, including Oregon, these programs are regulated by state apprenticeship agencies. States without their own agencies follow standards set by the U.S. Department of Labor.[76] When administered properly, registered apprenticeship is a powerful tool for filling workforce gaps, generating workers' economic mobility, and improving workforce diversity.

Effective registered apprenticeships build durable networks for recruiting, developing, and retaining skilled workers in high need industries such as construction. Across the country, Career and Technical Education (CTE) systems offer K-12 students exposure to hands-on learning and opportunities to earn industry-recognized credentials.[77] Partnerships between school districts, colleges, and unions can connect young people to post-secondary education that leads directly to quality jobs. In construction, labor standards on construction projects are another key driver of registered apprenticeship.[78] Prevailing wage and apprenticeship utilization requirements generate opportunities for young workers to learn, earn, and ascend to journey-level status.[79] Without strong labor standards, policymakers risk incentivizing the proliferation of low road programs that put apprentices on jobs without adequate training or a clear career path.

In general, union apprenticeships deliver better outcomes for participants when compared to non-union ones. Recent analysis of apprenticeships in the Portland area highlights the disparity between union and non-union apprenticeships–particularly for women and people of color. The study found union apprenticeships to be more diverse in terms of gender and race, have significantly higher graduation rates, and pay considerably higher wages.[80] Workers from underrepresented backgrounds saw the sharpest union difference. Women and people of color were "significantly more likely" to complete their apprenticeship when enrolled with a union compared to in non-union programs.[81] Furthermore, the study found that "women in union apprenticeships were almost 2.5 times more likely to make at least $40 per hour," and that "BIPOC union apprentices were nearly 3 times more likely to make at least $40 an hour compared to their non-union counterparts."[82] Quality programs promote economic equality by paying good wages and placing apprentices into family-sustaining careers.

Registered apprenticeship can also promote small business ownership among people from underrepresented backgrounds. Graduates of union apprenticeship programs are equipped with the skills, know-how, and networks to succeed at the journey-level. Union journeyworkers can build up the experiences and savings necessary to establish their own general contracting businesses. To ensure that businesses participating in certifications under Oregon's Certification Office of Business Inclusion and Diversity (COBID) promote good jobs for Oregonians, it is vital for the state to have a diverse and well-trained base of general contractors. Meeting that goal starts by bringing people of all backgrounds into the skilled trades through registered apprenticeships.

Credit: IBEW Local 125

And like prevailing wage rate laws, unions have been found to not only improve workers' working conditions and living standards, but also offer significant benefits for employers and the state. Per Brenner and Stepick (2019), "[b]oth national and state-level data show that unions raise wages, improve health and pension benefits, reduce overall income inequality, and significantly decrease racial and gender inequalities."[83] More specifically, Brenner and Stepick's (2019) research shows that, when controlling for other factors, union workers have 11% higher earnings on average, are 17.5% more likely to have employer-provided health benefits, and are 41% more likely to have employer-provided retirement.[84] Union workers are also over 33% less likely to be considered low-income.[85] In terms of benefits to employers, unionized workplaces are associated with fewer occupational fatalities, fewer Occupational Safety and Health Administration (OSHA) violations, improved productivity, and reduced turnover.[86] Unions are also essential to creating a pipeline of skilled and trained labor, likely due in part to the robust system of registered apprenticeship training unions provide.[87] This makes unions particularly well-suited to preparing workers for emerging industries– as is needed in the clean energy transition –[88] as well as meeting gaps in skills and worker gaps in the existing workforce.[89] Finally, union members and their families are over 35% less likely to rely on certain public safety net programs, thus helping to save public dollars.[90]

As the federal government reverses course on a union clean energy future with the passage of its "One Big Beautiful Bill Act," gutting climate funding that once promised to supercharge the U.S. economy while bolstering high-quality green jobs, now is the time for Oregon to push a bold climate plan with workers at the center.[91]

This report, created hand-in-hand with the state's building trades, provides policy pathways to tackle the climate and inequality crises together by building clean infrastructure, reducing emissions, and bolstering high-quality union jobs accessible to all. These pathways focus on five key themes:

1. **Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition**

2. **Future-proofing Oregon's Energy Grid and Industrial Economy,** which provides a vision for scaling of Oregon's renewable energy buildout, as well as the policies needed to get there. In addition, this section addresses emissions from the industrial sector, whose future is inextricably linked to that of the clean energy grid.

3. **Building Healthy & Resilient Communities,** which focuses on strategies that guarantee the reduction of GHG and health-harming emissions where Oregonians live, work, learn, and play, prioritizing innovative models for ensuring equity and scaling work to guarantee high-road jobs take the place or low-road ones.

4. **Protecting Oregon's Workers from Climate Impacts,** which looks at strengthening protections and standards for those workers on the front lines of the climate crisis.

5. **Leading on Climate with Equity & High-Road Union Careers,** which provides the framework for creating a diverse, equitable, and union clean energy workforce – from tightening enforcement of existing and future labor standards, to bolstering equitable workforce development, to ensuring public dollars lead to high-quality jobs.

Photo Credit: LiUNA Local 737

# COMPREHENSIVE GOLD STAR LABOR STANDARDS FOR OREGON'S GREEN UNION TRANSITION

To not only ensure the creation of high-quality jobs with family-sustaining wages and benefits through Oregon's Green transition, but also to create a skilled and diverse workforce, improve the quality and safety of green worksites, and increase state funding, Oregon must prioritize the creation of comprehensive labor standards. As such, this section provides a summary of the model workforce and contractor labor standards as well as equity provisions attached to the recommendations in this report.

These standards are both strengthened versions of existing provisions won by Oregon's labor movement through landmark legislation including H.B. 2021 (2021), H.B. 4059 (2022), H.B. 3031 (2023), and H.B. 4080 (2024), as well as other landmark bills that have reinforced the state's regime of labor standards on public projects.[1] This report also recommends adopting additional contractor labor standards, discussed in more detail below.

# MODEL WORKFORCE AND CONTRACTOR LABOR STANDARDS, EQUITY PROVISIONS FOR A GREEN TRANSITION IN OREGON

### PREVAILING WAGE REQUIREMENTS MODEL LANGUAGE AND PROJECT TYPES

Developers, contractors, and sub-contractors shall pay workers who perform work on a project no less than prevailing wage rate including fringe benefits. Applies to: any public improvement project or public works project that uses $50,000 or more of funds of a public agency; all projects using solar energy as defined under by ORS §279.800, regardless of project cost; and "covered projects" and other projects as defined in statute or recommended in this report.[2]

The model language is adapted from Oregon's existing prevailing wage rate law as well as labor standards won on clean energy projects.[3] Project types would update Oregon's existing prevailing wage rate law to:

- Cover public improvement projects that use $50,000 in funds of a public agency, and
- Lower the $750,000 threshold required for certain public works projects to $50,000

Additional projects that should be covered by prevailing wage requirements that do not meet the definitions of public improvement projects or public works are specified in each recommendation in this report.

### EMPLOYER-PAID BENEFITS REQUIREMENTS MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and sub-contractors shall offer employer-paid family health insurance and retirement benefits to workers who perform work on a project. Applies to: any public improvement project or public works project that uses $50,000 or more of funds of a public agency; all projects using solar energy as defined under by ORS §279.800, regardless of project cost; and "covered projects" and other projects as defined in statute or recommended in this report.[4]

The model language is adapted from labor standards won on clean energy projects.[5] Project types would update Oregon's public contracting code to require employer-paid benefits on all public improvement projects and public works projects at or above the $50,000 threshold, as well as all projects using solar energy. This is in line with suggested changes to prevailing wage rate law. In other words, all public improvement projects and public works projects that require prevailing wage rate must also require employer-paid benefits. Additional projects that should be covered by employed-paid benefits requirements that do not meet the definitions of public improvement projects or public works are specified in each recommendation in this report.

### APPRENTICESHIP UTILIZATION REQUIREMENTS MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and sub-contractors shall offer employer-paid family health insurance and retirement benefits to workers who perform work on a project. Applies to: any public improvement project or public

works project that uses $50,000 or more of funds of a public agency; all projects using solar energy as defined under by ORS §279.800, regardless of project cost; and "covered projects" and other projects as defined in statute or recommended in this report.[6]

The model language is adapted from labor standards won on clean energy projects.[7] Project types would update Oregon's public contracting code to require employer-paid benefits on all public improvement projects and public works projects at or above the $50,000 threshold, as well as all projects using solar energy. This is in line with suggested changes to prevailing wage rate law. In other words, all public improvement projects and public works projects that require prevailing wage rate must also require employer-paid benefits. Additional projects that should be covered by employed-paid benefits requirements that do not meet the definitions of public improvement projects or public works are specified in each recommendation in this report.

### PRE-APPRENTICESHIP GRADUATE UTILIZATION REQUIREMENTS MODEL LANGUAGE AND PROJECT TYPE COVERED

At least 20% of apprentices shall be graduates of registered pre-apprenticeship programs. Applies to: any public improvement project or public works project that uses $50,000 or more of funds of a public agency; all projects using solar energy as defined under by ORS §279.800, regardless of project cost; and "covered projects" and other projects as defined in statute or recommended in this report.[8]

The model language creates a pre-apprenticeship graduate utilization standard, as seen in municipalities like Chicago.[9] This, combined with tightened pre-apprenticeship program requirements for registered pre-apprenticeship as outlined in the recommendation *Expand Workforce Development Support Services to Create a Diverse, Equitable Green Union Economy* on pages 97-8 will help to create demand for high-quality registered pre-apprenticeship programs with pathways into union registered apprenticeship programs. Project types would update Oregon's public contracting code to require pre-apprenticeship graduate utilization on all public improvement projects and public works projects at or above the $50,000 threshold, as well as all projects using solar energy. This is in line with suggested changes to prevailing wage rate law. In other words, all public improvement projects and public works projects that require prevailing wage rate must also require pre-apprenticeship graduate utilization. Additional projects that should be covered by pre-apprenticeship graduate utilization requirements that do not meet the definitions of public improvement projects or public works are specified in each recommendation in this report.

### TARGETED OUTREACH, RECRUITMENT, AND RETENTION OF UNDERREPRESENTED GROUPS MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and subcontractors shall establish and execute a plan for outreach, recruitment, and retention of women, minority individuals, and veterans to perform work on the project. Applies to: any public improvement project or public works project that uses $50,000 or more of funds of a public agency; all projects using solar energy as defined under by ORS §279.800, regardless of project cost; and "covered projects" and other projects as defined in statute or recommended in this report.[10]

The model language is adapted from ORS §757.306, ORS §332.361, and H.B 4080 (2024).[11] Based on modified recommendations from Petrucci (2021), the 15% of work hours clause has been updated from a goal to a mandate.[12] Project types would update Oregon's public contracting code to require targeted outreach, recruitment, and retention of underrepresented groups on all public improvement projects and public works projects at or above the $50,000 threshold, as well as all projects using solar energy. This is in line with suggested changes to prevailing wage rate law. In other words, all public improvement projects and public works projects that require prevailing wage rate must also require pre-apprenticeship graduate utilization. Additional projects that should be covered by targeted outreach, recruitment, and retention of underrepresented groups that do not meet the definitions of public improvement

projects or public works are specified in each recommendation in this report.

### ENFORCEMENT MODEL LANGUAGE AND PROJECT TYPE COVERED

The Oregon Bureau of Labor and Industries (BOLI) may inspect developers, contractors or subcontractors to determine if required labor standards are being met. BOLI may initiate legal proceedings and impose civil penalties of $5,000 per violation on any developers, contractor, or subcontractor that fails to meet prevailing wage or any other mandated workforce or contractor labor standard. Any developer, contractor, or subcontractor that fails to meet prevailing wage requirements is liable for the amount of underpayment and liquidated damages equal to unpaid wages, including through civil action brought forth by authorized third party representatives. BOLI may also debar such developers, contractors, and subcontractors from receiving public improvement contracts and public works contracts. Applies to: any public improvement project or public works project that uses $50,000 or more of funds of a public agency; all projects using solar energy as defined under by ORS §279.800, regardless of project cost; and "covered projects" and other projects as defined in statute or recommended in this report.[13]

The model language is adapted from ORS §279C.850-§279C.875 and S.B. 426 (2025).[14] Together, the model language and project type:

- Clarify BOLI's ability to inspect and enforce labor standard violations to any project that requires prevailing wage per statute, including non-public projects,
- Clarify that developers, contractors, and subcontractors are liable for wage theft on non-public covered projects, and

Update ORS §279C.860 to enable BOLI to debar developers, contractors, and subcontractors who fail to meet the broader range of labor standards required on public and private projects from public improvement contracts as well as public works projects.

### BUY AMERICAN REQUIREMENT MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and sub-contractors shall purchase domestically-produced or manufactured component parts, wherever practicable, such as steel, iron, HVAC equipment, transmission cables, and electric vehicles. Applies to: any public improvement project or public works project that uses $50,000 or more of funds of a public agency; all projects using solar energy as defined under by ORS §279.800, regardless of project cost; and "covered projects" and other projects as defined in statute or recommended in this report.[15]

The model language and project type together expand requirements from ORS §279C.303 and H.B. 4080 (2024) to:

- Encompass a wider range of products that should be domestically produced or manufactured, and
- Expand the type of projects that should comply with this requirement as specified by the recommendations in this report.[16]

Unlike other labor standards covered above, the dollar threshold that triggers these requirements for public projects.

### SKILLED AND TRAINED WORKFORCE REQUIREMENTS MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and subcontractors shall use a skilled and trained workforce for on and off-site construction, construction-based maintenance, and construction-based operations. To complete the project, contract, or sub-contract. A skilled and trained workforce meets the following requirements for applicable apprenticeable occupations in the building and construction trades:

- All workers performing work in an apprenticeable occupation in the building and construction trades shall either be skilled journeypersons or apprentices registered in a state-registered apprenticeship program
- At least 30% of the skilled journeypersons are graduates of a state-registered apprenticeship program,

with increasing annual benchmarks up to 60% for specified trades

Applies to: "covered projects" and other projects as defined in statute or recommended in this report.

The model language is adapted from Cal. Pub. Cont. Code §2600-2602.[17] Dotson et al. (2020) provide further research advocating for adopting a skilled and trained standard to support Oregon's clean energy transition.[18]

### SELF PERFORMANCE OF WORK MODEL LANGUAGE AND PROJECT TYPE COVERED

Contractors, and sub-contractors shall perform at least 80% of the contracted labor for their scope. Applies to: "covered projects" and other projects as defined in statute or recommended in this report.

The model language is adapted from contractors including the Regional Workforce Equity Agreement of 2022 between the Oregon Metro, Multnomah County, the City of Portland; the Columbia Pacific Trades Council, and the Pacific Northwest Regional Council of Carpenters for covered projects.[19]

### DEMONSTRATED COMPLIANCE WITH LABOR LAWS AND PROTECTIONS MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and sub-contractors shall demonstrate a history of compliance in recent years, or provide available history for new businesses with applicable prevailing wage rate laws, worker classification requirements, state and federal wage and hour laws, and rules and regulations regarding occupational safety and health. Applies to: "covered projects" and other projects as defined in statute or recommended in this report.

The model language and project type is adapted from labor standards won on clean energy projects.[20] This language is updated to specify that developers, contractors, and subcontractors must demonstrate compliance with worker classification laws.

### RESPONSIBLE CONTRACTOR CERTIFICATION MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and sub-contractors shall maintain a license and good standing to perform work and remain eligible to receive contracts or subcontracts for public works. Applies to: "covered projects" and other projects as defined in statute or recommended in this report.

The model language and project type is adapted from labor standards won on clean energy projects.[21]

### PROJECT LABOR AGREEMENT EXEMPTIONS MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers, contractors, and sub-contractors may provide Project Labor Agreements (PLAs) – meaning "a pre-hire collective bargaining agreement with one or labor organizations that establishes the terms and conditions of employment for a specific construction project" – to relevant state agencies be exempted from the prevailing wage and additional labor standard requirements for certain projects as specified.[22] Applies to: "covered projects" and other projects as defined in statute or recommended in this report.

The model language is adapted from labor standards won on clean energy projects.[23] Project types would expand coverage of PLA exemptions to a broader array of project types, as denoted in this report.

### LABOR PEACE AGREEMENTS MODEL LANGUAGE AND PROJECT TYPE COVERED

Public contracting agencies shall assess the viability of a Labor Peace Agreement (LPA) requirement on each covered contract for non-construction work to ensure timely project completion by skilled labor. The LPA shall include card check recognition and neutrality provisions. Applies to: "covered projects" and other projects as defined in statute or recommended in this report.

The model language is adapted from labor standards won in H.B. 4080 (2024).[24] Project types would expand

coverage of LPAs to a broader array of project types, as denoted in this report.

### COMMUNITY BENEFITS AGREEMENT MODEL LANGUAGE AND PROJECT TYPE COVERED

Developers shall sign an enforceable contract illustrating a commitment to engage with local community-based organizations and bona fide labor organizations; the delivery of tangible benefits to communities where projects are developed, and the inclusion of women and minority-owned businesses. Applies to: "covered projects" and other projects as defined in statute or recommended in this report.

The model language is based on community benefits plan requirements for certain funding streams under the Inflation Reduction Act and Bipartisan Infrastructure Law, as well as other model policies in states including California and New Jersey.[25]

Credit: Ironworkers Local 29

## UNPACKING NEWLY-PROPOSED LABOR STANDARDS FOR OREGON

As mentioned above, while many of the standards discussed already exist in Oregon in some form, some are newly proposed, namely: pre-apprenticeship graduate utilization requirements, skilled and trained workforce requirements, community workforce agreements, and self-performance of work. This section unpacks the context of these newly proposed standards.

### PRE-APPRENTICESHIP GRADUATE UTILIZATION: THE IMPORTANCE OF HIGH-QUALITY PRE-APPRENTICESHIP PROGRAMS FOR CREATING A SKILLED, TRAINED, AND DIVERSE CONSTRUCTION WORKFORCE

In pre-apprenticeship programs, participants learn about apprenticeship opportunities in the building trades, prepare for entry exams, and develop "soft skills" for job readiness such as financial literacy, communication, and teamwork.[26] Program duration varies, but pre-apprenticeship cohorts generally spend between one and three months learning together.[27] Through targeted recruitment and provision of key wrap-around services such as childcare, personal protective equipment, or transportation stipends, high-quality pre-apprenticeship programs can be a powerful tool for bringing members of historically marginalized communities into family-sustaining jobs in the unionized trades.[28]

Importantly, high-quality pre-apprenticeship programs are not a back door to placing young workers into low-wage jobs on construction sites. Participants learn in classrooms or controlled environments, and are taught by experienced instructors. Many programs utilize the Multi-Craft Common Core Curriculum (MC3).[29] The MC3 was developed by the National Association of Building Trades Unions (NABTU), and offers 120-hours of gold standard, industry-recognized construction skills training.[30] Reflecting NABTU's efforts to build a diverse union workforce, the MC3 emphasizes career pathways for underserved populations.

In evaluating a pre-apprenticeship program, it is vital to understand the standard of instruction and learning offered. In addition to the MC3, another marker of a high-road program is the presence of a Master Agreement with one or multiple local building trades unions.[31] Such agreements allow successful pre-apprentices facilitated access to union apprenticeships after

graduation.[32] In Oregon, facilitated access takes many forms, including direct, direct interview, and beyond.[33]

**THROUGH TARGETED RECRUITMENT AND PROVISION OF KEY WRAPAROUND SERVICES SUCH AS CHILDCARE, PERSONAL PROTECTIVE EQUIPMENT, OR TRANSPORTATION STIPENDS, HIGH-QUALITY PRE-APPRENTICESHIP PROGRAMS CAN BE A POWERFUL TOOL FOR BRINGING MEMBERS OF HISTORICALLY MARGINALIZED COMMUNITIES INTO FAMILY-SUSTAINING JOBS IN THE UNIONIZED TRADES.**

By working with high-road program sponsors, such as those utilizing the MC3 curriculum, policymakers can promote bona fide programs that help place participants into quality jobs. Building a robust ecosystem for pre-apprenticeship with facilitated entry into union apprenticeship programs – and therefore union careers – is one powerful way that policymakers, unions and businesses can train a skilled, diverse, and well-compensated in-state workforce.

### SKILLED AND TRAINED: GUARANTEEING A HIGH-SKILLED WORKFORCE AND THE SAFE, EFFICIENT DELIVERY OF PROJECTS

Skilled and trained workforce standards are newer legislative tools to support workforce development and workplace safety on both public and private projects. These standards are composed of two complementary parts. First, they require a certain portion of workers on a construction-based project to have specific qualifications, typically requiring workers to have journeyworker status.[34] Second, these requirements also ensure that projects contribute to the growth of a skilled state workforce, accomplished through requirements of hiring labor from registered apprenticeship programs.[35]

The apprenticeship training requirements innate to skilled and trained workforce standards enable them to achieve these workforce development and safety aims. Firstly, in terms of workforce development, "[a]pprenticeship programs have long been a successful way to recruit and train skilled workers in the construction industry, and they provide a steady stream of workers destined to become highly-skilled experts in their trade."[36] Of note, Stepick and Manzo (2021) found that participants in joint labor-management apprenticeships – the type of apprenticeships run with unions at the helm – reported that these programs provided them with better skills and workplace safety training than employer-only alternatives.[37] Additionally, "registered apprenticeship programs in construction include health and safety courses, such as how to identify and report health and safety standards, use scaffolding, work safely with hazardous materials, operate machinery and forklifts, prevent silica exposure, and prevent burns on construction and demolition projects."[38] Within the green economy specifically, skilled and trained workforce standards can help both meet workforce needs in the clean energy economy and guarantee employment for apprentices post-graduation.[39]

California has led the nation in codifying skilled and trained workforce requirements, attaching such requirements on a variety of projects including certain school projects, certain housing projects, the refining sector, certain energy projects, and certain public works projects.[40] Adopting a similar skilled and trained standard in Oregon can ensure that the wide variety of infrastructure needed for a green transition needs are met on time, on budget, and with positive impacts on communities.

**OF NOTE, STEPICK AND MANZO (2021) FOUND THAT PARTICIPANTS IN JOINT LABOR-MANAGEMENT APPRENTICESHIPS – THE TYPE OF APPRENTICESHIPS RUN WITH UNIONS AT THE HELM – REPORTED THAT THESE PROGRAMS PROVIDED THEM WITH BETTER SKILLS AND WORKPLACE SAFETY TRAINING THAN EMPLOYER-ONLY ALTERNATIVES.**

Credit: IBEW Local 48

### SELF-PERFORMANCE OF WORK: CLOSING LOOPHOLES IN THE APPLICATION AND ENFORCEMENT OF CONTRACTOR LABOR STANDARDS

Requiring contractors or subcontractors to perform the majority of work themselves can help avoid the practice of breaking up contracts into infinitely smaller contracts to skirt mandated workforce and contractor labor standards. Self-performance requirements therefore ultimately serve to uphold both high-quality job creation and high-quality projects.

### COMMUNITY BENEFITS AGREEMENTS: CENTERING EQUITY IN THE CLEAN ENERGY TRANSITION

Community benefits plans are "enforceable contracts between developers and community coalitions which provide benefits for the community," whether for mitigating the potential negative impacts for a project or as part of a process of restorative justice.[41] These community coalitions should include representative community benefits organizations alongside bona fide labor unions, thus also helping bridge local communities to high-quality jobs. Justice-oriented community benefits agreements should provide both monetary and non-monetary co-benefits that are clearly defined.[42] A monetary benefit are direct payments to the community but may be at any level of community - i.e., directly to households, paid into a community fund or non–profit, transferred to the town – while non-monetary co-benefits can be much more expansive, such as job creation or the promise of a portion of clean energy generated from a project dedicated for use in the community in which the project is cited.[43]

Photo Credit: IBEW Local 125

# FUTURE-PROOFING OREGON'S ENERGY GRID & INDUSTRIAL ECONOMY

RECOMMENDATION

# BUILD 36 GW OF CLEAN ENERGY, 12.8 GW OF ENERGY STORAGE, AND EXPANDED TRANSMISSION CAPACITY BY 2040 USING UNION LABOR

- Ensure a clean and resilient grid by 2040 with:
  - 21.6 GW of new solar capacity,
  - 10.9-12.6 GW of new wind capacity,
  - 2.3 GW of new geothermal capacity,
  - 0.4 GW of additional hydropower from current capacity through existing dam retrofits
  - 12.8 GW of new storage capacity,
  - Upgraded and new transmission infrastructure for over 89% of additional capacity, and,
  - Upgraded distribution infrastructure across the state.

Expanding renewable energy is essential to meeting Oregon's climate goals as its electric power industry was the state's second largest source of greenhouse gas (GHG) emissions in 2022.[1] A decarbonized and expanded electricity system by 2040 will require massive infrastructure buildout, offering a historic opportunity to benefit Oregon's workers, ratepayers, industries, and communities. A strategic buildout of clean energy will support existing energy jobs and should expand access to in-state union careers across the building trades and other sectors through construction, operations, maintenance, professional, technical, supply chain, manufacturing, and induced jobs. Additionally, a carefully crafted strategy to meet rising energy needs offers the opportunity to modernize and strengthen the electric grid, provide greater energy independence and resilience, address environmental justice, and deliver affordability alongside protections for ratepayers.[2]

To meet climate goals while taking into account the state's anticipated increase in electricity demand, the Climate Jobs Institute's analysis shows that Oregon must build out 36 GW of generation capacity from new renewable energy resources and 12.75 GW of energy storage by 2040 from its 2025 nameplate capacity (See *Methodology Appendix* on pages 106-8).[3] Apart from generation and storage, the electric grid must expand with over 89% additional transmission capacity needed

**LABOR UNIONS HAVE BEEN INTEGRAL IN OREGON'S CLIMATE EFFORTS, INCLUDING BUILDING AND MAINTAINING MUCH OF ITS CLEAN ENERGY AND ELECTRIC GRID.**

to support these new sources, additional transmission capacity to meet reliability standards and interstate electricity flows, and distribution system upgrades to support modern electricity needs (See *Methodology Appendix* on pages 106-8).[4]

Labor unions have been integral in Oregon's climate efforts, including building and maintaining much of its clean energy and electric grid. As Oregon rapidly scales its buildout of clean energy infrastructure, its unions will remain essential, ensuring that grid decarbonization is completed in a timely, safe manner by skilled and trained workers.[5] Expediting decarbonization and building nearly 50 GW of generation and storage projects for a clean and resilient grid by 2040 provides unions the opportunity to build on existing momentum in the clean energy space with the potential to create widespread opportunities for Oregon's communities to access high-road careers in unionized trades.[6] In creating opportunities to organize the full clean energy sector, Oregon can set an example of how clean energy should provide the social and economic benefits of union careers for generations to come.

Oregon's electricity emissions have more than doubled since 1990, defying national trends.[7] Today, demand for energy is rising faster than it has in decades.[8] In Oregon, increasing demand has historically been offset by tackling energy efficiency.[9] However, with electricity demand projected to rise 30% in the next decade and to double by 2050, Oregon must significantly scale its clean energy capacity in addition to its traditional energy efficiency and demand response strategies.[10]

Fortunately, the state has an abundance of untapped technical capacity for renewable resources.[11] [a] With 1.61 GW installed, solar has only been developed to 0.5% of Oregon's technical capacity; while the state's 4.2 GW of onshore wind has only reached 14.47% of its technical capacity.[12] While Oregon's nascent offshore wind (OSW) industry faces blockages, the technology remains a key industry for long-term grid needs due to its potential to provide up to 225 GW of electricity from Oregon's coast, along with its environmental benefits and job opportunities.[13] Finally, Oregon has some of the highest potential for enhanced geothermal energy in the country.[14] While geothermal still has challenges to commercialization, modern technologies increase its viability through cheaper drilling methods, offering Oregon an additional source of firm, carbon-free electricity and economically-competitive thermal energy.[15]

**FORTUNATELY, THE STATE HAS AN ABUNDANCE OF UNTAPPED TECHNICAL CAPACITY FOR RENEWABLE RESOURCES.**

The cost savings potential of Oregon's renewable energy buildout is a welcome reprieve for Oregon's businesses and families given rising utility rates for electricity.[16] Renewables are currently the cheapest ways to produce electricity in the United States based on the levelized cost of energy (LCOE), a measurement of the total cost of an electricity generation project on a dollar per megawatt hour basis.[17] Additionally, a 2025 analysis by the U.S. Electricity Information Administration (U.S. EIA) demonstrated that on-shore wind and solar PV are more economical under the 2024 market compared to natural gas combined cycle plants when looking at the levelized avoided cost electricity.[18] In other words, even without subsidies, "renewable energy remains one of the most cost-competitive form[s] of generation [... which is] particularly true in the current high power demand environment, where renewables stand out as both the lowest-cost and quickest-to-deploy generation sources."[19] Additionally, because renewable electricity

a In its 2012 study, the National Renewable Energy Lab defines technical capacity as "the achievable energy generation of a particular technology given system performance, topographic limitations, environmental, and land -use constraints." It can act as an "upper-boundary estimate of development potential." Technical potential follows resource potential which is the physical constraint, theoretical physical potential, and energy content of a resource; but it precedes economic and market potential which have their own barriers such as cost and regulation (NREL, 2012, p. 1).

is not subject to the volatile price of imported fuels, renewables can also support in-state energy resilience and stable rates for consumers.[20] As prices for renewables continue to fall globally, the price of U.S. natural gas continues to rise, potentially even doubling by the end of this year compared to the first quarter of 2024.[21] Nevertheless, the continuing rise of inflation, growing energy burden, changing federal support for affordable energy, and the scale of development needed requires novel approaches to ensuring affordable access to clean electricity as addressed by the recommendations in this report.[22]

Modeling done in early 2025 at the Climate Jobs Institute (CJI) provides a projection for a cost-effective pathway to achieve 100% clean electricity production in Oregon by 2040, in line with the target set by H.B. 2021.[23] CJI modeling is based on a regionalized high-electricity demand model and data from the National Renewable Energy Laboratory (NREL).[24] The projection factors in energy demand, electrification projections, shifting transmission needs, the current electricity portfolio, technology availability, capacity potential, siting constraints, and clean electricity targets. See full energy modeling methodology in *Methodology Appendix* onon pages 106-8. There are countless factors that can change the least cost pathway in the next two decades. Either a change in U.S. energy policy favoring and funding clean energy sources or technical and market breakthroughs for emerging or not-yet-known clean energy sources are both examples that could shift what a lowest-cost pathway to a clean grid may look like. Other changes, such as the feasibility of adopting long duration energy storage technologies and clean, dispatchable firm power sources can greatly impact the importance of each technology type on the grid. Finally, energy-efficiency developments for end-use users such AI data centers or hard-to-abate sectors, as well as the rapid adoption of demand-response strategies and distributed behind-the-meter assets, unforeseen breakthroughs in electrification of hard-to-abate sectors, or rapid adaption of wide-spread demand response strategies could all greatly affect the amount of clean electricity required by 2040 and greatly impact the make up of the needed portfolio of clean energy sources in Oregon.

## ELECTRICITY GENERATION BUILDOUT

The CJI modeled pathway using a high electric demand, least cost, decarbonized, and siting constrained pathway shows that achieving a clean, flexible, and resilient grid by 2040 is possible with a buildout of traditional renewables such as solar and land-based wind, retrofits to existing hydropower generation, and from emerging renewables such as enhanced geothermal and OSW (see *Methodology Appendix* on pages 106-8*)*.

Traditional renewables are essential for the expanding grid, with 9.6 GW of new land-based wind, 21 GW of new large-scale solar photovoltaic (solar PV), and 0.62 GW of new small-scale solar PV generation capacity needed in Oregon by 2040 (*see Methodology Appendix* on pages 106-8). Additionally, there is potential for hydropower infrastructure upgrades that result in 360 MW of additional capacity at existing plants. These upgrades must be strategically aligned with other efforts to deconstruct certain dams for ecological health. Notably, much of the new capacity needed will be produced by sources that are variable, meaning they do not generate a constant supply of power as production is tied to inconsistent energy from the sun, wind, and flow of water.[25] As dependence on natural gas phases out, Oregon must achieve new sources of firm and more consistent clean power with 2.25 GW of new geothermal projects, 1.3-3 GW of offshore wind, and a simultaneous energy storage buildout.

Clean generation technologies like geothermal, nuclear, OSW, and other ocean-based renewables continue to see scientific and engineering advancements that may make these technologies more accessible, safe, and efficient.[26] As new technologies are introduced, market and political-economic factors will continue to play a role in affecting projected energy resources within the state. Moreover, Oregon's clean energy buildout must include utility scale projects as well as distributed and behind-the-meter community and small-scale projects.

Of course, changes in the economic, political, and technical landscapes will impact the final make up of

Oregon's clean portfolio and greatly determine each technology's contribution. A recent example of changing considerations is highlighted with hydropower. Recently, some hydropower capacity, including 98 MW at Oregon's JC Boyle Dam, was decommissioned as part of the Klamath River dam deconstruction project (*see Methodology Appendix* on pages 106-8).[27] The removal of four hydroelectric dams in California and Oregon was completed in response to the social and environmental costs of the dams outweighing the benefits of the energy source, leading to a successful union deconstruction and indigenous-led adaptation project that is restoring the ecology of the river.[28] Given this context, CJI modeling therefore limited the build-out of new hydroelectric, but factored in the potential for dam retrofits at existing sites (see *Methodology Appendix* on pages 106-8). Uncertainty remains about the future of hydropower in the region, however opting for dam retrofits in lieu of building up new capacity can help maximize existing energy resources and create additional opportunities for union labor while avoiding further disruptions to culturally and environmentally significant lands and waters.[29]

Changing landscapes are also highlighted with OSW energy which, despite its success at producing reliable clean energy around the world, continues to face dramatic setbacks in the United States.[30] While the state had begun to explore potential for 3GW of OSW by 2030, the Kotek and Biden Administrations postponed the initial federal offshore water leases off the coast of Oregon in 2024; the Trump Administration's various actions in 2025 further prevent Oregon from accomplishing this goal in the near future.[31] Siting, permitting, and construction timelines, as well as existing market uncertainty, pose significant development barriers for meeting present OSW goals; and projects should expect a 5-7 year predevelopment timeline before construction can begin once federal policies reverse.[32] Nevertheless the technology likely remains an important piece of the energy portfolio when planning long-term.[33] Strong state policy, including labor standards that require union labor on its construction, will be needed to support a smooth, efficient, and sustainable buildout of the OSW once development is feasible.[34]

Credit: IUOE Local 701

## ENERGY STORAGE BUILDOUT

Significant energy storage buildout is essential to meet the needs of an expanded renewable-based electric grid. Traditional battery energy storage systems (BESS) allow variable renewable sources such as solar to support real-time electricity demand, while emerging long duration energy storage (LDES) solutions will support longer-term energy needs on day, multi-day, and even seasonal time periods. As of March 2025, Oregon had 56 MW of operating utility-scale battery storage with an additional 2.3 GW awaiting construction.[35] By 2040, the state will need an additional 7.54 GW of BESS and 5.21 GW of LDES capacity (see *Methodology Appendix* on pages 106-8).

## TRANSMISSION EXPANSION

Greater transmission capacity is essential for the renewable energy buildout, allowing more projects to come online, offering more diverse siting options for renewable and storage resources, and meeting rising electricity demands.[36] Expanded transmission capacity comes with additional benefits, including: improved reliability, resource adequacy, and resilience; expanded capacity within the existing rights-of-way; reduced congestion and energy losses; and reduced curtailment of renewable energy sources such as solar.[37] To accommodate the expanded generation, storage, and demand by 2040, CJI's analysis projects that Oregon's transmission system capacity will need to expand by over 89% (see *Methodology Appendix* on pages 106-8). This growth is in addition to the transmission required to meet reliability needs and for additional interstate capacity for importing and exporting electricity.

Apart from in-state transmission growth, Oregon should work with California and Washington to prepare for offshore transmission. The state must also collaborate within the western region to ensure interstate transmission needs are met for a safe and reliable regional grid (see *Create More Efficient Siting and Permitting Processes with Labor at the Table to Ensure Faster Clean Energy Development* on page 37).[38]

## DISTRIBUTION UPGRADES

Finally, Oregon must also expand and upgrade distribution systems. Distribution infrastructure is vital for connecting communities, businesses, services, and industry to clean electricity. In addition to standard distribution infrastructure, an expansion that includes newer technologies such as microgrids "can bolster the resilience of the transmission system."[39] Other technologies that can handle customer-sided, grid-connected resources; support reverse charging technologies; and allow greater demand response and system control could unlock a much more flexible grid and expand community resilience.

### WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR UNION-BUILT CLEAN ENERGY GENERATION

Update ORS 757.306 by:

a) **Amending the definition of covered project:** lower the capacity rating to 1 megawatt or greater for renewable energy generation, sequestration, storage, and community solar. Note that this is in line with best practices from other states that have successfully attached labor standards on clean energy projects, including Minnesota, New York, Illinois, and California.[40] Additionally, expand the definition to include projects co-located with data centers, thermal energy networks (including front-of-meter and behind-the-meter work), and anaerobic digestion facilities (see *Make Oregon A Leader In Sustainable Data Center Buildout* on page 49, *Establish Neighborhood-Scale Building Decarbonization through Thermal Energy Networks Policy* on page 64, and *Advance a Clean Agriculture Sector with On-Site Renewables* on page 85).

b) **Prevailing wage requirements:** require all developers, contractors, and subcontractors on covered projects per the definition above to pay workers who perform work on the project no less than prevailing wage rate, which includes fringe benefits.

c) **Benefits requirements:** clarify that all developers, contractors, and subcontractors on covered projects per the definition above offer employer-paid family health insurance and retirement benefits to workers who perform work on the project.

d) **Skilled and trained workforce:** adopt a skilled and trained workforce standard for covered projects that requires:
   i) All workers on covered projects in apprenticeable occupations in the building and construction trades shall either be skilled apprentices registered in a state-registered apprenticeship program; and
   ii) At least 30% of the skilled journeypersons are graduates of a state-registered apprenticeship program, with increasing annual benchmarks up to 60% for specified trades.

c) **Pre-apprenticeship graduate utilization requirements:** require developers, contractors, and sub-contractors to ensure that at least 20% of apprentices are graduates of a registered pre-apprenticeship program.
d) **Self-performance of work:** require contractors to perform at least 80% of the contracted labor for their scope.
e) **Enforcement:** enable any developer, contractor, or subcontractor that fails to meet prevailing wage requirements to be held liable for the amount of underpayment as well as liquidated damages equal to underpayment. Additionally clarify the role of the Oregon Bureau of Labor and Industries (BOLI) and the Commissioner of BOLI in enforcing the standards on covered projects, including:
    i) Amend the attestation or declaration of good faith requirement to require documentation of good faith with regard to workforce and labor standards to BOLI rather than the Oregon Department of Energy to streamline enforcement,
    ii) Enabling the Commissioner of BOLI to issue stop work orders on projects that fail to comply with workforce and contractor labor standards as well as assess civil penalties up to $5,000 per violation, and
    iii) Enabling BOLI to debar contractors and subcontractors who violate standards from receiving public improvement or public works contracts.

The following standards under ORS 757.306 should remain the same:[41]

a) ORS §757.306(2)(a)(A), which establishes **apprentice utilization requirements** on covered work;
b) ORS §757.306(2)(a)(B), which establishes **targeted outreach, recruitment, and retention of underrepresented groups** on covered work;
c) ORS §757.306(2)(C), which help to establish diverse and equitable workplace policies and workplaces free from discrimination and harassment on covered work;
d) ORS §757.306(2)(D), which establishes **responsible contractor certifications** on covered work;
e) ORS §757.306(2)(E-F), which requires **demonstrated compliance with labor laws and protections;**
f) ORS §757.306(2)(G), which requires quarterly reporting and recordkeeping on covered projects; and
g) ORS §757.306, which establishes the **project labor agreement exemptions** for covered projects.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR UNION-BUILT TRANSMISSION AND DISTRIBUTION

As the research above demonstrates, there is an acute need to rapidly expand Oregon's transmission and distribution infrastructure - a need which requires skilled labor, which unions can provide.[42] To meet this need efficiently, safely, and reliably, Oregon should adopt a **skilled and trained workforce standard** requiring:

i) All workers on covered projects in apprenticeable occupations in the building and construction trades shall either be skilled apprentices registered in a state-registered apprenticeship program; and
ii) At least 60% of the skilled journeypersons are graduates of a state-registered apprenticeship program, with increasing annual benchmarks up to 60% for specified trades.

In addition, transmission and distribution projects that fall under the definition of public improvement project or public works project as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20 must include the following model standards as defined in said section:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,** and
f) **Enforcement**

Credit: LiUNA Local 737

| Technology | Total Direct Jobs through 2030 | Total Construction Trades Jobs through 2030[b] | Total Cost Per Year through 2030 |
|---|---|---|---|
| 21.62 GW Solar | 82,000 | 18,000 | $2,700,000,000 |
| 9.6 GW Land-Based Wind | 75,000 | 17,000 | $2,490,000,000 |
| 0.36 GW Hydroelectric Upgrades | 1,400 | 320 | $46,500,000 |
| 12.76 GW Energy Storage | 25,000 | 5,700 | $839,000,000 |
| Transmission Expansion | 19,000 | 4,200 | $617,000,000 |

*Jobs estimates do not include the additional indirect jobs that would be created in the Oregon energy supply chain, nor do they include the additional induced jobs that would be created in Oregon communities due to increased economic activity.*

## EMISSIONS REDUCTION

11,100,000 MTCO2e per year by 2040.[43]

b Note that construction trades jobs are a share of direct jobs. See appendix for more details.

## THE IRONWORKERS' OFFSHORE WIND TRAINING PROGRAM SHOWCASES THE ADVANTAGES OF UNION LABOR IN BUILDING EMERGING RENEWABLE ENERGY TECHNOLOGIES

Offshore wind farms could provide abundant clean power to communities across Oregon. Unlocking that potential requires a skilled workforce capable of safely and efficiently raising projects at sea. Unions have leveraged the scalability and adaptability of their apprenticeship and continuing education programs to meet this need while also providing family-sustaining wages and benefits. The International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers' (IW) have demonstrated the ability to meet the workforce needs of emerging green industries such as offshore wind through their world-class training infrastructure.

Since 2023, the IW has been one of a select few Global Wind Organization (GWO)-certified training providers in North America.[44] Offshore wind installations are massive undertakings, but union Ironworkers already possess the relevant core skills including rigging, welding, and erecting structural supports.[45] Participants therefore focus on adapting to the unique work environment and the hazards that come with working at sea. By completing the program, participants obtain key safety certifications and thoroughly prepare for work on a vessel. In as little as two weeks, skilled union Ironworkers can be ready to work on offshore wind sites. Already, 167 members across three regions have received GWO-certified training.[46]

Offshore wind projects have already employed hundreds of Ironworkers on the eastern seaboard. The union operates its training program in states from the Mid-Atlantic to New England.[47] IW members have built utility-scale wind farms including the Block Island and Empire Wind projects that will power hundreds of thousands of homes.[48] In the recent past, Oregon has faced its own hurdles in jumpstarting offshore wind.[49] Still,

Credit: Ironworkers Local 29

the IW had plans to bring its training programs to West Coast locals, where members were ready to lead the buildout of clean energy in Oregon and California. However, the Trump administration's attacks on offshore wind have stalled progress in a national industry that was poised to create thousands of union jobs. Ironworkers and other union members on paused East Coast projects such as Revolution Wind have already lost significant work hours; and those on the West Coast have seen the promise of quality work in the offshore wind industry delayed.[50]

RECOMMENDATION

# CREATE MORE EFFICIENT SITING AND PERMITTING PROCESSES WITH LABOR AT THE TABLE TO ENSURE FASTER CLEAN ENERGY DEVELOPMENT

- **Ensure energy infrastructure is built at the pace Oregon needs, with meaningful input and holistic benefits for labor and for communities.**

The siting and permitting processes are essential to ensuring the safe and responsible development of clean energy infrastructure.[51] However, current processes are complex, contributing to delays, inefficiencies, and long timelines for necessary energy projects, while also leading to unsatisfactory community engagement.[52] Siting and permitting slowdowns risk creating an unreliable grid, threatening the state's clean energy goals and prolonging emissions from the energy sector, while also waning the steady stream of union construction jobs necessary to scale this sector on the timeline climate change demands.

Across the region, studies "consistently estimate the buildout of new renewable and transmission capacity needed [...] is in the order of hundreds of gigawatts by 2040."[53] Despite this substantial need, grid-connected renewable, storage, and transmission projects are often delayed or have long timelines due to siting and land-use restrictions; complexity, cost, and legal risk; discrepancies between local, federal, and state permitting processes; a lack of transmission availability; and long interconnection queues.[54] Notably, projects also face competition and high withdrawal rates in the interconnection queues nationally, suggesting larger issues such as the prevalence of speculative proposals, community pushback, and financing challenges.[55]

These issues have contributed to the incredibly slow pace of Oregon's annual renewable growth, placing it 47th in the country – behind only Maine, Louisiana, and Washington.[56] Siting and permitting delays and inefficiencies have similarly stymied transmission buildout. For example, Idaho Power's 271 mile Boardman to Hemingway line that will cover five of Oregon's counties was first filed for intent with Oregon Department of Energy (ODOE) in 2010.[57] The project is deemed critical as existing interstate transmission between the Pacific Northwest and the Intermountain states is at capacity.[58] However, preconstruction compliance remains ongoing and construction, which began last year is expected to continue through 2027 – nearly two decades later.[59]

Nationwide, the average project request-to-operation timeline for generation infrastructure continues to grow.[60] However, Oregon and surrounding states face significantly exacerbated headwinds due in part to inefficiencies at the Bonneville Power Administration (BPA), the U.S. DOE's self-funded, non-profit power marketing administration that owns more than 75% of the high-voltage transmission in the Pacific Northwest.[61] While the BPA serves as the region's de facto transmission planning authority, it has failed to fully finance new transmission lines and is notably slow at approving new project interconnections: just one of the 469 large-scale

renewable project applications it received in the last decade was approved as of May 2025.[62] Recent workforce downsizing by the Trump Administration – in spite of the BPA's independent status – threaten to further impede progress.[63] Issues with the BPA are also complicated by the fact that most of its transmission was built between 1930 and 1970, meaning upgrades and replacements are needed alongside new lines.[64]

Unfortunately, state reforms are being debated within an uncertain federal policy landscape. For example, one proposal would have eliminated the Oregon Energy Facility Siting Council (EFSC)'s land-use review process for transmission lines located entirely on federal land.[65] However, this was dropped after the Trump administration signaled it may weaken federal environmental standards, including regulation under the National Environmental Policy Act.[66]

While this is a complex issue that will require further strategic regulatory and planning reform, there are tangible steps that the state can take to make these processes more efficient and effective. As Oregon strategizes a new best approach, siting and permitting reform must be executed in a way that protects the state's natural beauty, culturally significant sites, and people while also prioritizing creating good jobs, increasing energy access, and reversing the sector's disparate impacts on communities.

### EMPOWER THE STATE TO BECOME THE CENTRAL PLANNER FOR ENERGY INFRASTRUCTURE BUILDOUT

To contend with the unprecedented buildout of generation, storage, and transmission projects, the State should take on the role of a central planner and coordinator of priority energy sites.

For generation and storage projects, the State can identify locations with existing transmission available, brownfield sites, areas with large demand, places with inadequate access to energy, communities with high energy burdens, and prepare for the retirement of energy projects as they near their end-of-useful-life. Other states have pursued such an approach. For instance, the New York State Energy Research and Development Agency (NYSERDA) has adopted a Build-Ready Program to work with local partners and stakeholders to make priority sites available for competitive bidding of projects eligible through the state's renewable portfolio standard. Specific underutilized sites that private developers are not knowingly pursuing, including "brown fields, former industrial sites, parking lots, and abandoned or existing commercial or industrial sites," are made "'build ready'" for renewable energy development. The State is responsible for "project design, engineering, permitting, and electric grid interconnection activities as well as developing a project host community benefit package" that includes consideration for workforce development and environmental justice.[67] Oregon may choose to adopt a similar program where the state takes the lead in ensuring priority sites are "build ready" or choose to identify sites for fast-track certification and allow private developers to take on the full scope of development. All work done to make sites build ready and any fast track certification should meet the standards outlined *Contractor Labor Standards for Fast-tracked Projects* on page 40.

To expedite the transmission buildout, some states have successfully implemented – or are in the process of implementing – measures to spur public and private development and centralize energy planning. These include the creation of state transmission authorities, centralized state grid planning offices, transmission infrastructure accelerators, public-private financing mechanisms, and public development and ownership models.[68] In Oregon, a central energy planning office can coordinate with the public utility commission (OPUC), utilities, and regional projects to identify locations where upgrading existing lines or adding grid enhancing technologies can support transmission needs. Moreover, by centralizing and front-loading site identification, the state can take the role of upfront community and Tribal engagement, minimizing community opposition when development begins. Any tools created should spur, coordinate, and speed development; reconcile grid priorities; engage relevant stakeholders; create funding streams that benefit ratepayers; require community benefits; and include strict labor standards.

Oregon should also restart funding for review and updates to county-level comprehensive plans, better equipping the State in its role as central planner to ensure that local values and land-use needs are reconciled with state goals.[69] Local plans are necessary as energy projects permitted at any level are required to comply with them. Helping to guarantee they are up to date is an important step to creating faster permitting processes.

Finally, the State should also consider opportunities for centralized approval, funding, and planning of transmission project development as the state is not within an independent system operator or a regional transmission organization's jurisdiction and does not have a state transmission authority.[70]

### FAST-TRACK STATE PERMITTING OF RENEWABLE ENERGY, BATTERY STORAGE, AND TRANSMISSION PROJECTS

The EFSC, which approves large energy facilities, high-voltage transmission lines, and other energy projects, provides developers a central siting option to receive a certificate to construct and operate an energy facility.[71] Following Governor Kotek's Executive Order 25-25, in light of the urgent need to accelerate the pace of clean energy development — exacerbated by the amended sunset date of the federal clean electricity production and investment tax credits, the EFSC should create fast track processes for clean energy project development.[72] [c]

As such, the Governor should further direct the EFSC to implement expedited clean energy certification processes and a pre-approval certification method, including strong labor standards and environmental protection. Implementation of these standards should be created with input from industry, labor, ratepayer, environmental, and Indigenous stakeholders, but should at minimum include the standards in the table below, or their equivalent through an enforceable contract (see *Contractor Labor Standards for Fast-tracked Projects* on page 40). To comply with the needs outlined in Section 2 of EO-25-25, tax-credit eligible priority solar and wind projects should be moved to the front of this fast-track queue.[73]

**AS SUCH, THE GOVERNOR SHOULD FURTHER DIRECT THE EFSC TO IMPLEMENT EXPEDITED CLEAN ENERGY CERTIFICATION PROCESSES AND A PRE-APPROVAL CERTIFICATION METHOD, INCLUDING STRONG LABOR STANDARDS AND ENVIRONMENTAL PROTECTION.**

Investments in monitoring, enforcement, data collection, and reporting must be included, with strict penalties for noncompliance including civil remedies and criminal charges for willfully violating such standards. While these proposals may take additional effort to implement, strategic investments will allow streamlined and rapid development of needed energy infrastructure.

Oregon can also take other tangible steps to make current siting and permitting more efficient in the interim. For example, the state can make storage projects part of the EFSC's jurisdiction, as today battery energy storage projects can only be reviewed when coupled with generation, unless the developer or local government elect for central review.[74] Unlocking this avenue may spur an increase in battery development, transcending a complicated network of local planning processes and providing an alternative pathway as long-duration energy storage technologies commercialize. The state should also streamline permitting processes for alternative transmission technologies that mitigate transmission buildout needs. This could include fast-tracking projects that upgrade existing transmission line capacity

c For the latest updates on Inflation Reduction Act climate-change provisions, see Sabin Center for Climate Change Law, "Inflation Reduction Act Tracker," Columbia Law School, Columbia Climate School, Environmental Defense Fund, https://iratracker.org/ira-database/.

Credit: IBEW Local 112

or requiring utilities to consider advanced transmission technologies and grid-enhancing technologies needs outlined in the integrated resource plan process. State agencies can also collaborate to modernize and synchronize state permitting processes to create one-stop permitting filing systems. Ideally, this collaboration should extend to the federal government's permitting agencies to further simplify processes.

## CONTRACTOR LABOR STANDARDS FOR FAST-TRACKED PROJECTS

The EFSC should require projects to submit attestations of good faith in meeting the following contractor labor standards as provided by the model language in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20 in order to be eligible for fast-tracking:

a) **Prevailing wage rate,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,** and a
f) **Community benefits agreement:**

**PLA exemptions:** clean energy generation and storage projects only may comply with requirements a - e by providing EFSC with a copy of a project labor agreement.

## UPDATE OREGON'S ENERGY POLICY TO SUPPORT ITS ENERGY FUTURE

As Oregon's energy system evolves, so too should its energy policy. Policies and programs should be designed so that all Oregonians can benefit from access to clean, low-cost energy, reducing energy burdens while creating community resiliency and good union jobs. Beyond this, Oregon's new energy system must strategically mitigate excessive transmission buildout, siting and permitting challenges, and long interconnection timelines. Below are some first steps to amending Oregon's existing clean energy policy and programs to prepare for its grid of the future.

### DISTRIBUTED ENERGY RESOURCES

Firstly, Oregon should incentivize union-built distributed energy resources (DERs) at the scale and pace needed for the grid. DERs are small-scale energy systems that include rooftop solar, home battery systems, local microgrids, bi-directional electric vehicle charging systems, among other technologies.[75] When aggregated, DERs can make up virtual power plants (VPPs) for even greater community and grid flexibility, responsiveness, and resilience through the coordination of multiple small-scale energy projects to provide grid services.[76] DERs provide grid reliability and flexibility and enhance community resilience.[77] Since DERs are sited near the electricity user, a wide-scale buildout has the potential to mitigate a portion of the transmission and grid-scale generation buildout, easing some land-use and permitting concerns, while also mitigating losses and congestion that occur on the transmission and distribution systems.[78] While DERs are typically smaller-scale, individual projects, a wide-spread DER buildout should target strategic areas for aggregated buildout to allow bundled projects to meet thresholds for workforce and contractor labor standards as provided on pages 33-4.

To financially support the buildout of DERs, the legislature should provide additional funding for the Solar + Storage Rebate Program to support homeowners and low-income service providers willing to invest in these technologies, especially in the absence of federal incentives.[79] The legislature should also prioritize

funding for energy burdened communities and areas far from load centers, such as by providing additional funding to Oregon Department of Energy's (ODOE) environmental justice-focused Community Renewable Energy Grant Program, which completed 44 construction renewable and resilience between 2021 and 2024.[80] However, additional prioritization and funding should go toward projects made up of various connected DERs at the community or neighborhood level, creating opportunities for union labor by awarding larger projects that encompass different connected resources.

### COMMUNITY STORAGE PROGRAM

Oregon must also invest in larger-scale, grid-connected storage capacity. The Oregon Public Utility Commission (OPUC) facilitates the Community Solar Program (OCSP) requiring private utilities to procure from community solar projects within their service territories through long-term contracts.[81] This program currently only covers solar projects; however, the PUC can expand the program rules to include similar requirements for community battery projects.[82] The legislature should also create a Community Storage Program to complement the OCSP.[83] Similar to OCSP, this would allow customers in IOU services territories to benefit from energy storage and expand grid battery-storage capacity without requiring every household or business to install home-batteries.[84] These funding sources are needed more than ever as federal funding for smaller-scale clean energy projects evaporates, leaving many in financial limbo with uncertain futures.[85]

RECOMMENDATION

# PILOT A CENTRAL ENERGY PROCUREMENT PROGRAM THAT DEVELOPS A MARKET AND STRONG UNION WORKFORCE FOR EMERGING CLEAN ENERGY INDUSTRIES

- **Advance the development of emerging clean energy resources by piloting a central state procurement process that creates union jobs, delivers firm power to the grid, protects ratepayers, and sparks investments in a diverse portfolio of resources to meet Oregon's current and future needs.**

Alongside the high road construction of mature renewables like solar, land-based wind, and batteries, Oregon must also prepare for emerging clean energy industries to ensure a sustainable, electrified future. Nascent and emerging resources like floating offshore wind (OSW) and long-duration energy storage (LDES) are critical to meeting Oregon's decarbonization needs alongside its electricity demand growth, offering a diversified range of firm and baseload power. Beyond supporting market development for these new technologies, Oregon must also ensure that these emerging sectors create high-quality union careers. Guaranteeing a union workforce can improve the development of emerging energy technologies as unions and their apprenticeship programs provide and develop a skilled workforce that can meet workforce needs, bring safer worksites, quicken project timelines, provide high-quality careers, and benefit the state's economy.[86]

Emerging generation and storage technologies can offset the challenges of intermittent renewables, but face challenges towards full commercialization. One major constraint is the initial costs of such technologies before they mature, potentially making them less competitive than established alternatives.[87] Addressing this hurdle is especially important given the continuing rise in energy costs felt by residents and businesses.[88] Other barriers include community pushback, environmental concerns, inequities caused by legacy energy programs and energy systems (e.g. in Oregon, the disproportionate impacts of energy burden, energy-related pollution, negative impacts on working and natural lands, and insufficient resilient against climate change and extreme weather events), long permitting timelines, political opposition, siting and land use concerns, and the technical challenges of scaling certain technologies.[89] Oregon must proactively address these challenges to stimulate investments in necessary clean energy technologies, ensuring that they are built safely, on-time, and create a new wave of in-state, high-road union careers.

To do so, the state should pilot a centralized electricity procurement process that grants a state agency the authority to procure competitive, long-term contracts from specified, non-fossil fuel-based energy projects in emerging industries on behalf of electric ratepayers.

Under this policy, the public utilities commission (OPUC), as the regulator of public electric utilities in the state, would determine the specific technologies eligible for state procurement and set a maximum procurement cap based on a combination of factors such as grid needs, technological feasibility, likelihood of private investment without state participation, effect on emissions, ratepayer impact, climate goals, and stakeholder input.[90] After the OPUC makes these determinations, the procuring agency will be able to accept bids for contracts that meet strict standards from the enacting legislation (e.g. labor standards, ratepayer impact analysis) and from the OPUC (i.e. technology type, capacity amounts). The process of establishing procurement standards, evaluating contracts, and approving projects between the OPUC and the procuring agency adds multiple rounds of oversight to the process, ensuring that legislative intent is followed.

State-procured energy would then be purchased at cost by the state's investor-owned utilities (IOUs) who serve about 60% of utility customers in Oregon and nearly 55% of power sold by utilities in 2024.[91] This can be accomplished through the OPUC's existing authority to regulate IOUs: existing policies like the renewable portfolio standard, net metering, the integrated resources planning process, and clean energy plans already in part impose requirements on IOU electricity procurement.[92] Additionally, a centralized procurement policy should include a process for public- and consumer-owned utilities to opt in to procurement of this energy, allowing smaller utilities to benefit from these large, high-barrier emerging technologies. Aggregating utility and ratepayer demand for these technologies creates attractive contract solicitation opportunities, spreads costs among ratepayers of multiple utilities, and allows smaller, publicly owned utilities to access these industries that could otherwise be unattainable due to the novelty of these technologies.

This policy is also a high-road jobs incubator: apart from wide-scale job creation, all projects built under state procurement would be public works projects, meaning prevailing wage and related laws apply. Strict and enforceable labor standards on construction and construction-based maintenance of the projects, including contract and subcontract work must be included. This can be mandated through workforce and contractor standards as laid out at the end of this recommendation. Importantly, this can establish union-built clean energy generation, transmission, and distribution as the standard for emerging energy industries, providing new opportunities for Oregonians to access high-quality union careers.

By investing in technologies that are not yet considered viable by the private market (due to the pre-commercial status of such industries and a lack of demand certainty) but are no less important for a balanced clean grid, central procurement has the potential to send clear market signals to clean energy developers and utilities.[93] This could effectively encourage future market participation and investment, sparking the development of technologies which are technically sound, but have not achieved economies of scale like OSW, LDES, and enhanced geothermal systems.[94] It may also spark investments in proven technologies that have high upfront costs and minimal development, such as traditional geothermal. In the future, this program could support faster advancement of other novel clean energy technologies.

Credit: LiUNA Local 737

## CENTRALIZED PROCUREMENT AT A GLANCE

| Milestone | Authority | Description |
|---|---|---|
| Policy Creation | Legislature | Legislation must include clear requirements for the OPUC and procuring agency to follow, includes, but not limited to:<br>• Community engagement;<br>• Robust labor standards; and<br>• Definitions to establish what resources may be procured |
| Rulemaking | OPUC | The OPUC should work with the procuring agency, provide clear rulemaking for the procurement process, including:<br>• Technology standards;<br>• Capacity standards;<br>• Cost recovery; and<br>• The establishment of a process by which utilities can purchase State-procured and deliver it to ratepayers |
| Preparing and Accepting Bids | Central Procurement Agency | The OPUC may choose to require the procuring agency to follow a competitive process. Only bids that meet standards set by the policy, such as labor standards, will be accepted. The state will not be required to elicit bids or procure the full amount of energy.<br>The legislation can also require the procurement agency to convene an advisory group with members from affected community groups, energy market experts, IOUs and public utilities, Tribal Nations, community and environmental groups, ratepayer advocates, and labor, similar to the procurement group created by California's DWR central procurement law and recommended by the CPUC's administrative decision (which allows the procurement agency to have leeway in establishing the group).[95] |
| Selecting and Approving the Contracts | Central Procurement Agency and OPUC | The procuring state agency should submit selected contracts to the OPUC, who will review and accept public comments to determine the outcome of the contracts and authorize cost recovery as necessary. |
| Utility Procurement | IOUs and Interested Public Owned Utilities | Include energy procurement from the state agency as a part of the IRP/CEP planning for OPUC approval. |

In addition to helping establish new industries, this program is designed with stopgaps to ensure electricity remains as affordable for residents as businesses. As the procurer, the state has no return on investment requirements, no dividend payouts, and access to cheaper debt, meaning lower energy costs.[96] Moreover, centralized procurement splits the first-to-the-market costs of emerging industries between all ratepayers of participating utilities, rather than amongst the customers of a single procuring utility, further lowering energy costs. In

Massachusetts, the Department of Energy Resources recently proposed an attribute-only procurement model (as they are not currently empowered to participate as a purchaser in the energy market), similar to New York State's Energy Research and Development Authority program, which was modeled to save money for energy consumers.[97] Finally, such a policy must include ratepayer impact assessments at every stage, including in the assessment of technology- and capacity-needs determination by the OPUC and with backstops to prevent the procurement agency from signing contractors for a project if it is not in the interest of the ratepayers.

While a program like this would be new to Oregon, it is modeled after similar policies in other states designed to deliver cheaper electricity through publicly procured projects. For instance, in New York, the New York Power Authority (NYPA) has the authority to build and sell clean energy using public funding, leading to the lowest cost energy in the state.[98] More recently, California adopted its own centralized procurement of long-lead time clean energy resources.[99] The state's Department of Water Resources is now empowered to solicit contracts for up to 7.6 GW of OSW, 2 GW LDES, and 1 GW of geothermal.[100] Many California labor, industry, environmental, and environmental justice groups supported this policy, even advocating for more renewable capacity than was ultimately included in the program.[101] This policy will help Oregon be ready to procure emerging technologies as quickly as possible and set the standard for an affordable emerging energy sector built and maintained with union labor.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR CLEAN ENERGY GENERATION PROJECTS CONTRACTED THROUGH A PILOT CENTRALIZED PROCUREMENT PROGRAM

Clean energy generation, storage, transmission, and distribution projects procured through this pilot program meet the threshold of public works projects as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20.

As such, the following labor standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American requirements,** and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in said section for all bidders, developers, contractors, and subcontractors for on-site and off-site construction and construction-based maintenance of projects procured under this program, including:

h) **Skilled and trained workforce standards,**
i) **Self-performance of work requirements,**
j) **Responsible contractor certifications** for applicable trades, and
k) **Demonstrated compliance with labor laws and protections.**

**Workforce development agreement exemptions:** bidders, developers, contractors, or subcontractors for clean energy generation and storage projects only may comply with the requirements a-e and h-j by providing the central procuring agency and the OPUC a copy of a workforce development agreement that includes at minimum each of the following:

- **Project labor agreements** for on- and off-site construction as well as construction-based maintenance,
- **Labor peace agreements** where assessed as viable by the procuring state agency for non-construction based maintenance and operations, and a
- **Community benefits agreement**

RECOMMENDATION

# ADVANCE UNION-BUILT, PUBLICLY-OWNED RESIDENTIAL SOLAR AND STORAGE

- **Create opportunities to reverse low-road jobs in the residential sector with a state-funded, publicly owned, union-built oregon neighborhood resilience program.**

Distributed projects are key components of Oregon's electric grid buildout, offering the potential to alleviate new transmission needs while advancing energy affordability (see U*pdating Oregon's Energy Policy to Support Its Energy Future* on page 41). Distributed energy resources (DERs) are essential to strengthening community resilience, which requires "having adequate local resources that can sustain community needs for days, weeks, months, or even a year," including supporting essential public services.[102] To ensure that DERs are widely adopted and accessible to all, Oregon should create a public residential solar and storage program benefitting rural communities, low-to-moderate income households, and renters; all while strengthening high-quality union jobs in the residential sector.

While traditional rebate programs and incentives do spur investments in rooftop projects, experience shows that they do not remove all financial, economical, and permitting barriers to accessing distributed resources, especially among lower-income households.[103] Further, research in New York and California's solar workforce shows that rooftop solar has not provided similar opportunities to high-quality jobs or pathways to union careers as utility solar.[104]

Oregon and its utilities already support rooftop solar.[105] For example, the Oregon Department of Energy's (ODOE) Solar + Storage Rebate Program provided rebates to 4,480 households over four years.[106]

However, 80% of the program's rebates benefitted above-moderate-income households, demonstrating a larger issue within the proliferation of DERs.[107] Today, "most low-income households and DACs (disadvantaged communities) still struggle to access the benefits of solar technologies."[108] These same disparities are mirrored in installations supported by Energy Trust of Oregon: the organization supported over 25,000 solar installations from 2003 to 2023, but only 1,500 low-to-moderate income (LMI) single-family home households benefited.[109] Further, utility compensation for rooftop solar production may be contributing to the energy burden felt by LMI households, who already spend a higher proportion of their income on electricity.[110] This means that while taxpayer-funded rebates are more likely to subsidize renewable energy for higher-earning households, LMI households are stuck paying for higher and higher utility bills to supplement profits.[111]

Oregon should therefore complement existing programs with the buildout of publicly owned rooftop solar and storage. Modeled on New York City (NYC)'s public solar proposal put forth by the NYC Comptroller[112] Creating a centralized public energy financing authority to cover specific projects could allow the use of public and public-private financing to construct, own, and maintain on solar sited on private rooftops under the Oregon Neighborhood Resilience Program. This will help aggregate a variety of funding sources, including public

debt or bonds to pay for upfront costs of the projects and use revenue sharing on the projects to help sustain funding for maintenance costs.

### LAYING THE GROUNDWORK FOR THE OREGON NEIGHBORHOOD RESILIENCE PROGRAM

As a first step toward implementing the Oregon Neighborhood Resilience Program, the State should require ODOE to study the potential for public rooftop solar and storage, focusing on potential capacity and overall energy needs when combined with existing programs. It should also consider the costs of installing and maintaining new rooftop projects; funding structures and sources; potential to buy out privately-owned rooftop solar to capture the revenues and support home and business owners; methods to aggregate projects; and state ownership structures. The program should benefit specific neighborhoods and communities that will continue to face burdens to accessing clean energy funding, and should be crafted to guarantee energy bill savings for the ratepayer. The State could "build the pipeline" for residential solar by pre-screening communities and doing community outreach.[113]

### ENSURE PUBLIC DISTRIBUTED RESOURCES ARE UNION-BUILT

Further, a publicly built Oregon Neighborhood Resilience Program is an opportunity to support union energy careers. All projects under this program would be classified as public works, allowing strong labor standards to be attached. Additionally, rather than treating each rooftop as a separate project, public rooftop projects should be aggregated at the neighborhood-scale projects and classified as community projects for the purposes of contractor labor standards – a practice typically known as project bundling. This would ensure rooftop solar and small-scale batteries are built strategically, efficiently, and safely. Further, the state should allow a pre-qualification option for contractors that attest they will, and historically have, included the contractor labor standards found below to fast track these neighborhood-scale resilience projects. Finally, the state must update the minimum community solar capacity to include all community renewable and storage projects that meet the threshold requirement.

### WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR THE OREGON NEIGHBORHOOD RESILIENCE PROGRAM

The following model contractor and labor standards as defined in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20 should apply to projects under the Oregon Neighborhood Resilience Program:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for bundled projects over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20 for all bidders, developers, contractors, and subcontractors for on-site and off-site construction and construction-based maintenance of projects procured under this program, including:

a) **Self-performance of work requirements,**
b) **Responsible contractor certifications** for applicable trades, and
c) **Demonstrated compliance with labor laws and protections.**

**PLA exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e as well as h-j by providing all relevant agencies a copy of a project labor agreement.

## HOW STATES ARE FACTORING IN NUCLEAR POWER TECHNOLOGY ADVANCEMENTS AS THEY DECARBONIZE

Nuclear remains a potential pathway for a clean and decarbonized future if it can overcome its environmental, economic, and community-impact challenges.[114] In the U.S., the potential for small modular nuclear reactors (SMR) and research into advanced nuclear in particular are challenging assumptions about nuclear's role in a clean and just economy, not only as a source of clean electricity, but also as a source of high-temperature thermal power for industrial users and high-quality jobs.[115]

Recently, various states have increased their interest in SMR, advanced, and traditional nuclear as a pathway to increase baseload and dispatchable capacity; improve electric grid reliability and resilience; sustain union construction, operation, maintaining, manufacturing, and supply chain jobs; and to decarbonize their economies.[116] In 2024, 25 states took pro-nuclear actions, including creating multi-stakeholder nuclear taskforces, publishing exploratory studies, creating tax incentives, exploring advanced cost recovery, and boosting workforce development opportunities.[117] Even with mounting excitement around novel nuclear power technologies, the U.S. new nuclear development is still in its infancy — and therefore can still potentially be shaped to account for continued concerns over safety, costs, and environmental impacts.[118] As of November 2025, SMR projects are still in very early stages in project development, advanced nuclear facilities have not yet been realized, no reactors are under construction in the United States, and only three units of traditional nuclear have come online in the U.S. in the 21st century.[119] However, these advanced technologies may yet provide advantages over traditional nuclear as they can be sited at retired power plants where existing transmission infrastructure exists, use less fuel, require less land for siting, and have fewer restrictions on cooling.[120]

Despite a four-decade moratorium, Oregon's 2025 legislative session reflected similar momentum for exploring nuclear's potential.[121] Proposals to allow voters to overturn the nuclear moratorium, create a pathway to pilot a SMR in Umatilla County, require Oregon State University to study Oregon's nuclear feasibility, and require the Oregon Department of Energy to study nuclear and nuclear waste with engagement of Tribal communities and stakeholders were all introduced – but each failed to pass.[122] Notably, the Confederated Tribes of the Umatilla Indian Reservation and environmental groups, like the Columbia Riverkeepers, opposed the SMR pilot project due to safety and pollution concerns.[123] Oregon is also located close to the Hanford Site in southeastern Washington, a weapons-grade plutonium site that is now "the most nuclear waste-polluted area in the Western Hemisphere."[124]

While these recent measures failed, consideration, research, and stakeholder dialogue around nuclear should continue, particularly as other states develop new projects and the international community continues to collaborate for breakthroughs in safety, fuel, and waste.[125] With advancements in engineering, science, and technology and a justice- and environment-focused approach that centers Indigenous respect and leadership, SMRs and advanced nuclear may be able to help Oregon to meet long-term energy and resilience needs.

RECOMMENDATION

# MAKE OREGON A LEADER IN SUSTAINABLE DATA CENTER BUILDOUT

- A sustainable data center buildout should create high-quality union jobs, incorporate clean energy generation and storage, and advance breakthrough efficiency technologies, all while protecting Oregon's ratepayers and the electric grid.

Data centers are an important component of Oregon's economy, acting as critical infrastructure to support a connected world.[126] Oregon is attractive for data center development due to the availability of reliable, low-cost hydroelectricity power; land availability; and favorable state tax incentives.[127] The pace of data center buildout has increased over the last few years, and with the rise of artificial intelligence (AI), this is only expected to continue. An expanded buildout means a steady supply of jobs, but without constraints, this buildout risks stressing the same resources that make Oregon attractive for data centers, slowing progress towards clean energy goals, and raising electric costs.[128] As this industry rapidly grows, now is the time to create a policy and regulatory environment that promotes growth in this sector while also securing union jobs and protecting the state's natural environment and communities.

The rapid expansion of data center construction in Oregon has significant implications for its electricity grid. Presently, data centers consume between ten and 50 times the amount of energy of a typical commercial

building.[129] Their energy load will only increase as newer, AI capable data centers – which are both larger and more powerful – come online.[130] In fact, "some [generative AI] data centers consume more energy than even the most energy-intensive facilities we are accustomed to and that the grid was built for."[131] While the scale of data center expansion remains uncertain, Oregon's data center industry is expected to consume anywhere from 8.3 million to 17 million megawatt hours per year [MWh/year] of electricity by 2030, nearly triple its energy consumption in 2023.[132] In fact, data centers could consume nearly a quarter of all electricity in the state by 2030.[133] Given this, data centers threaten to hinder Oregon's clean energy goals if not paired with an equivalent buildout of clean energy resources to power them.[134] Data center expansion without adequate clean energy growth even threatens to cause blackouts.[135]

### DATA CENTER ELECTRIC CONSUMPTION IN 2030 PROJECTIONS[136]

| | |
|---|---|
| **2023 Actual Consumption** | |
| Consumed | 6,413,663 MWh/year |
| **2030 Projection Consumption** | |
| Low-Growth | 8,276,574 MWh/year |
| Moderate Growth | 9,024,668 MWh/year |
| High Growth | 12,498,415 MWh/year |
| Highest Growth | 17,029,342 MWh/year |

Furthermore, the very resources that make siting data centers in Oregon attractive.[137] Unchecked development could trigger competition for currently abundant resources between longstanding communities and newly constructed data centers. The current methods by which states and local governments assess whether to approve and site data centers rarely consider the number of full-time jobs, energy and water use, noise, or associated emissions from these facilities.[138] These considerations are especially important in Eastern Oregon – one of the state's most attractive areas for data center development – where 30-52% of households across already face a high-or-severe energy burden, meaning they are unable to bear additional energy cost strains due to a dearth of resources.[139]

**OREGON'S DATA CENTERS HAVE A UNIQUE OPPORTUNITY TO BECOME GRID ASSETS THAT ADVANCE BREAKTHROUGH TECHNOLOGIES AND CREATE A PIPELINE OF UNION ENERGY AND CONSTRUCTION JOBS.**

To effectively manage its current resource advantages alongside the real opportunity to become a primary hub for data centers, Oregon must create nation-leading sustainable data center buildout policies. With sustainable development, Oregon's data centers have a unique opportunity to become grid assets that advance breakthrough technologies and create a pipeline of union energy and construction jobs.

### INDUSTRY DATA COLLECTION TO INFORM SUSTAINABILITY STANDARDS

Currently, there is no central tracking of energy use and emissions impact from U.S. data center sites, meaning current research is largely based on voluntary disclosure or aggregated data.[140] To enable the design of impactful policy and the creation of breakthrough energy and efficiency innovations, Oregon should require agency collaboration to create a coordinated data center industry data collection process. The Oregon Department of Energy (ODOE) and the state's Water Resources Department should study the impacts of data centers on the electric grid and water supply, with special consideration for electric demand projections and the impact of the climate crisis on resource availability. Oregon's Employment Department should track local construction jobs and full-time job creation, including

a breakdown by trade and occupation. The Revenue department should produce an impact analysis on communities where data centers have benefited from Oregon's generous tax incentives. The public utility commission, Bonneville Power Administration, and utilities should continue to plan for data centers' impact on grid reliability and share best available projections with other agencies.

### CONVENE A DATA CENTER PLANNING COUNCIL AND ESTABLISH A STRATEGIC DATA CENTER PLAN

The state should convene a Data Center Planning Council to develop Oregon's Sustainable Data Center Priorities. This council must include representatives from industry, developers, labor, water and energy experts, utilities, Tribal governments, environmental representatives, and public advocates. These priorities can in turn inform a Strategic Data Center Plan for the state. This plan should address modernizing existing data, including through increased efficiency and the incorporation of cleaner technologies such as battery storage or advanced cooling techniques. Strategies for the continued development should include siting considerations; emerging strategies like thermal energy networks (TENs) and advanced water recycling; and strategies that allow flexible operations to preserve grid reliability and resilience. A central planning committee should also develop state-wide metrics standards like water efficiency, power-use efficiency, and water efficiency to align data center buildout with the state's emissions, energy, and climate goals alongside the creation of sustainable communities and high-quality jobs.

### SUPPORT PILOT PROJECTS FOR SUSTAINABILITY AND INNOVATION

Many innovative strategies and techniques are available or emerging to boost data center sustainability. These may include connecting data centers to TENs, advanced water recycling technologies, and long duration energy storage projects. These technologies are also large-scale projects with the potential to support many union jobs across construction and maintenance. These technologies are relatively unexplored in the data center space but could be instrumental in creating sustainability for high-energy consuming next generation data centers. Oregon should create a competitive pilot program to explore a variety of technologies at data centers. All pilot projects and grants from ODOE to data center developers must include responsible contractor standards. Pilot projects could be chosen through a point-based system, rewarding projects that prioritize sustainability, high–quality union jobs, and community benefits.

### ATTACH SUSTAINABLE STANDARDS THROUGH TAX INCENTIVES AND PERMITTING

Data centers are the primary recipient of Oregon's generous enterprise zone tax incentives.[141] Before the next sunset date, the State should consider incorporating technical and economic standards such as minimum permanent job creation, construction labor standards, renewable energy generation and storage, and efficiency standards. This could help guarantee the economic benefits promised by these incentives.

The state should also explore how permitting could incentivize clean energy generation and storage on data center projects. For example, the state could fast track clean energy projects associated with powering data centers if they provide local grid benefits, such as demand response or grid backup. Permitting reform may also present an opportunity for more stringent labor standards.

### ENSURE QUALITY JOBS AND COMMUNITY BENEFITS

Given the tax benefits that data centers receive, it is important for these facilities to create tangible benefits for communities.[142] A pipeline of data center development should provide a steady stream of high-quality construction opportunities. In the long term, operations and maintenance jobs will be on the energy and cooling infrastructure that keep the facilities operating. Distribution system projects, on-site renewable energy, and energy storage components also present an opportunity for high-road union jobs. As such, all state data center

development-, upgrade-, and innovation-related grants should prioritize projects that have project labor agreements (PLAs) or follow strict responsible contractor standards. Moreover, if data centers are sited on state land, the state should ensure the full project includes responsible contractor standards or PLAs. In addition to labor standards, the state should attach requirements for enforceable community benefits agreements through the permitting process and as a condition of any state grants provided to data center projects.

Data centers will continue to be a part of the fabric of Oregon's economy. As the industry grows, Oregon's unions and communities have the chance to advocate for nation-leading policies for sustainable data centers. By attaching smart energy infrastructure, clean energy generation, and energy storage requirements to data centers, the facilities can become grid assets that benefit communities. Strong and innovative regulations can make data centers a source of good jobs and grid benefits. These regulations are necessary to meet Oregon's clean energy goals and lower emissions.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR ON-SITE RENEWABLE GENERATION AND ENERGY STORAGE FOR DATA CENTERS

On-site renewable generation, storage, transmission, and distribution buildout must abide by the same workforce and contractor labor provisions for covered projects as laid out under *Build 36 GW of Clean Energy, 12.8 GW of Energy Storage, and Expanded Transmission Capacity by 2040 Using Union Labor* on pages 33-4.

Projects that meet the contractor labor standards for fast-tracked projects as laid out under *Create More Efficient Siting and Permitting Processes with Labor at the Table to Ensure Faster Clean Energy Development* shall be permitted fast-tracked status.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR DATA CENTERS THAT RECEIVE STATE GRANTS OR ON PUBLIC LANDS

Data centers that receive state grants to pursue pilot projects for sustainability and innovation as well as data centers sited on public lands meet the threshold of public works projects as updated as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20. As such, the following model standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for grants over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in in said section for all developers, contractors, and subcontractors for on-site and off-site construction and construction-based maintenance for projects receiving grant funds or being built on public lands, including:

h) **Self-performance of work requirements,**
i) **Responsible contractor certifications** for applicable trades, and
j) **Demonstrated compliance with labor laws and protections.**

**Workforce Development Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e as well as h-j by providing all relevant agencies a copy of the following:

- **Project labor agreements** for on- and off-site construction as well as construction-based maintenance, and a
- **Community benefits agreement**

## HYPERSCALE DATA CENTER SOLUTIONS: MITIGATING RESOURCE RISKS

New data centers are projected to be the main driver of the Pacific Northwest's growing electricity demand, while their anticipated growth also presents challenges for fresh water supply and community impacts.[143] Sustainable strategies that include novel technologies to mitigate electric grid strain, protect water supply, put data centers to work for local communities, and create high-quality infrastructure jobs must be developed.

### WASTE HEAT

Some traditional data centers are designed to transfer heat to neighboring buildings, providing thermal comfort from what would otherwise be waste heat.[144] Oregon should explore designing and retrofitting data centers to provide thermal energy to buildings directly or indirectly through district heating systems, where feasible. New district heating and thermal energy network systems could also be developed strategically with data centers, depending on the proximity of the hyperscale data center to population centers.[145]

### ELECTRICITY CONSUMPTION

Due to their high energy demand for power and cooling, standard energy efficiency measures are insufficient to protect the power grid from massive influxes in electricity.[146] Policy can be explored for data center participation in demand response programs and facilitate the acceptance of otherwise curtailed grid energy at data centers.[147] [d] This is particularly important for grid reliability and resilience, such as during power plant maintenance and extreme weather events.[148]

Other solutions include utilizing on-site microgrids and designing data centers to have flexible operations may also reduce energy use, costs, and energy footprint.[149] As technologies and markets advance, next generation data centers may also be co-sited with enhanced geothermal power or small modular nuclear reactors.[150] While many hurdles still need to be overcome, these technologies may be suitable to provide ample clean power while reducing strain on the grid.[151]

### WATER AND COOLING NEEDS

While siting traditional data centers typically accounts for water availability, climate-conscious siting should be encouraged for new data centers, particularly as hyperscale facilities require even more water for cooling while participation patterns continue to be altered due to climate change.[152] In addition, on-site water reclamation, treatment, and pre-treatment may increase reusability and reduce the burden on the public water treatment plants.[153] Using geothermal energy could also "provide direct cooling for data centers" in addition to providing clean power.[154]

Overall, novel data center sustainability approaches are essential to not only protecting the scarce resources that Oregon's communities depend upon, but also for scaling new large infrastructure that can support additional union jobs. The state can support research and development to make data centers more sustainable, mitigate resource risks, and benefit communities.

d For example, see Tex. S.B. 6 (2025).

RECOMMENDATION

# PROTECT UNION JOBS & CREATE HEALTHIER WORKPLACES BY HELPING MANUFACTURING FACILITIES MEET EMISSIONS REDUCTION MANDATES

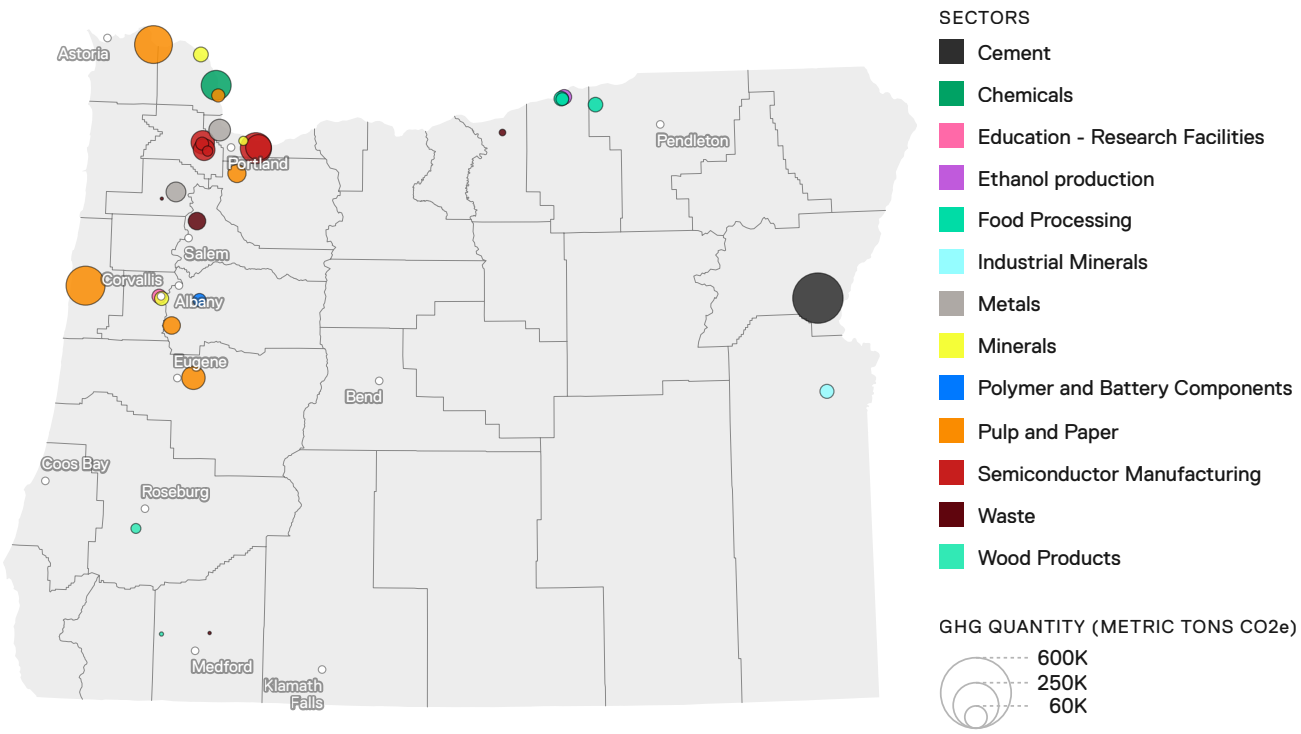
- To help industrial facilities meet the 50% decarbonization target by 2035 under the state's Climate Protection while preserving existing jobs, Oregon should set up a grant program to:
  - Target the highest-emitters that need the most support: semiconductors, cement, and pulp and paper;
  - Support the deployment of industrial decarbonization technologies such as heat electrification, carbon capture, and others; and
  - Require commitments for high-quality job preservation and creation in funding decisions.

With 204,000 jobs and a $36.3 billion gross domestic product (GDP) contribution in 2024, Oregon's manufacturing sector is a vital component of the state's economy.[155] Together, these figures represent about 11% of the state's overall employment and 14% of its GDP.[156] The sector is diverse, consisting of major production in technology and electronics; food and beverage; wood products; fabricated metal, and machinery,[157] Importantly, manufacturing jobs pay family-sustaining wages: workers earn an average of $111,451 a year.[158]

Oregon's industrial sector is also responsible for 22% of the State's total greenhouse gas (GHG) emissions in 2023, or 12 MMTCO2e.[159] An analysis of emissions from the state's largest industrial facilities showed that pulp and paper, semiconductor manufacturing, and cement production were large drivers of industrial emissions across the state.[160]

Oregon has begun to take proactive steps to reduce its industrial emissions, with the Climate Protection Program (CPP) playing a central role. Using 2017-2019 average emissions as a baseline, the CPP mandates that regulated facilities reduce emissions 50% by 2035 and 90% by 2050.[161] The CPP includes Community Climate Investments (CCIs), enabling regulated facilities to buy credits to fulfill their emission reduction obligations.[162] These credits will largely support projects in the transportation, commercial, and residential sectors that decrease emissions while benefiting climate-vulnerable communities, including low-income, rural, and tribal communities.[163] However, large industrial facilities subject to CPP regulations are not permitted to use CCI funds for their own decarbonization initiatives.[164] This creates a regulatory gap: Oregon's manufacturers face expensive compliance requirements without adequate state support to achieve the necessary technological transitions.

## OREGON GREEN HOUSE GAS (GHG) EMISSIONS FROM LARGE FACILITIES, 2023




Map: Cornell ILR Climate Jobs Institute's visualization of Oregon Green House Gas (GHG) Emissions From Large Facilities, 2023

Source: U.S. Environmental Protection Agency, *Greenhouse Gas Reporting Program (GHGRP) Data: Facility-Level Emissions, 2023, Oregon*

There is strong precedent for addressing this challenge. In 2017, California reformed its cap-and-trade program to provide support to the industrial sector through 2030.[165] These changes reduced compliance costs for industrial facilities to prevent them from relocating to other states.[166] The European Union established compensation guidelines for energy-intensive industries to manage increased electricity costs from carbon pricing with total compensation estimated at more than €60 billion between 2021 and 2030.[167] These examples demonstrate that supporting industrial decarbonization is both feasible and effective, providing a proven pathway for Oregon to lead in pro-worker climate policy.

Building on these models, Oregon has the opportunity to tailor a similar approach to its own context by creating an industrial decarbonization grant program, redirecting some of the resources acquired through the CPP. This method would fill the aforementioned regulatory gap, giving Oregon's manufacturers access to state funding for technologies that reduce emissions from high-emitted facilities while still upholding strong labor standards and commitments to environmental justice.

The redirected CCI funds would maintain the program's mission of supporting environmental justice by focusing on industrial sites that are often near low-income and BIPOC communities affected while also supporting healthier workplaces for the diverse manufacturing workforce, where 18% of workers are people of color.[168] Sites like the former Blue Heron Paper Mill at Willamette Falls, which is located on Indigenous ancestral land and requires extensive environmental remediation.[169] Intel's semiconductor plants in Hillsboro, where residents say they smell bad every day and the company was fined $143,000 for not reporting fluoride emissions for decades; and the Ash Grove cement plant in Durkee,

which was forced to install $20 million in emission controls in 2010 after being identified in 2008 as releasing approximately 2,500 pounds of mercury annually highlight the urgency of targeted action on industrial sites themselves for achieving environmental justice.[170]

The program would also focus on the industries that produce the most pollution: pulp and paper, semiconductor manufacturing, and cement production. Implementation would involve two key steps:

### 1. LEGISLATIVE AMENDMENT

To enable the creation of a CPP-funded grant program for industrial decarbonization, Oregon must amend CPP regulation to redirect 20-25% of annual revenue from CCI entities to the state-run grant program discussed below.

The amendment must have three key elements: (1) eligibility criteria that define which industrial facilities are eligible to receive grant program funds (e.g., those that meet minimum emissions thresholds, are involved in specific sectors, or demonstrate a financial need for technology deployment); (2) a cost-sharing arrangement between the state and participating facilities; and (3) workforce and contractor labor standards as defined below.

### 2. GRANT PROGRAM CREATION

Oregon should establish a new industrial decarbonization grant program run by the Oregon Department of Energy (ODOE) funded by moving 20–25% of CPP revenue, about $30–37.5 million a year from the estimated $150 million generated.[171] Based on cost analysis of target technologies, implementation is estimated to require about $33 million per year of public financing, meaning that the program can provide adequate funding.

The program would establish a cost-sharing arrangement in which the state covers 30–50% of decarbonization expenditures and private facilities pay the remaining amount. This cost-sharing range derives from an evaluation of industrial decarbonization programs and academic studies about optimal funding participation levels. For instance, the Decarbonization Incentive Program of Canada provides funding that covers up to

40% of project costs, while the Biden administration's U.S. Department of Energy (U.S. DOE) had sought an up to 50% cost-share for its $6 billion Industrial Demonstrations Program in 2023.[172] The U.S. Climate Alliance's *State Policy Guidebook for Industrial Decarbonization* supports the need for major financial incentives and public-private partnerships to address high capital expenses in the steel, cement, and chemical industries.[173] The 30–50% funding range was chosen to strike an optimal financial balance, ideally enabling companies to overcome their high capital expenses.

The program would support specific decarbonization technologies for each target sector. Electric heating system upgrades and carbon capture technology could be supported in pulp and paper facilities.[174] Semiconductor manufactures could get support for industrial heat pumps and advanced leak detection systems to prevent release of potent greenhouse gases.[175] Cement production facilities would be eligible for resources to apply carbon capture systems technology and enhanced operational efficiency improvements.[176] Grant funding should prioritize facilities that not only are major emission sources but also committed to strict labor standards and demonstrate positive impacts on environmental justice communities.

Beyond the application of contractor labor standards to grants disbursed through this program (see below), applicants must include in their application Labor Compliance Affidavits detailing jobs that will be retained and created through receipt of this grant money. These affidavits will include clawback provisions for ODOE.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR INDUSTRIAL DECARBONIZATION GRANTS

Industrial facilities that receive state grants through this program meet the threshold of public works projects as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20. As such, the following model standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for grants over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in said section for all contractors and subcontractors for on-site and off-site construction and construction-based maintenance of projects receiving grant funds under this program, including:

h) **Self-performance of work requirements,**
i) **Responsible contractor certifications** for applicable trades, and
j) **Demonstrated compliance with labor laws and protections.**

**Workforce Development Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e as well as h-j by providing all relevant agencies a copy of the following:

1. **Project labor agreements** for on- and off-site construction as well as construction-based maintenance,
2. **Community benefits agreement,** and
3. **Labor peace agreements** where assessed as viable for non-construction based maintenance and operations.

### Jobs

**1,900 direct jobs through 2030**
570 construction trades jobs through 2030

### Cost

$33,000,000 per year

### Emissions Reduction

1,460,000 MTCO2e by 2035

# BUILDING HEALTHY AND RESILIENT COMMUNITIES

RECOMMENDATION

# TRANSFORM AFFORDABILITY AND JOB QUALITY IN HOUSING CONSTRUCTION WITH GREEN PUBLIC HOUSING THAT CREATES UNION JOBS

- To address its severe housing affordability crisis, Oregon should re-envision the future of housing affordability through a Good Jobs, Green Homes public housing pilot program. Simultaneously, the state should reconcile poor labor standards in its existing affordable housing framework.

Oregon's housing crisis symbolizes how existing structures and systems are failing to uplift working people. As of 2024, 32% of Oregonians faced chronic homelessness, over half of all renters were housing burdened; three in every ten households could not afford to purchase a home; and the majority of the state's fastest-growing occupations have failed to provide wages high enough to afford housing.[1] Oregon's housing crisis has also been driven by decades of underproduction, resulting in a shortfall of at least 150,000 affordable rental units for Oregonians making 50% of the area median income or less.[2] To address this crisis, Oregon will need an additional 550,000 housing units in the next 20 years, roughly 1.5 times its current annual production rate.[3] Of those 550,000 units, over 175,000 must be affordable.[4] To meet its housing need, Oregon must produce nearly 30,000 units a year.[5]

State officials have made this crisis a top priority. In the past three years alone, the legislature has passed two landmark housing packages representing a combined investment of nearly $600 million in public dollars toward housing; Governor Kotek has set an annual housing production target of 36,000 housing units (including 18,000 affordable units); and state agencies

have numerous reports on the housing crisis and the state's progress toward its goals.[6] [a]Yet even with this influx of funding and attention, analysis indicates that Oregon is unlikely to meet its housing production goals.[7]

Despite the amount of State dollars poured into these projects, affordable housing is largely exempt from Oregon's prevailing wage rate law: projects four stories or less that provide at least 60% affordable housing and are either (a) privately owned, or (b) leased by a private entity for 50 or more years are exempt from paying prevailing wage.[8] Worse still, industry stakeholders including the State's own Housing Production Advisory Council – which notably excluded the Oregon building and construction trades, themselves key stakeholders – are pushing to expand existing loopholes in Oregon's prevailing wage requirements for affordable housing construction.[9] Taking this kind of low-road workforce approach to the state's much-needed affordable housing buildout reflects key misunderstandings both in the impact of labor standards including the payment of prevailing wage on project costs as well as the core issues driving Oregon's housing gap.

Firstly, recent research on the impact of prevailing wage laws on affordable housing project costs suggest that costs will at most face a modest 5 or 6% increase.[10] Notably, this research also points out that cost increases may be due to the effect prevailing wage laws and their enforcement have on limiting residential contractors' ability to engage in illegal labor practices that have become commonplace or even institutionalized in the residential sector.[11] Practices such as cash-only payments, wage theft, worker misclassification may help reduce overall project cost for contractors, but they also short workers their wages and benefits, lower tax revenue for the state, and displace further costs to the state by forcing public services to pick up tabs for costs such as medical coverage that should be covered by employers.[12] Indeed, research by Jacobs et al. (2022) indicates that between 2015 and 2019, 43% of construction workers' families are enrolled in at least one public safety net program, costing the federal and state government a combined $710 million annually.[13] Moreover, an estimated $2.6 billion is lost in state and federal revenue due to wage theft in the sector - let alone the cost to workers themselves.[14]

**PRACTICES SUCH AS CASH-ONLY PAYMENTS, WAGE THEFT, WORKER MISCLASSIFICATION MAY HELP REDUCE OVERALL PROJECT COST FOR CONTRACTORS, BUT THEY ALSO SHORT WORKERS THEIR WAGES AND BENEFITS, LOWER TAX REVENUE FOR THE STATE, AND DISPLACE FURTHER COSTS TO THE STATE BY FORCING PUBLIC SERVICES TO PICK UP TABS FOR COSTS SUCH AS MEDICAL COVERAGE THAT SHOULD BE COVERED BY EMPLOYERS.**

Secondly, the lack of strong labor standards and union presence in the affordable housing sector may in fact help to drive many of the sector's workforce issues. Currently, residential construction is plagued by low-road labor practices including low wages and fewer benefits as well as the myriad of illegal practices mentioned above, all of which indicate low job quality in the sector.[15] Analysis of Oregon's construction wage

a See for example Oregon Department of Land Conservation and Development and Oregon Housing and Community Services, *Oregon Housing Needs Analysis Legislative Recommendations Report: Leading with Production* (State of Oregon, 2022), https://www.oregon.gov/lcd/UP/Documents/20221231_OHNA_Legislative_Recommendations_Report.pdf; Brandon Schrader, *State of the State's Housing* (Oregon Housing and Community Services, 2024), https://www.oregon.gov/ohcs/about-us/Documents/state-of-the-states-housing.pdf; Office of Economic Analysis, *Oregon Housing Needs Analysis Methodology* (Oregon Department of Administrative Services, 2024), https://www.oregon.gov/das/oea/Documents/OHNA-Methodology-Report-2024.pdf.

rates in 2024 shows that average annual wages per employee in residential construction ($61,923) were nearly $10,000 below average annual wages across all industries ($71,313) and over $40,000 below average annual wages of their non-residential construction counterparts ($107,358).[16] If one assumes that wage rates in affordable housing construction mirror those in the wider residential construction industry, workers may be losing out on over $30,000 per year due to exemptions in the state's prevailing wage laws for affordable housing construction.[17] The decline of union density in residential construction has additionally contributed to declining wages in the sector.[18]

Lowering labor standards in the sector as recommended by the Housing Production Advisory Council could exert further downward pressure on job quality in affordable housing, which could equally impact recruitment and retention. By contrast, tightening labor standards in the sector would not only raise wages, but it could also help improve the supply of skilled and trained workers in part due to the positive effect prevailing wage laws have on apprenticeship training and in part due to the ability to draw on "the stable supply of skilled, safe, and productive construction workers" from union contractors.[19] This is in addition to the benefits of union jobs and strong prevailing wage rate laws such as higher productivity and reduced injuries.[20]

Expanding Oregon's housing stock could help the state combat its climate crisis and ensure long-term livability for Oregonians. To do this, the State should pursue a two-pronged solution – one that transforms the affordability crisis by building all-union low carbon public housing through the creation of a new pilot green public housing program; and one that creates a pathway to support union-built affordable housing under the existing paradigm.

## INVESTING IN WORKERS, CLIMATE, AND COMMUNITIES THROUGH A GOOD JOBS, GREEN HOMES PILOT PUBLIC HOUSING PROGRAM

Oregon should pilot a Good Jobs, Green Homes public housing program to jumpstart high-road construction on low-carbon housing fully funded and owned by the state. The Good Jobs, Green Homes program can be created by (a) establishing a public benefit corporation to operate as the state's Green Housing Authority, similar to the New York Public Housing Authority's relationship to New York City; and (b) authorizing $277 million in annual Article XI-Q bonds for 10 years to support construction (see the *Methodology Appendix* on pages 110-11).[21] This pilot would create 5,800 union-built housing units in the next 10 years while also preserving existing funding streams for the state's affordable housing program. To ensure the pilot delivers on its three prongs of affordability, green housing, and high-quality jobs, representatives from the Office of Housing and Community Services, the Oregon Department of Energy, and the Oregon Bureau of Labor and Industries (BOLI) – in addition to key stakeholders such as public housing residents and labor unions – should be appointed to the board of the Green Housing Authority.

The current affordable housing system leverages millions in public monies to deliver limited-term affordability in the private market before converting to market rates – often for only 30 years, or less than one generation, – while failing to deliver on the promise of good jobs required by most other publicly-funded construction.[22] By contrast, public housing built through the Good Jobs, Green Homes pilot program would be publicly owned and therefore considered public works, meaning it must adhere to strict contractor labor standards, including prevailing wage. Beyond this, labor standards such as targeted outreach, recruitment, and retention of underrepresented groups and apprenticeship requirements can create high-quality employment opportunities for the inhabitants of public housing themselves. see *Workforce and Contractor Labor Standards for the Good Jobs, Green Homes Pilot Public Housing Program* on page 62.

Focusing on a state-owned public housing pilot program would also allow the state to address deep affordability concerns by harnessing bulk purchasing power and eliminating profit incentives, thereby lowering the cost of affordable housing production. In fact, without factoring in these efficiencies, the cost per unit of Good

Jobs Green Homes is estimated to be comparable to that of existing affordable housing (see the *Methodology Appendix* on pages 110-11), but with the added benefits of guaranteeing high quality jobs and permanent deep affordability.[b] To wit: tenants themselves can expect to pay an average rent of $546/month, delivering on the promise of deep affordability by guaranteeing no household pay more than 30% of their income on housing (see *Methodology Appendix* on page 112).

To demonstrate proof of concept, the pilot program should target housing development in cities and regions where there is existing high-quality apprenticeship training infrastructure and a skilled and trained construction workforce. This should overlap with areas such as the Metro region, Willamette Valley, or Western Oregon, where cities such as Gladstone and Keizer saw no production of regulated affordable units from 2018-2023.[23] If this pilot is successful, the state should expand the program, providing public housing as a backstop to guarantee the state and its cities meet their housing production and emissions reduction goals with green and healthy homes.

## IMPROVING WORKING CONDITIONS FOR THE EXISTING AFFORDABLE HOUSING WORKFORCE

In addition to this pilot program, BOLI, the Governor, and the legislature should work with labor and industry stakeholders as well as affordable housing advocates to create an effective on-ramp for expanding prevailing wage and other labor standards on affordable housing projects that are currently exempt. For example, neighboring California has deployed a skilled and trained workforce standard on certain classifications of affordable housing.[c] Applying such a standard in Oregon would help ensure that affordable housing funded under the current model is high quality and safely built.[24] Ensuring construction workers are paid a fair, livable wage will also help to address the inequality crisis that in part drives the housing crisis. An additional model could be setting a declining dollar threshold for applying prevailing wage and apprenticeship utilization requirements to projects receiving Local Innovation and Fast Track (LIFT) grants, which currently lack any workforce or contractor labor standards despite the millions in public funds being disbursed through such grants.[25] This threshold could be set at $5,000,000 starting in 2026 and ramp down over time. In order to successfully build momentum for improved labor standards on state-funded affordable housing, BOLI should partner with labor unions to run an internal and external public education campaign on the importance of unions and gold-star labor standards in remedying workforce issues in the affordable housing sector. Lastly, fixing the business-as-usual model will help to create guaranteed demand for union workers, in turn enabling unions to increase apprenticeship enrollment to meet this demand.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR THE GOOD JOBS, GREEN HOMES PILOT PUBLIC HOUSING PROGRAM

Projects under this pilot program will be publicly owned, meaning that they are not subject to exemptions to prevailing wage law under ORS §279C.810.26 Therefore, public housing projects procured through this program meet the threshold of public works projects as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20. As such, the following labor standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**

b Note that this is a comparison of total cost for a unit of green public housing versus a unit of market-based affordable housing. The State provides an average subsidy of about $310,000/unit when weighted by units per project, lower than the average total cost per unit of $460,000 when weighted by units per project. See *Methodology Appendix* on pages 110-11.

c See for example Cal. Gov. Code § 65913.4(F)), accessed December 11, 2025, https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=65913.4.

e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for grants over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in said section for all developers contractors, and subcontractors for on-site and off-site construction and construction-based maintenance of projects receiving grant funds under this program, including:

h) **Skilled and trained workforce standards,**
i) **Self-performance of work requirements,**
j) **Responsible contractor certifications** for applicable trades, and
k) **Demonstrated compliance with labor laws and protections.**

**Workforce Development Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e as well as h-k by providing all relevant agencies a copy of the following:

- **Project labor agreements** for on- and off-site construction as well as construction-based maintenance with specific hiring targets for residents who are eligible for public and affordable housing;
- **Labor peace agreements** where assessed as viable by the Green Housing Authority for non-construction based maintenance and operations of public housing, and a
- **Community benefits agreement**

### Jobs

**6,200 direct jobs through 2030**
2,100 construction trades jobs through 2030

### Article X-IQ Bond Funding

**$266 million** issued each year
$2.66 billion total

### Operating Expenses

**2029** (operating subsidy begins): $2 million/year
**2038** (all units constructed): $20 million/year

## NORTH BEND FAMILY HOUSING: DEMONSTRATING THE VALUE OF UNION LABOR TO AFFORDABLE HOUSING CONSTRUCTION

In May of 2025, authorities in Coos County, Oregon broke ground on the area's most significant low-income housing project in decades.[27] Built on the site of a former school, the North Bend Family Housing project will create 176 homes available to applicants earning between 60% and 80% of the area's median income, with 20 units set aside as permanent supportive housing.[28] The state provided most of the $40 million in financing, with Coos Health and Wellness providing additional funds to guarantee on-site mental health services.[29] The project will "help fill a need that has been growing in this community for decades," North Bend City/Coos Curry Housing Authority Executive Director Matt Vorderstrasse told *The World*, "being able to have a community win like this is huge."[30]

IBEW Local 932 members will perform electrical work for the entire North Bend facility. The union's leaders met with local government officials who recognized that collaborating with Local 932 would help their community make the most of the state's investment. "Each one of these projects is a training opportunity for local apprentices," points out Robert Westerman, Business Manager of Local 932.[31] The project will provide work hours for local apprentices training toward journeyman status.[32] Even before the first families move into finished units, Oregon's investment will have helped put residents of nearby communities on the path to a quality, family-sustaining career.

Responding to Oregon's most pressing challenges requires strategies to promote affordability while creating quality jobs for the state's workers. By partnering with unions, policymakers can maximize returns on investment into housing and infrastructure projects. "We need to let communities know that we can hire locally and pay a good wage," says Westerman.[33] Leaders at the state and local level can look to projects such as the one in North Bend for guidance on how to grow Oregon's housing stock while creating quality careers for local workers.

RECOMMENDATION

# ESTABLISH NEIGHBORHOOD-SCALE BUILDING DECARBONIZATION THROUGH THERMAL ENERGY NETWORKS POLICY

- **By adopting a comprehensive thermal energy network (TEN) pilot program for all utility types; enabling municipalities to fast-track TENs deployment; and enabling TENs to benefit from incentives under the state's Renewable Portfolio Standard, Oregon can apply best practices from across the country to rapidly decarbonize buildings equitably and with union labor.**

Oregon's buildings are a key driver of greenhouse gas (GHG) emissions in the state. Excluding their electricity usage, buildings account for roughly 15% of overall emissions.[34] These emissions are driven in large part by the distribution and combustion of fossil fuels and biomasses used primarily for space and heating, cooking, and drying clothe.[35] Indeed, 37% of Oregon households and 80% of commercial buildings rely on natural gas for space heating.[36] Many Oregonians also rely on inefficient electric resistance heating, posing problems for both Oregonians' wallets as well as overall costs to the decarbonizing electric system.[37]

Beyond climate concerns, the cost to heat and cool Oregon homes exacerbates affordability issues in the state. As of 2024, 28% of Oregon households were considered energy burdened, meaning they spend 6% or more of their income on energy needs such as electricity, heating, and cooling.[38] Between 2020 and 2022 alone, the number of energy burdened households grew to nearly 480,000, an increase of over 100,000 households in just two years.[39] While natural gas rates have dropped in some areas; the state's largest utilities have seen both natural gas and electricity rates increase by about 50% since 2020.[40]

**AS OF 2024, 28% OF OREGON HOUSEHOLDS WERE CONSIDERED ENERGY BURDENED, MEANING THEY SPEND 6% OR MORE OF THEIR INCOME ON ENERGY NEEDS SUCH AS ELECTRICITY, HEATING, AND COOLING.**

As temperatures continue to rise and extreme heat becomes more commonplace, Oregonians are at risk of facing even higher energy burdens. As of 2023, approximately 58% of Oregonians living in public-supported housing, manufactured and mobile homes, and RVs lacked access to adequate cooling equipment.[41] Energy

burden is also linked to the state's overall housing crisis, as "energy burden can lead to housing instability," and typically has a greater impact on low-income households.[42] This is reflected in data released by PGE in 2024: of the 140,000 energy burdened households they serve, 118,000 or 84% are low-income.[43] Those low-income households were found also to pay an average of $400 more per year on electricity bills than the overall average, meaning their higher energy burden is not just a factor of their lower incomes, but may likely be due to the age and/or energy efficiency of their homes.[44]

**OREGON'S POLICIES AND PROGRAMS FIT THE TYPICAL BUILDING-BY-BUILDING DECARBONIZATION APPROACH THAT HAVE THUS FAR FAILED TO DELIVER DECARBONIZATION AT THE SCALE NEEDED TO MEET EMISSIONS REDUCTIONS GOALS.**

Oregon has adopted a number of policies, programs, and goals to tackle buildings' share of emissions and alleviate energy burden through the installation of energy efficient, fossil-free equipment, most notably through the passage of S.B.1536 (2022) and H.B. 3409 (2023).[45] S.B. 1536 (2022) established a fund to support heat pump deployment and led to the creation of Oregon's Community Heat Pump Deployment and Oregon Rental Home Heat Pump Programs.[46] Additionally, H.B. 3409 (2023) set forth Oregon's goal of install 500,000 heat pumps by 2030 and established the state's energy performance standards for large buildings.[47]

However, Oregon's policies and programs fit the typical building-by-building decarbonization approach that have thus far failed to deliver decarbonization at the scale needed to meet emissions reductions goals.[48] Moreover, unlike public building decarbonization efforts under H.B. 3031 (2023) – which required robust contractor labor standards on HVAC retrofits in schools – these efforts lack such standards outside of S.B.1536's (2022) responsible contractor certifications and demonstrated compliance with labor laws and protections.[49] In this way, Oregon's linchpin building decarbonization laws contribute to the potential proliferation of low-road residential construction and building decarbonization work, rather than harnessing these opportunities to create high-quality green union.[d]

To meet the needs of scaled building decarbonization and high-quality job creation, more and more states including neighboring Washington and California have adopted legislation to support the deployment of thermal energy networks, or TENs.[50]

### A THERMAL ENERGY NETWORK POLICY THAT MEETS OREGON'S NEEDS

As Oregon looks to adopt a comprehensive starting point for deploying TENs, the state should apply lessons learned from other states' policies as well as tailor its policy to its own unique heating and cooling characteristics and its union workforce. Legislation to establish TENs in the state should therefore include the following:

- **Enable gas, electric, and water utilities as well as publicly- or consumer-owned utilities to construct, own, manage, operate, and recover rates from TENs.** Oregonians are served by a diverse network of utilities with many different ownership structures, including "38 consumer- or public-owned electric utilities."[51] Enabling each set of utilities to pursue TENs will ensure the widest and most equitable buildout of the technology, thus enabling the state to more quickly meet its heat pump deployment and decarbonization goals while creating the greatest opportunity for scaling a union TENs workforce. To help combat further energy burden, Oregon should require

d See Iain Walker et al., *Challenges and Opportunities for Home Decarbonization*, Lawrence Berkeley National Laboratory, 2023, https://doi.org/10.20357/B7XG7T.

that rates for thermal energy provided by TENs do not exceed customers' existing rates, in line with Maryland's WARMTH Act (2024).[52] In addition, Oregon should build on a particularly innovative approach adopted in Vermont to **grant municipalities the same authority as above while also bypassing approvals from the Public Utility Commission (PUC)**.[53] Spurring the deployment of some publicly-owned TENs while other models wind through the regulatory processes of the PUC could help build familiarity, support, and workforce demand for TENs.

- **Require the 6 largest electric and gas utilities to propose at least one TENs pilot, up to five total proposals per utility, with half or more of proposed pilots per utility serving environmental justice communities as defined under ORS §182.535.**[54] Including both electric and gas utilities in this mandate will allow for a more integrated utility resource and transition planning process as recommended by Bagdanov et al. (2023).[55] It will also help target the 37% of households that rely on inefficient electrical resistance heating in addition to those that use natural gas for home heating.[56] Such a mandate follows precedent set by New York's Utility Thermal Energy Network and Jobs Act (2022).[57]

- **Permit gas utilities to replace existing gas infrastructure with TENs or install TENs in lieu of expanding gas infrastructure**. This will help prevent such infrastructure from becoming stranded assets, therefore defraying costs to utilities and consumers alike.[58]

- **Permit utilities to drill geothermal boreholes in the public right-of-way, where feasible.** Also modeled on Maryland's WARMTH Act (2024), this will make the most out of utilities' existing advantages in the deployment of this technology.[59]

- **Update its Renewable Portfolio Standards (RPS) by:**
  a) Amending ORS §469A.025 to include non-electricity generating, non-emitting, non-combusting thermal energy (in other words, the energy deployed through TENs) to be included as a renewable energy source that may be used to comply with a renewable portfolio standard, and
  b) Ensuring that thermal energy is eligible to generate renewable energy certificates.[60]

  Oregon may choose to look to Maryland or Virginia to determine the most effective approach to integrating thermal energy into RPS statute.[61]

- **Require gold-star labor standards on front-of-meter and behind-the-meter work, as well as the operations and maintenance of a TEN.** These standards are detailed below.

Of note, the proposed TENs policy described above is a significantly more comprehensive policy than S.B. 1143 (2025), which would have required a more limited TENs pilot program targeting natural gas utilities.[62] In addition to the above, the recommendation *Lead by Example by Retrofitting and Installing Clean Technologies on Public Buildings with Union Labor* on page 68 outlines a strategy for installing TENs on public university campuses.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR THERMAL ENERGY NETWORKS

Thermal energy networks must abide by the same workforce and contractor labor provisions for covered projects as laid out in under *Build 36 GW of Clean Energy, 12.8 GW of Energy Storage, and Expanded Transmission Capacity by 2040 Using Union Labor* on pages 33-4.

In addition, Oregon should establish provisions that require utilities to give existing employee bargaining units the opportunity to work on the construction, maintenance, and operations of utility TENs projects, as established under Maryland's WARMTH Act (2024).[63]

## THERMAL ENERGY NETWORKS: SOLUTIONS FOR SCALED BUILDING DECARBONIZATION AND UNION JOB CREATION

Thermal energy networks (TENs) utilize a system or "network" of underground pipes to deliver emissions-free, non-combusting thermal energy – that is, heating and cooling capabilities – to multiple buildings at once, often at the block, campus, or neighborhood scale.[64] Depending on the technology used to form the TEN, the network can leverage a variety of thermal resources including traditional geothermal energy as well as thermal energy derived from bodies of water, waste heat from data centers, wastewater treatment, or other sources.[65] TENs offer a scalable, efficient, affordable, just, and union solution to building decarbonization.

**Scalability:** Aside from their inherently scaled nature, certain TENs technology types are particularly adept at supporting future growth of an initial network. In a networked geothermal TEN, wherein each interconnected building has a ground-source heat pump (GSHP), increasing the number of buildings can create even further system efficiencies through load canceling and waste heat reuse.[66]

**Efficiency:** Beyond waste heat reuse and load cancelling, the technology that forms the basis of many TENs (GSHPs) is remarkably efficient at both heating and cooling, far more efficient than fossil fuel or electric alternatives.[67]

**Affordability:** TENs deliver affordability at the systems and building/household scale. Their efficient nature helps to reduce electricity demand linked to systems-wide decarbonization, thus potentially saving billions on transmission buildout.[68] Meanwhile, reduced energy consumption due to installation of TENs has helped building owners and households alike save on energy costs. Oh and Beckers (2023) report that some universities that installed TENs saw cost savings up to 65%, while residents of Framingham, Massachusetts – home to the nation's first utility-owned and operated TEN (UTEN) – pay roughly between $8-10 per month to meet their heating and cooling needs.[69]

**Justice:** TENs have the potential to reach low-income and renter-occupied households that are most often excluded from accessing or benefitting building decarbonization under the current policy model.[70]

**Union-led:** TENs are unique among building decarbonization technologies in that they create opportunities for the existing unionized natural gas workforce. For members of the pipe trades who are often on the front lines of displacement in the face of building electrification, TENs offer an approach to redeploy their skillset, adapting familiar training and materials to emissions-reducing technologies.[71] At the same time, the in-house union utility workforce can similarly redeploy to maintain and operate TENs.[72] TENs offer opportunities for many other trades, as well: electricians, sheet metal workers, operating engineers, and laborers can all expect to see job creation from the installation of TENs.[73]

The city of Klamath Falls, Oregon is heated using a geothermal energy network.

RECOMMENDATION

# LEAD BY EXAMPLE BY RETROFITTING AND INSTALLING CLEAN TECHNOLOGIES ON PUBLIC BUILDINGS WITH UNION LABOR

- **Prioritizing the public sector will set an example for economy wide decarbonization. Oregon should therefore install 635 MW of rooftop solar, 381 MW of battery storage, and 304 electric vehicle chargers on State agencies, public universities, and K-12 public schools; as well as completing energy retrofits including the installation of thermal energy networks.**

Addressing emissions from public facilities alongside transportation emissions related to the public sector is key to combatting the climate crisis. Beyond buildings, everything from school bus fleets; commutes; waste; and groundskeeping all contribute to emissions from the public sector.[e]

Oregon has adopted a number of policies and programs to target public sector emissions. Since 1991, the State Energy Efficient Design (SEED) program has supported state facilities in meeting energy efficiency benchmarks set by the state.[74] In 2017, former Governor Kate Brown issued EO 17-20 (2017) that (a) established high performance energy use targets for existing state-owned buildings, and (b) required all new state buildings to be carbon neutral by 2022.[75] State buildings will also be required to comply with the state's building performance standards as of 2028.[76] Moreover, light-duty vehicles purchased or leased by state agencies must be zero-emission.[77] Most recently, Oregon adopted a target to reduce emissions by 80% across state agencies by 2050, a goal which includes both buildings and transportation emissions.[78]

Looking at public universities and schools, some public universities such as Oregon State University (OSU) and Southern Oregon University have adopted voluntary emissions reductions targets.[79] Meanwhile, K-12 public schools within the Portland General Electric (PGE) and Pacific Power service territories receive funding for energy efficiency, renewable energy, and fleet transition projects through the Public Purpose Charge (PPC) program.[80] And finally, public institutions including State agencies and public K-12 schools (but not State universities) are required to spend 1.5% of the total contract budget for new construction projects or major

e See for example Oregon Department of Administrative Services, "Enterprise Building GHG Emissions by Agency, 2019-2023: Combined Electricity & Natural Gas GHG's [Sp] (MTCO2e)," n.d., accessed December 11, 2025, https://app.powerbigov.us/view?r=eyJrIjoiY2U5OGM4YTctOGFhYyooOTkyLTlmODEtMjE1MGNiYzgoMDEwIiwidCI6ImFhM2Y2OTMyLWZhN2MtNDdiNC1hMGNlLWE1OThjYWQxNjFjZiJ9&pageName=5b7c80deaa8b2d06d5b8; Paul Platosh et al., *Commuting and Climate Change* (Oregon Department of Transportation, 2024), https://storymaps.arcgis.com/stories/ed2de2b6477f49ffbb388925f07bc9aa; Brian Zepka and Amy Todd, *Electric School Buses in the US Could Bring $1.6 Billion a Year in Health and Climate Benefits* (World Resources Institute & Carleton University, 2025), https://www.wri.org/insights/electric-school-bus-health-climate-benefits.

renovations on green energy technologies.[81] This policy is also referred to as the 1.5% Green Energy Technology (GET) requirement.[82]

**FOCUSING ON ENERGY COSTS, THE SEED PROGRAM HAS SAVED AN ESTIMATED $77.4 MILLION SINCE ITS INCEPTION, WHILE SCHOOLS HAVE SAVED OVER $6.8 MILLION THROUGH THE PPC PROGRAM SINCE 2012.**

Together, these efforts have not only delivered emissions reductions, creating healthier schools and workplaces, but they have also generated taxpayer savings. Focusing on energy costs, the SEED program has saved an estimated $77.4 million since its inception, while schools have saved over $6.8 million through the PPC program since 2012 (see *Methodology Appendix* on pages 112-13).[83] Furthermore, at least roughly 11 MW of solar capacity has been installed on public buildings due to the 1.5% GET policy, generating energy with a value of nearly $1,600,000/year on average (see *Methodology Appendix* on pages 112-13). However, more ambitious action is still needed. Half of the 309 buildings included in the SEED program's 2023 reporting failed to meet their energy use intensity targets.[84] Some public universities have no documented emissions reduction goals or plans (see Eastern Oregon University), while others have had to step back from their goals due to lack of progress.[85] And with the repeal of Inflation Reduction Act tax credits, which offered a huge financial boon to public institutions through the direct pay option, there is now a substantial funding hole for public decarbonization projects.[86]

To lead by example through public investments that tackle climate change and create high-quality union jobs, Oregon should commit to fully decarbonizing schools, public universities, and state facilities by 2040 while supporting transportation emissions reduction through the buildout of electric vehicle (EV) chargers at public facilities. This will build on the existing school decarbonization work driven by Oregon's building trades, specifically SMART Local 16 and the electrical workers (see *SMART, IBEW, and Ironworkers are Creating Healthy and Safe Schools, Modelling the Importance of Union-led Public Decarbonization Efforts* on page 72).[87] To accomplish these goals, Oregon must take the following steps to amend existing policies and programs while also dedicating new funding.

### 1. UPDATE EMISSIONS REDUCTIONS TARGETS TO ACHIEVE 100% EMISSIONS REDUCTION BY 2040 FOR PUBLIC SECTOR

Newer climate science conveys the increasing urgency of the climate crisis (Intergovernmental Panel on Climate Change [IPCC], 2023).[88] Oregon should update its climate reduction goals for state agencies to meet this new reality, requiring 100% emissions reduction by 2040. Additionally, Oregon should extend this goal to public schools and universities, ensuring the state's future residents and leaders can learn in safe and healthy environments.

### 2. INSTALL GREEN TECHNOLOGIES ON PUBLIC BUILDINGS USING UNION LABOR

To support decarbonization of buildings and transportation while improving the working and learning conditions of State employees, professors, teachers, and students alike, Oregon should build out green technologies on public facilities as detailed on page 70.

In addition, the State should weatherize these public buildings and install ground source heat pumps (GSHPs) to support 100% emissions reduction, in line with the goals outlined above. Focusing on rooftop solar will help bolster union density in this sector, as (a) projects should be considered public works and thus subject to the requisite labor standards as described below; and (b) smaller projects can be bundled together to make them more appealing to union contractors. Altogether, retrofits and renewable energy construction will support 33% of the total energy needs for State agencies, public universities, and public K-12 schools (see *Methodology Appendix* on pages 113-15).

| Technology Type | Overall Buildout Goal by 2040 | Buildout by Facility Type |
|---|---|---|
| Rooftop Solar | 635 MW | **State Agencies:** 21 MW<br>**Public Universities:** 55 MW<br>**Public K-12 Schools:** 559 MW |
| Battery Storage | 381 MW | **State Agencies:** 12 MW<br>**Public Universities:** 33 MW<br>**Public K-12 Schools:** 336 MW |
| Thermal Energy Networks (TENs) | 6 | All TENs included in this recommendation are anticipated to be installed at public universities |
| Level 2 EV Chargers | 304 | All EV chargers included in this recommendation are anticipated to be installed at State facilities |

Public universities were chosen for TENs installation as their campus structures with buildings under single ownership make them particularly well-suited to this technology.[89] State agencies were the focus of EV charging buildout given the relative accessibility of these chargers to the public compared to those installed at universities or schools.

### 3. AMEND EXISTING POLICIES SUCH AS THE 1.5% GET REQUIREMENT AND THE SEED PROGRAM WHILE PURSUING ADDITIONAL FUNDING

To coordinate this work, Oregon should expand the SEED program to include oversight of public K-12 buildings and public universities. This expansion should be undertaken alongside the holistic Enterprise-wide energy management strategy recommended in the Oregon Department of Energy's (ODOE) most recent SEED report.[90] Putting ODOE/SEED at the center of this more ambitious public decarbonization program would support data collection, provide added support for meeting new building performance standards, and leverage bulk purchasing utilizing best value procurement to bolster high-road jobs in the clean energy supply chain.[91]

The Department of Administrative Services can continue its role in overseeing EV charging installation, amending internal policy to remove the limit on EV charging installations in parking spaces.[92]

Existing policies – namely, 1.5% GET and the PPC program – generate an average of $13 million in spending for clean energy work, decarbonization, and the installation of EV infrastructure (see *Methodology Appendix* on pages 112-13). Increasing the 1.5% GET requirement to 5% could increase spending to $17 million annually not accounting for inflation; while expanding the definition of eligible green energy technologies to include GSHPs and TENs can provide further support for decarbonizing public buildings (see *Methodology Appendix* on pages 112-13). The State should allocate additional funding – including tax credits, grants, loans, and bond funding – to support critical emissions reduction and the creation of publicly-supported union jobs.

### CONTRACTOR LABOR STANDARDS FOR RETROFITTING AND INSTALLING CLEAN TECHNOLOGIES ON PUBLIC BUILDINGS AND FACILITIES

These projects meet the threshold of public works projects as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union*

Credit: SMART Local 16.

*Transition* on page 20. As such, the following labor standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for projects over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in said section for all contractors and subcontractors for on-site and off-site construction for all energy efficiency, HVAC, solar, battery storage, EV charging installation, and thermal energy network-related work on public buildings and facilities

h) **Skilled and trained workforce standards,**
i) **Self-performance of work requirements,**
j) **Responsible contractor certifications** for applicable trades, and
k) **Demonstrated compliance with labor laws and protections.**

**Workforce Development Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e as well as h-k by providing all relevant agencies a copy of the following:

- **Project labor agreements** for on- and off-site construction as well as construction-based maintenance,
- **Labor peace agreements** where assessed as viable by relevant procuring agency for non-construction based maintenance and operations of public buildings and facilities, and a
- **Community benefits agreement**

### Jobs

**13,000 direct jobs through 2030**
3,500 construction trades jobs through 2030

### Cost to State

**$510,000,000/year**
$2.55 billion total cost through 2030

### Emissions Reduction

296,000 MTCO2e by 2040

## SMART, IBEW, AND IRONWORKERS ARE CREATING HEALTHY AND SAFE SCHOOLS, MODELLING THE IMPORTANCE OF UNION-LED PUBLIC DECARBONIZATION EFFORTS

Through an innovative partnership with the Oregon Department of Education, Sheet Metal Workers Local 16 (SMART Local 16) has developed a strategy to keep members at work while helping Oregon students thrive.

In 2023, a SMART Local 16-led coalition helped pass H.B 3031 (2023) requiring that school districts using public funds for HVAC improvements prioritize indoor air quality improvements.[93] As discussed in this report's introduction, this legislation contained strong labor standards to ensure taxpayer dollars would support high-quality work and good union jobs. The union and its allies based their advocacy on the growing body of research highlighting the critical influence of indoor air quality on student outcomes and insufficiencies in current HVAC installment practices that limit energy efficiency gains.[94]

Next, Local 16 and SMART's Northwest Regional Council implemented the "SMART Facilities" pilot program. Participating school districts devised Community Benefits Plans that engaged union labor, and SMART members performed the building assessments required for federal grant applications.[95] The Oregon Department of Education played an important role in promoting the program and connecting school districts to the union. More than 80 school districts in the region expressed interest, and the program grew quickly.[96] In addition to ventilation upgrades, the Oregon Department of Education and SMART collaborated on additional resilience upgrades including solar installations, battery storage, and covered parking.[97] This model is not specific to a single trade: Local 16 partnered with other building trades unions such as the IBEW and Ironworkers on multi-faceted school infrastructure projects.[98] These efforts help to highlight the integral role union members should play in making public buildings healthier, safer, and emissions free, in line with the recommendation

Credit: IBEW Local 48

Funding from Biden Administration programs had helped lessen the cost burden on schools. For example, 11 facilities in rural Oregon school districts received a $7.8 million investment through the Bipartisan Infrastructure Law for upgrades.[99] With federal funding increasingly unreliable, state support for these and similar initiatives is all the more critical.

RECOMMENDATION

# STRENGTHEN AND DECARBONIZE OREGON'S PUBLIC TRANSIT WITH UNION JOBS AND OPERATIONAL FUNDING

- To strengthen public transit, reduce emissions, and create high-quality union jobs, Oregon must:
  - Require zero-emission buses starting in 2027 (reach 100% of fleet by 2040), and
  - Expand light rail and improve Amtrak Cascades service by 2035,
  - Build the Cascadia High-Speed Rail project by 2050

Transportation is the biggest driver of greenhouse gas (GHG) emissions in Oregon: as of 2023, transportation was responsible for 35% of the state's total emissions.[100] Over half of this 35% – or 20% of emissions overall – are from light-duty or passenger vehicles.[101] Expanding and electrifying public transit – an alternative to the proliferation of passenger vehicles – will be essential to meeting the state's emissions reduction goals.

Currently, the state's transportation system is showing real strain. Decreased revenue from the state gas tax has coincided with a 68% rise in highway construction costs since 2021.[102] These and other factors – most notably, H.B. 2017 (2017), which created statutory requirements that limit Oregon Department of Transportation's (ODOT) ability to use new revenue for routine operations and maintenance – contributed to a projected deficit of over $350 million for ODOT, a deficit which threatens hundreds of jobs, including union jobs.[103] Like ODOT, the Tri-County Metropolitan Transportation District of Oregon (TriMet) also anticipated a $300 million deficit.[104] To compensate, service cuts began in late 2025, with further cuts projected for the coming years – in fact, the agency may be forced to eliminate up to 51 of its 78 bus lines by 2031 to address its operating deficit.[105] While the Oregon legislature passed H.B. 3991 (2025) during a special session to help fill budget gaps in the short term, the majority of revenue raised is directed at maintaining roads and highways, with a small portion allocated for public transit.[106] Together, budget shortfalls, constraints on spending due to H.B. 2017 (2017), and prioritization of roads and highways over public transit create a vicious cycle where transit systems deteriorate, service frequency declines, ridership drops, and the agency can only expand — not maintain or operate — what already exists.[107]

Additionally, public transit is still recovering from the effects of the COVID-19 pandemic, and recovery has shown slow progress. Though TriMet's ridership is steadily on the rise from lows met during the pandemic, ridership remained at only 65.1% of the pre-pandemic levels as of June 2024.[108] Though weekly system boardings have been steadily increasing, on the whole, the transportation provider is providing approximately 30 million fewer rides each year than it did in 2019.[109]

Investing in public transportation will not only help reduce emissions, but it also offers governments one of the best returns on investment in transportation

spending. According to the American Public Transportation Association (APTA), every dollar spent on public transit produces approximately five dollars in economic benefits, and each billion dollars in transit investment creates approximately 50,000 jobs. And because Oregon's public transit sector demonstrates strong union representation with competitive wages, benefits, and worker protections, these jobs are a key part of an equitable, union green transition.[110]

Investments in public transit can also help defray costs to households. Oregon residents carry an average auto loan balance of $4,270, and the annual cost of owning and operating a car costs an average of $12,296 as of 2024 (national average assuming 15,000 vehicle-miles per year).[111] Compare that to the annual cost of a TriMet pass, which is at most $1,200; or Lane Transit, which ranges from $540 to $600 a year depending on if riders opt for 3-month or 1-month passes.[112]

By building zero-emission public transit infrastructure, Oregon can connect workers to jobs, reduce cost burdens, and create thousands of union jobs in rail construction, maintenance, and operations. Pathways including decarbonizing existing transit, expanding light rail and Amtrak services, and maintaining commitments to build high-speed rail, will not only cut pollution, they will also strengthen Oregon's economy.

**INVESTING IN PUBLIC TRANSPORTATION WILL NOT ONLY HELP REDUCE EMISSIONS, BUT IT ALSO OFFERS GOVERNMENTS ONE OF THE BEST RETURNS ON INVESTMENT IN TRANSPORTATION SPENDING.**

### DECARBONIZING THE PUBLIC BUS FLEET BY 2040

To reach 100% public bus fleet decarbonization by 2040, Oregon should adopt legislation mandating that all new public transit bus purchases be zero-emission

vehicles starting in 2027. This will build on existing efforts at transit agencies including TriMet and Lane Transit District, both of which have adopted 100% zero-emission fleet goals.[113] Notably, transit agencies are pursuing fleet decarbonization through both battery-electric and hydrogen fuel cell buses.[114] Moreover, by establishing unified procurement agreements, ODOT can help smaller agencies meet these purchasing goals, leveraging economies of scale to achieve lower per-vehicle expenses.

Transitioning Oregon's over 1,400 public transit buses would reduce lifecycle greenhouse gas emissions while generating potential cost savings.[115] TriMet's analysis showed a 57% emissions reduction potential in Portland General Electric's service territory.[116] Also, over the lifetime of an electric bus, estimates from bus manufacturer New Flyer indicate savings of approximately $400,000 in fuel costs and $125,000 in avoided maintenance costs; notably, these benefits may vary from one region to another depending on local electricity rates and utility structures.[117] Through unified procurement agreements, Oregon can also condition contracting on high-roads labor standards.

## EXPANDING LIGHT RAIL CAPACITY

Oregon should create a light rail expansion strategy that targets high-ridership corridors and transit-oriented development. However, recent attempts to expand light rail have faced the same funding hurdles as Oregon's wide transportation system. Most notably, the Southwest Corridor Light Rail project, which offered regional connectivity between Downtown Portland and Tualatin, stalled due to the failure of Measure 26-218 in 2020 aimed at funding transit projects.[118]

Outside the additional sustainable funding solutions needed to support public transit, agencies can pursue alternative solutions to help bolster support for light rail. For example, an initial bus rapid transit phase may help demonstrate the market demand for and economic potential of proposed light rail routes. Oregon can also apply lessons learned for using tax increment financing (TIF) to support light rail development (see Denver's example).[119] To help facilitate this, ODOT should provide model policy to ensure light rail projects are eligible for TIF funds. Finally, ensuring robust labor standards on the construction, maintenance, and operation of light rail projects will help to guarantee that projects are completed on time and safely while boosting the economic return on investment to the state.

## BUILDING TOWARD HIGH-SPEED RAIL (2025-2050)

### Strengthening Amtrak Cascades (2025-2035)

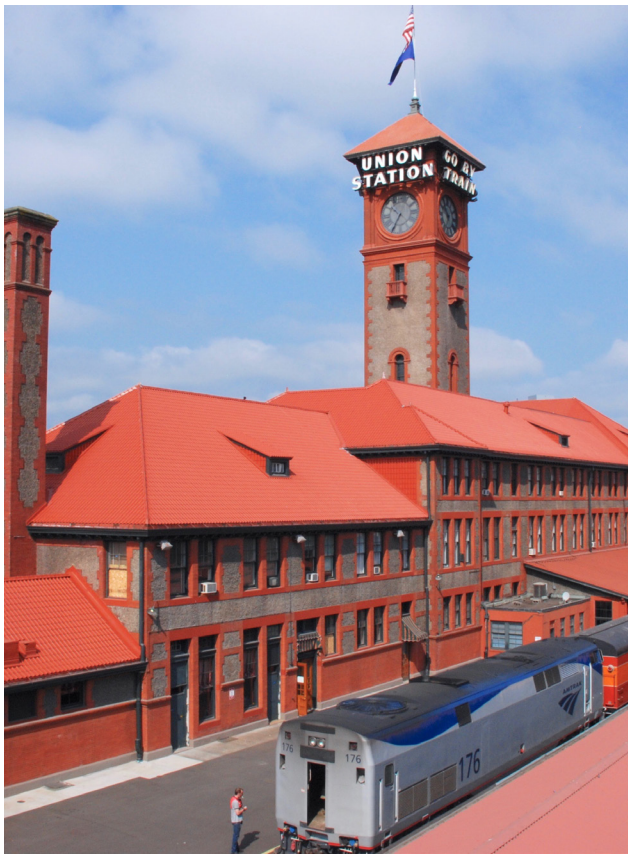
In 2024, Amtrak Cascades had over 941,000 passengers, the most ever for the whole corridor.[120] Oregon alone saw 161,899 passengers, a 29% increase from 2023.[121] Yet as ridership increased, Oregon's on-time performance dropped to 58%, well below its 80% goal.[122] In anticipation of the arrival of eight new Airo train sets, ODOT must prioritize the completion of infrastructure upgrades at Union Station and Eugene Station by this year to make the most out of new equipment.[123] This will enable the system to handle triple the service frequency between Portland and Eugene and improve travel time.[124] As future rounds of transportation funding legislation are being debated, ODOT must prioritize the $140 million a year needed to pay for these improvements.[125]

### Cascadia High-Speed Rail Planning and Construction (2025-2050)

Finally, to improve public transit and deliver on its economic, climate, and jobs benefits, Oregon must prioritize the completion of the Cascadia High-Speed Rail project. This project, which is anticipated to connect the corridor between Vancouver, British Columbia; Seattle, Washington; and Portland, Oregon, most recently received a combined $55 million in funding from the federal government and Washington State to advance.[126] The Cascadia High-Speed Rail project is expected to bring in $355 billion in regional economic growth, spur the creation of 160,000 to 200,000 new permanent jobs, and cut regional carbon emissions by 6 million metric tons of $CO_2$ over 40 years.[127]

The full Cascadia High-Speed Rail project is expected to cost between $24 and $42 billion in 2017 dollars, approximately $36 to 63 billion in today's dollars.[128] To

keep these high costs under control and make the project more likely to succeed, Oregon should focus on cost-control strategies like doing engineering and design work in-house to cut down on consulting costs, speeding up the delivery and permitting processes to cut down on delays and cost overruns, and improving construction management and contractor accountability to make the project more efficient and keep costs down. These strategies, along with model workforce and contractor labor standards, will help the project deliver on its promise of 200,000 jobs while ensuring these jobs are high-quality.[129]




## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR PUBLIC TRANSIT

Public transit projects meet the threshold of public works projects as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20. As such, the following labor standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for grants over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in said section for all contractors and subcontractors for on-site and off-site rail construction.

h) **Skilled and trained workforce standards**

**Workforce Development Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e, h by providing all relevant agencies a copy of the following:

- **Project labor agreements** for on- and off-site construction as well as construction-based maintenance, and a
- **Community benefits agreement**

**Labor Peace Agreements:** public transit agencies must assess the viability of a Labor Peace Agreement (LPA) requirement on each covered contract for non-construction work to ensure timely project completion without the threat of labor disputes. The LPA must include card check recognition and neutrality provisions.

**Procurement:** ODOT and other transit agencies must comply with best value procurement per the recommendation to *Leverage Public Dollars to Support a Diverse, Union, Clean Energy Economy by Strengthening Public Procurement Standards* on page 101.

RECOMMENDATION

# DECARBONIZE OREGON'S MEDIUM- AND HEAVY-DUTY VEHICLES BY 2035 TO ADVANCE UNION JOBS AND ENVIRONMENTAL JUSTICE

- **Oregon should adopt a two-phase plan to deploy electric vehicle (EV) charging infrastructure in pollution hotspots and freight corridors, prioritizing environmental justice communities and creating union jobs.**

In 2023, transportation accounted for 34.4% of the state's total emissions (20.45 million MTCO2e).[130] Medium- and heavy-duty vehicles (MHDVs) alone were responsible for about 42% of transportation greenhouse gas (GHG) emissions.[131] Beyond GHGs, MHDVs generate 70% of on-road nitrogen oxides and 64% of on-road particulate matter emissions, disproportionally affecting communities of color and low-income populations near major freight corridors.[132] The American Lung Association found that MHDV electrification from 2020-2050 could save Oregonians $1.1 billion in health-related costs as well as prevent 103 premature deaths.[133]

Oregon's MHD EVs charging infrastructure remains in its early stages, primarily limited to private fleet depots.[134] According to the Oregon Department of Transportation (ODOT), the state will need 10,140 MHD EV charging ports by 2035.[135]

Oregon should pursue a coordinated two-phase approach to accelerate the installation of EV chargers and clean, emissions-free fueling infrastructure for MHDVs, in turn accelerating its clean vehicle transition. Phase 1 will focus on medium-duty vehicles including school buses, transit buses, and delivery trucks in environmental justice communities. Phase 2 will target heavy-duty freight vehicles along major transportation corridors. This strategy will create high-quality union jobs in both cities and rural areas, facilitate statewide MHDV decarbonization through the adoption of electric and hydrogen vehicles, and reduce the impact of transportation emissions on Oregonians.

### PHASE 1: ZERO EMISSION PRIORITY ZONES (2026-2035)

Together, ODOE and ODOT should establish Zero Emission Priority Zones, building on the pilot zonal approach modeled by Portland through its Zero-Emission Delivery Zone.[136] A zonal approach focused on medium-duty vehicles that make local trips such as school buses, transit buses, and delivery trucks can help ensure communities most harmed by transportation pollution for clean vehicle infrastructure deployment.

Oregon should use future rounds of funding through the Oregon Zero-Emission Fueling Infrastructure Grant Program and the Carbon Reduction Program to provide seed capital to support a braided funding model that leverages state, utility, and municipal funding streams together to jumpstart a coordinated, zonal decarbonization approach.[137] Given the uncertainty of federal funding and increasing constraints in ODOT's budget, this braided approach can help better target the universe of EV infrastructure overall to achieve the goals of this zonal approach.[138] For instance, in addition to Portland's Clean Energy Community Benefits Fund, which has

thus far allocated over $350 million to transportation decarbonization efforts, localities including Woodburn, Philomath, and West Linn recently received ODOE grants to support EV infrastructure deployment.[139] At the same time, utilities fund their own suite of programs to facilitate EV charger adoption.[140] To target opportunities for braiding, the Public Utility Commission (PUC) should require investor-owned utilities to outline how they are using dedicated funding for clean transportation infrastructure to support the installation of such infrastructure in designated Zero Emission Priority Zones in their Transportation Electrification Plans.[141] To ensure this disaggregated funding structure still supports the creation of good jobs, workplace safety, and efficient project completion, Oregon should adopt skilled and trained workforce requirements on all clean vehicle fueling infrastructure including EV charging. The full set of workforce and contractor labor standards to be attached to this work are detailed later in this recommendation.

This braided funding model comes from federal weatherization programs that use money from different sources.[142]

Oregon should install the following for each vehicle type:

- **Transit and School Buses:** 2,832 Level 2 chargers and 485 DC fast 50kW chargers by 2030
- **Local Commercial Fleets:** 949 DC fast 150kW chargers by 2030

### PHASE 2: FREIGHT CORRIDORS ELECTRIFICATION (2030-2035)

Oregon's Freight Corridors Electrification will establish an integrated clean fueling network along its main freight routes (Interstate 5, Interstate 84, U.S. Route 20 and U.S. Route 97).[143] In addition to hydrogen fueling stations, 690 EV charging ports will be built in key locations to support a wide range of long-distance freight operations.[144] Battery electric solutions are well-suited for short-haul and medium-duty applications, while hydrogen is great for long-haul heavy-duty trucking due to its long range and quick refueling capabilities.[145] This dual-technology approach therefore ensures that all freight transportation needs are met.

The state should leverage its share of the $102 million in federal funding for the West Coast Truck Charging and Fueling Corridor Project.[146] Recent reports indicate that Oregon was able to receive $21 million in funding ($26 million with private sector matching funds) before a federal funding freeze was ordered.[147] Regardless, this funding will not cover the entire infrastructure build-out to meet the state's needs, making it critical for Oregon to plan strategically and identify other funding sources.

Project bundling under this phase will help extend funding further during this period of budget uncertainties, as project bundling has been shown to lower costs by leveraging economies of scale, minimizing the construction cost impacts of inflation.[148] Bundling helps to increase bid competition as well, which may help further save on costs. Finally, project bundling can also help to maximize job creation.[149]

Adopting robust labor standards on the build-out of clean vehicle charging and refueling infrastructure is crucial, supporting the creation of a qualified union workforce with access to high-quality careers while ensuring that the build-out of clean vehicle infrastructure is done with quality, safety, and efficiency. Below is a summary of the full suite of labor standards attached to this program.

### WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR CLEAN VEHICLE CHARGING AND REFUELING

Projects in phase 1 and phase 2 that receive public funds meet the threshold of public works projects as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20. As such, the following labor standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**

e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for grants over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in said section for all contractors and subcontractors for on-site and off-site construction for all EV charging and hydrogen fueling infrastructure:

h) **Skilled and trained workforce standards**

**Project Labor Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e, h by providing all relevant agencies a copy of a PLA for on- and off-site construction as well as construction-based maintenance and operations.

### Jobs

**1,700 direct jobs through 2030**
630 construction trades jobs through 2030

### Infrastructure

**Phase 1**: 4,266 charging ports by 2030, 9,243 charging ports by 2035
**Phase 2:** 690 stations by 2035

### Cost

$385,000,000 by 2030
$1,460,000,000 by 2035


## THE USE-CASE FOR CLEAN GREEN HYDROGEN

Hydrogen is emerging as a clean energy strategy, becoming especially important for hard-to-decarbonize sectors, including medium- to heavy-duty transportation. Hydrogen is an energy carrier that stores useful energy in a gas or liquid form, which can then be used as a fuel or converted to electricity with a fuel cell. While its costs remain high, hydrogen remains attractive because it can be produced through electrolysis, using only water and electricity to split water molecules into hydrogen and oxygen. At consumption (e.g. tailpipe emissions) water is its only emission. When production is paired with renewable electricity, hydrogen provides the ability to store and use renewable electricity on demand - although it notably competes for freshwater and the limited supply for energy. As such, the demand for, and production of, carbon-free hydrogen should be carefully managed, with regulation on specific use cases and flexibility in production.

Although electricity will be the dominant energy source for transportation, batteries currently cannot provide the power necessary for all modes of transportation. For example, long distance trucking and buses may benefit from hydrogen fuel cell technology which can go longer distances and propel vehicles up hills much better than battery-electric technology . Because it can also be burned as a fuel, including blending with fossil fuels, hydrogen will likely also play a role in sustainable aviation fuels and for shipping - two high emitting sectors.

Production of hydrogen must have high environmental and siting standards. It should also be located close to the site of consumption to prevent inadvertently increasing the total energy consumed and adding to the carbon intensity. For example, producing hydrogen on site at ports can support decarbonizing port infrastructure and may be scaled in the future for ships. Another potential transportation solution is to produce it on site at truck stops and bus depots with a microgrid configuration.

RECOMMENDATION

# CREATE A PRO-WORKER CIRCULAR ECONOMY THROUGH ROBUST LABOR STANDARDS ON BUILDING DECONSTRUCTION AND RENEWABLE WASTE RECOVERY

- **Change Oregon's waste management strategy by requiring state projects to be deconstructed, establishing union-run deconstruction certification programs, and imposing extended producer responsibility for waste from renewable energy.**

Oregon has two converging challenges that present a great opportunity for leadership in the circular economy and the creation of good jobs. First, building and demolition waste represent a massive environmental and economic burden. For example, construction and demolition debris from residential buildings make up approximately 30-35% by weight of landfill-bound waste in Portland.[150] This is because traditional mechanical demolition crushes buildings with heavy machinery, sending materials directly to landfills instead of leveraging opportunities for reuse.[151] This in turn leads to significant environmental impacts from producing new materials to replace what could have been salvaged.[152]

Simultaneously, while Oregon's renewable energy sector has major employment potential for high-quality jobs, it also portends a significant future waste challenge as the lifecycle of these facilities reaches term. Wind turbines and solar panels reach end-of-life after around 20 and 25 years, respectively, presenting an opportunity to proactively develop strategies for circular use and waste as the industry scales.[153] Oregon is already confronting significant waste challenges from decommissioning renewables. For example, in 2022, B&K, a recycling company that processes parts from wind turbines, faced an influx of 141 shipments of wind turbines from farms in the Arlington area alone.[154] Wind turbine parts are complicated to process – for instance, take the Shepherds Flat project, which is constructed from over 900 blades weighing 17,000 pounds each.[155] At the same time, solar panels contain dangerous substances like lead, and cadmium which must be handled sensitively.[156]

Oregon is in a unique position to be a leader in the circular economy. In terms of building deconstruction, Portland, home to over 10% of the state's 2.2 million buildings, has modeled a successful program since 2016.[157] Nearly 600 houses have been deconstructed, 2,000 tons of materials have been saved, 3.6 million MTCO2e of carbon emissions have been avoided, and approximately 30 new jobs have been created.[158] Building deconstruction offers a chance to develop a comprehensive circular economy, where Oregon can take the lead bringing significant change and act as a model for other states.

Moreover, Oregon is one of only 7 states with extended producer responsibility (EPR) legislation, Which requires

producers to fund the post-consumer management of their products from collection to final disposal.[159] Under this program, producers must pay for improvements to the recycling system, support the collection and recycling of covered products, and compensate local government for recycling services.[160] This framework demonstrates a pathway for producer-funded waste management systems , principles that can be applied to managing waste from building deconstruction and renewable energy projects.[161]

### STATEWIDE BUILDING DECONSTRUCTION

Based on the success of Portland's deconstruction program, Oregon should adopt a statewide deconstruction policy. To start, a state building deconstruction policy would require deconstruction in lieu of demolition for all buildings built before 1940 that are owned, leased, or funded by the state.[162] Over time, expand to commercial and industrial buildings, and finally to residential structures. To manage deconstructed materials, this policy would create regional processing networks starting with the Portland Metro, Eugene/Springfield, and Bend/Redmond areas. The law would also set up a system for certifying contractors, ensuring that only qualified companies with the right training, safety measures, and compliance with prevailing wage laws are eligible for state-funded deconstruction projects.

**RESEARCH FROM CORNELL UNIVERSITY'S CIRCULAR CONSTRUCTION LAB FOUND THAT IF HALF TO THREE-QUARTERS OF RESIDENTIAL DEMOLITIONS IN NEW YORK STATE WERE TURNED INTO DECONSTRUCTION, IT COULD CREATE BETWEEN 8,130 AND 12,630 JOBS.**

A statewide building deconstruction program would also help create high-quality union jobs across crafts. Research from Cornell University's Circular Construction Lab found that if half to three-quarters of residential demolitions in New York State were turned into deconstruction, it could create between 8,130 and 12,630 jobs.[163] Moreover, reusing materials creates 30 jobs for every 1,000 tons of materials handled, versus 4.3 jobs created by incineration, landfilling, and recycling.[164] This shows how deconstruction could serve as a job multiplier. To ensure these jobs are high-quality, Oregon should build on recent wins such as S.B. 594 (2023), which expanded the definition of public works to include demolition and hazardous waste removal, thus requiring the payment of prevailing wage on said projects.[165] Such a provision must specify that deconstruction follow the craft, creating jobs across unions and building a robust circular deconstruction economy rooted in skilled trades. More recent legislation such as S.B.426 (2025), which holds property owners and general contractors responsible when subcontractors engage in wage theft, should equally be extended to deconstruction, ensuring that Oregon's shift from demolition to deconstruction includes strong labor standards.[166]

Although deconstruction requires greater up-front investment than mechanical demolition, the rising costs of demolition coupled with revenue generation opportunities from deconstruction could help make the creation of a deconstruction program cost-competitive.[167] For instance, landfill tipping fees are rising throughout the United States, increasing the cost of demolition.[168] Between 2016 and 2020, tipping fees increased at an annual rate of nearly 3%, rising from $48.27 per ton to $53.72 per ton; and average fees for construction and demolition waste cost $52.67 per ton in 2020.[169] Additionally, the cost for demolition contractors to dispose of lumber through standard methods reaches between $80 and $125 per ton.[170] By contrast, when salvaged, this same lumber can bring in prices between $200 and $1000 per ton.[171] The average salvage value from whole-building residential deconstruction projects amounts to $20,000 per project, while donation appraisal values reach between $10,000 and more than $300,000 based on building characteristics.[172] And according to DEQ, experienced practitioners can recover up to 37% of the material by weight. The combined revenue from salvaged materials and the savings

from avoiding disposal costs could help pay for the increased expenses of deconstruction.[173]

Funding mechanisms, such as DEQ's Materials Management Grants, are already in place to support program implementation.[174] This program provides $2 million on a biennial basis to projects advancing material reuse, infrastructure deconstruction, and waste reduction, especially in underprivileged areas.[175] As this program expands, it should specifically redirect funding toward deconstruction projects and require compliance with the workforce and contractor labor standards below.

### RENEWABLE ENERGY WASTE EXTENDED PRODUCER RESPONSIBILITY

Oregon's second circular economy opportunity lies in addressing the growing challenge of renewable energy waste. Building on Oregon's successful plastic EPR law, the state should create a manufacturer/developer-funded system for managing solar panels and wind turbine components at the end of their useful lives.[176] This program would address critical safety and infrastructure gaps in renewable waste management. Companies would pay fees based on the volume and hazard level of their waste materials, creating a state-administered fund for full cost recovery of responsible waste management. By setting up collection infrastructure in major metro areas and deploying mobile pick up units in rural communities, Oregon could establish itself as a regional hub for solar panel and wind turbine disposal. This regional model is supported by the National Renewable Energy Laboratory (NREL), which emphasizes that "State-level regional factors, such as landfill tipping (disposal) fees, transportation distances, and differing capabilities in local workforce and material demand play a critical role in the environmental sustainability and cost-competitiveness of recycling technologies. "[177]

Adopting such a policy will not only expand job creation in waste management and renewables recycling facilities, but in construction as well. Much like the construction of renewable projects, the deconstruction of said projects will require a skilled and trained workforce, creating opportunities to grow union jobs. Workers could acquire complementary skills through registered apprenticeship programs for both construction and dismantling of renewable projects.[178] Relying on trained apprentices and journeyworkers would also help to guarantee the safe handling of hazardous materials from these technologies.[179]

### WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR DECONSTRUCTION

Deconstruction of public facilities, deconstruction on publicly-owned land, and deconstruction projects that receive state grants meet the threshold of public works projects as updated in the section *Comprehensive Gold Star Labor Standards for Oregon's Green Union Transition* on page 20. As such, the following labor standards as defined in said section should apply:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Buy American** for grants over $250,000, and
g) **Enforcement.**

In addition, Oregon should adopt the following standards as provided by the model language in said section for all contractors and subcontractors for these projects, including:

h) **Skilled and trained workforce requirements,**
i) **Self-performance of work requirements,**
j) **Responsible contractor certifications** for applicable trades, and
k) **Demonstrated compliance with labor laws and protections.**

**Workforce Development Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-e as well as h-k by providing all relevant agencies a copy of the following:

- **Project labor agreements** for on- and off-site construction as well as construction-based maintenance, and a
- **Community benefits agreement**

Credit: LiUNA Local 737

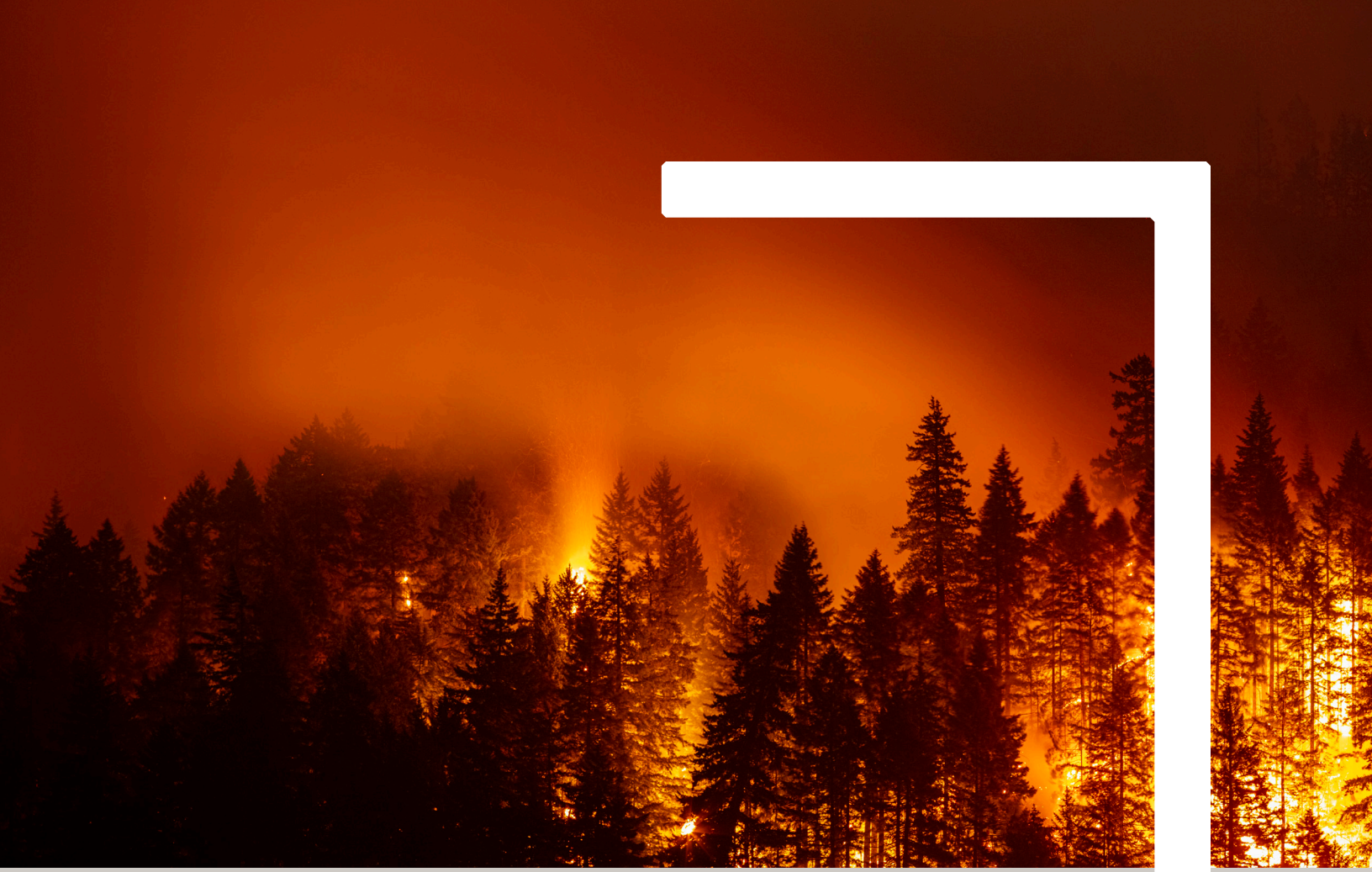
## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR RENEWABLE WASTE EXTENDED PRODUCER RESPONSIBILITY

Under its extended producer responsibility policy for renewable waste recycling, Oregon should establish the deconstruction renewable projects in preparation for recycling as "covered projects" that must meet the following labor standards for all on- and off-site construction-based work:

a) **Prevailing wage requirements,**
b) **Employer-paid benefits requirements,**
c) **Apprenticeship utilization requirements,**
d) **Pre-apprenticeship graduate utilization requirements,**
e) **Targeted outreach, recruitment, and retention of underrepresented groups,**
f) **Skilled and trained workforce requirements,**
g) **Self-performance of work requirements,**
h) **Responsible contractor certifications** for applicable trades,
i) **Demonstrated compliance with labor laws and protections,** and
j) **Enforcement.**

**Project Labor Agreement exemptions:** contractors, or subcontractors for these projects may comply with the requirements a-i by providing all relevant agencies a copy of a PLA.

**Labor Peace Agreements:** For the materials processing side of this program, state agencies that award funds for the development of this industry must assess the viability of **labor peace agreements**.



# PROTECTING OREGON'S WORKERS FROM CLIMATE IMPACTS

RECOMMENDATION

# ADVANCE A CLEAN AGRICULTURE SECTOR WITH ON-SITE RENEWABLES

- **Decarbonizing agriculture with union-built renewable solutions will help boost rural resilience while generating benefits for farmworkers and union labor alike.**

Oregon has a strong agricultural industry, employing over 40,000 people, and producing everything from meat to Christmas trees to grapes for wine.[1] In 2022, the state had 35,547 farms, over 80% of which were family or individually-owned.[2]

Unlike other sectors, most of agriculture's emissions stem from methane and nitrous oxide, both of which have significantly higher global warming potential when compared to carbon dioxide.[3] These high-impact emissions stem from waste streams and emit through soil management, enteric fermentation, residue burning, manure management, and fertilization.[4] Today, it is responsible for about 11% of the state's emissions.[5] As "a prime driver and the first victim of climate change," the sector faces a two-fold challenge: it must adapt to a changing climate and incorporate mitigation strategies that reduce its contributing effect.[6]

Farms are impacted by rising energy costs. In 2022, fuel and utilities accounted for 7.6% of farm expenditures, meaning energy is already a significant expense for local farms.[7] Electric rates in Oregon rose 26.2% on average from 2020 to 2024, with further potential increases on the horizon.[8] Rural areas in particular threaten to become energy burdened, in part due to the increased costs of providing services, delivering fuels, and maintaining electric infrastructure over long distances.[9] At the same time, electrifying farm operations – including irrigation, machinery, pesticide systems, and transportation – can have a variety benefits, such as increased energy efficiency, decreased energy and maintenance costs, and increased safety, among others.[10]

As described in *Build 36 GW of Clean Energy, 12.8 GW of Energy Storage, and Expanded Transmission Capacity by 2040 Using Union Labor* on page 29 in this report, Oregon must dramatically increase the pace of clean energy development. While modeling by the state shows that land-use consideration will likely not be a constraint to building out the needed renewables in the Oregon, concern remains about competition with land-use, including farming, as well as interest in co-beneficial projects, such as agrivoltaics.[11] Untapped farmland presents a clear opportunity to expand renewables as only 10% of Oregon's farms have renewable energy systems in 2022; and a majority of solar (64%) installed on small farms.[12]

On-farm renewable technologies such as agrivoltaics, or solar co-located on working farmland, are designed to allow farmland to remain agriculturally viable while also producing renewable energy.[13] Such technologies also have the potential to save water from irrigation systems, increase beneficial shade for crops and livestock, create resilient farms and rural communities, and generate income for farm operations.[14] While momentum for farm-based climate mitigation is beginning to pick up (the number of farm-sited renewable projects in Oregon grew 23.3% from 2017 to 2022), less than 10% of Oregon's farms had renewable energy systems in 2022.[15] Following Executive Order 25-25, the early sunsetting of the federal Clean Energy Investment and Production tax credits creates an urgency to quickly expand the state's clean energy portfolio, with Oregon's agricultural land presenting a unique opportunity for multi-beneficial renewable energy projects.[16]

While there are energy efficiency incentives for farms and rural communities, Oregon lacks a centralized strategy to reduce agricultural emissions.[17] Electrification, capturing emissions, and transitioning to bio-based drop in fuels are all important for reducing the sector's climate impact.[18] A strong vision can support emissions and pollutant reduction, provide rural clean electricity to contribute to community resilience, and create good union jobs.

### ADOPT AN AGRICULTURAL CLEAN ENERGY GRANT PROGRAM

To achieve this vision, Oregon should create an Agricultural Clean Energy Grant Program to fund, provide technical assistance, and facilitate community engagement for projects that create a more resilient, decarbonized agricultural sector. Grants administered through this program will support upfront planning costs as well as construction costs for building renewable infrastructure, advancing clean fuels, and reducing organic waste. Project funding decisions should incorporate a strong preference for projects sited on farms in areas with high energy burdens, projects that include emerging technologies, and those that guarantee strong labor standards on construction and maintenance work. The state should require long-term contracts with project owners, allowing it to recover program costs by earning a percentage of the income or energy savings to recover program costs. As a condition of a state grant, revenue-raising projects should also be required to have a profit sharing component with farmworkers in the form of payments or benefits, such as a small business profit-sharing retirement plan, an annual cash bonus plan, or a combination or variation of the two.[19] Through these measures, these proposed grants would mitigate emissions while providing pathways for high-quality union jobs and benefitting farmers and agricultural workers.

Two main types of projects should be supported through this grant: agriculture-sited DERs and waste to useful bioenergy projects. DERs include generation, storage, and control systems created for a specific user's application and located close to the load and typically focus on energy efficiency, security, and carbon reduction (see *Updating Oregon's Energy Policy to Support Its Energy Future* on page 41).[20] The systems can be sited at an individual location, co-located, co-aggregated, or jointly controlled - and can be in front or behind the meter.[21] Because DERs make farms more resilient to power outages, may create a revenue source, and can potentially create rural jobs, they are integral to the sector's green transition.[22] Digester and biogas systems are also customizable, meaning not only can they meet the diverse needs of specific farms, they can also support rural resilience through the integration of energy storage, as well as tie into the local grid.[23]

**BECAUSE DERs MAKE FARMS MORE RESILIENT TO POWER OUTAGES, MAY CREATE A REVENUE SOURCE, AND CAN POTENTIALLY CREATE RURAL JOBS, THEY ARE INTEGRAL TO THE SECTOR'S GREEN TRANSITION.**

Meanwhile, waste to useful bioenergy, which can be created from biomass waste like crop residue, green waste, food waste, and dairy gas, can take the form of RPS-eligible electricity; hydrogen; and liquid-, gas-, or solid-fuel.[24] Using biofuels will displace reliance on fossil fuels, allowing for greater overall emissions reductions.[25] If combined with carbon capture or biochar production on agriculture and working lands, it may provide carbon dioxide removal benefits, especially in rural areas.[26] Waste-to-energy technologies such as anaerobic digesters, which convert manure to energy, already have a presence in Oregon.[27] Moreover, there is evidence that combining certain food scraps with manure can help its breakdown into usable energy, closing the loop between food production, energy production and usage, and waste in agriculture and rural communities.[28] Bioenergy projects awarded grant monies should be analyzed to determine their benefits through net energy generation; fuel quality; pollutant risk, environmental impact, and net emissions impact. Projects where fuel will be used on- or near-site should be prioritized, and no grants should go to support biofuel created with land-displacing biomass feedstock.

## STATEWIDE FOOD WASTE DIVERSION

Oregon can bolster its food waste collection efforts to provide land-benefitting compost and feedstock for bioenergy systems. Incorporating compost and other green waste into anaerobic digesters provides additional energy, but also ensures a higher-quality output of energy compared to agriculture waste alone.[29] Increasing food waste collection and green waste diversity can reduce emissions from waste, lessen environmental impacts, benefit clean energy production, and support waste collection and transportation jobs.[30]

### ESTABLISH AN OFFICE OF AGRICULTURAL ENERGY

To administer the grant program, provide technical assistance, and lead community engagement, Oregon should create an Office of Agricultural Energy within Oregon Department of Energy. Beyond providing direct support to farms interested in incorporating clean energy systems on their farms through the grant program, the Office could support farms interested in pursuing projects directly with developers. This office should work collaboratively with the Oregon Department of Agriculture, Oregon Department of Environmental Quality, and Oregon State University's Cooperative Extension for technical assistance, siting assistance, developing monitoring methods, and the creation of best practices for agriculture clean energy and farm community engagement. Other relevant stakeholders, including labor should be consulted in the creation of the program. In addition to grants, the Office of Agriculture Energy can also distribute Small Scale Local Energy Loans — a state bond-funded loan program adopted by voters in 1980 — to support energy projects on farms.[31]

### UPDATE TAX LAW TO INCENTIVIZE ON-FARM PROJECTS BUILT WITH UNION LABOR

To further encourage agrivoltaic development with pro-labor provisions, Oregon should amend its exclusive farm use tax incentive to allow agrivoltaic projects that meet certain criteria (i.e. agricultural benefits, labor standards, environmental review, community benefits). The state should also update its contractor labor standards to include agrivoltaic projects above 1 MW as covered projects, separate from traditional project and community-scale size requirements.[32] Anaerobic digestion facilities should also be included in covered projects.[33]

Tackling agriculture emissions presents an opportunity for creative policy to uplift farms – including small-medium size farms and BIPOC, woman-, and veteran-owned farms alongside farmworkers, and rural communities.[34] And by prioritizing rural energy projects far from generation sources, they can also help relieve transmission needs while bolstering rural resilience.

## WORKFORCE AND CONTRACTOR LABOR STANDARDS FOR CLEAN ENERGY PROJECTS CITED ON AGRICULTURAL LANDS (INCLUDING AGRIVOLTAICS) AND ANAEROBIC DIGESTION FACILITIES

Clean energy generation and storage projects including agrivoltaics as well as anaerobic digestion facilities must abide by the same workforce and contractor labor provisions for covered projects as laid out in under *Build 36 GW of Clean Energy, 12.8 GW of Energy Storage, and Expanded Transmission Capacity by 2040 Using Union Labor* on pages 33-4. For projects that connect to the grid, transmission and distribution must similarly abide by the requisite standards for said projects as laid out in said recommendation.

Projects that meet the contractor labor standards for fast-tracked projects as laid out under *Create More Efficient Siting and Permitting Processes with Labor at the Table to Ensure Faster Clean Energy Development* on page 40 shall be permitted fast-tracked status.

RECOMMENDATION

# UPLIFT OREGON'S AGRICULTURE WORKERS AS PART OF A BROADER JUST TRANSITION

- **Increase health and safety standards and enforcement while guaranteeing agriculture workers' equal rights to collective bargaining and fair labor relations.**

Beyond reducing emissions and developing clean energy strategies, Oregon's agricultural sector must also focus on mitigating the effects of climate on its agricultural workers.[35] Agricultural workers are at heightened risk of climate impacts like rising temperatures, extreme weather events, increased storms, droughts, and floods.[36] Oregon is already experiencing climate impacts including heat wages, drought, and wildfires – meaning its agricultural workers are, too.[37]

Farmworkers are also some of the lowest paid employees in the state: in the first quarter of 2024, farmworkers and laborers in Oregon's crops, nurseries, and greenhouses earned an average of just $36,019 a year, while agricultural equipment operators earned an average of $42,944.[38] A just transition to a sustainable clean economy should include expanded private sector bargaining rights, stronger labor protections, and more equitable enforcement for farmworkers as well as greater farmworker control in shaping the industry's standards.

Oregon's farmworkers have already been winning nation-leading employment protection, in large part thanks to the organizing efforts of Pinero y Campesino Unidos del Noreste (PCUN) and the United Farm Workers. Specifically, Oregon's agricultural workers are covered by minimum wage, overtime, rest and meal break, occupational health and safety (including heat standards and housing safety), sanitation and pesticide safety, farmworker housing safety standards, and worker's compensation laws as well as adhering to a joint-employer responsibility framework for farm labor contractors.[39] While federal collective bargaining rights exclude agricultural workers, Oregon is one of only 14 states where farmworkers do have the right to join and organize labor unions free from retaliation.[40]

However, significant barriers remain. For example, Oregon law does not provide agricultural workers or their unions the right to file a lawsuit or administrative complaint for many labor relations disputes, nor does it set up rules for collective bargaining within the sector.[41] Moreover, Oregon's labor protections for agricultural workers lack adequate enforcement. Of the violations found, Oregon Occupational Safety and Health Administration (OSHA) cites the "most violated agriculture rules [as] toilet and hand washing facilities for hand labor work; living areas and site requirements for agricultural labor housing; no safety committees or safety meetings; and no written hazard communication program."[42] Oregon's farmworkers also desire to have a voice in their working conditions and the solutions that will strengthen the industry and improve their livelihood.[43]

## COLLECTIVE BARGAINING & FAIR LABOR PRACTICES

Oregon farmworker organizations can lead the fight to amend the state's private sector collective bargaining protections to include agricultural workers and expand its Employment Relations Board with an office dedicated to private sector collective bargaining. This expansion should enable the Board to verify union

elections; prevent, investigate, and remediate unfair labor practices, and facilitate collective bargaining across the agricultural sector. Similar provisions have been enacted in other agriculture-heavy states. For example, California's Agricultural Labor Relations Act (1975) extends collective bargaining rights, establishes protections for collective action, and creates an Agricultural Labor Relations Board to cover all unions, agricultural employers, and farmworkers that are excluded under the National Labor Relations Act.[44] In 2019, New York created similar protections with the Farm Laborers Fair Labor Practices Act (2019).[45] Oregon should join these states to ensure the promise of union protections extends to those doing essential work in its crops, fields, forests, greenhouses, and nurseries.

### ENFORCEMENT

To ensure the enforcement of new and existing labor standards, Oregon must build out the capacity of its OSHA. The outcomes of the Oregon Farmworkers report due in December 2026 will provide insights on further policy to implement to improve the working conditions of Oregon's agriculture workers.[46] Finally, the state should establish and fund a robust Agriculture Joint-Labor Workforce Standards Board, as recommended by PCUN with support from the OR AFL-CIO, the SEIU of Oregon, UFCW Local 555, the Oregon Just Transition Alliance, the Farmworker Ministry, and others, ensuring greater enforcement of worker protections and labor standards throughout the industry.[47]

## LABOR STANDARDS TO UPLIFT OREGON'S FARM AND AGRICULTURAL WORKERS

A just transition requires policies that support all workers. Oregon must expand and solidify full private sector bargaining rights to its agricultural workers. Additionally, increase occupational health and safety enforcement across the sector by expanding Oregon's OSHA department's enforcement capacity and promote fairer oversight and enforcement of worker protections and labor standards by creating and funding an Agriculture Joint-Labor Workforce Standards Board.

## SAFEGUARDING PRIVATE SECTOR BARGAINING RIGHTS FOR AN UNCERTAIN FUTURE

In addition to expanding labor protections to Oregon's agricultural workers, the state must take precautionary action to ensure its workers maintain their right to join, form, and participate in a union; engage in collective action; and access fair labor relations. The National Labor Relations Act (NLRA) and the National Labor Relations Board (NLRB) have been the authority on private sector labor relations in the U.S. since the 1930s.[48] While their initial power has dwindled over time, today, the NLRA and NLRB threaten to be wholly dismantled.[49] As the Trump Administration continues to undermine everything from labor and consumer rights to civil and human rights — including following through on its first term's goal of weakening the NLRB — states have a responsibility to take action for their workers.[50]

Generally, states are preempted from regulating private sector labor relations for employees covered under the NLRA and Railway Labor Act and for workers who are explicitly prevented from these protections under these Acts, like supervisors and undocumented immigrant workers.[51] However, states are free to regulate labor relations for non-covered, non-preempted employees, for example through state laws granting public sector collective bargaining rights.[52] At least nineteen states have laws protecting some degree of private sector labor relations.[53]

Some states are now looking to expand their existing labor laws to ensure any erosion of federal protections has minimal impact on the rights and responsibilities of private-sector workers, employers, and unions.[54] State proposals include protecting employee freedom to associate for mutual aid and protection and to seek representation of their own choosing; allowing a state labor relations board to determine unfair labor practices and provide relief; and establishing processes for private sector union representation and collective bargaining.[55] These laws would apply should the NLRB be substantially limited or cease to exist—and would be essential if the NLRA itself were to be repealed.[56]

RECOMMENDATION

# ADOPT BEST-IN-CLASS WORKER PROTECTIONS AND LABOR STANDARDS FOR FORESTRY WILDFIRE MITIGATION & WILDFIRE CLEAN-UP

- **Protect workers in Oregon's most hazardous climate occupations by requiring improved safety regulations, labor standards, and pre-approved qualified contractors.**

Oregon's rising temperatures have worsened wildfires, shifting these natural disasters from seasonal events to year-round threats and putting workers at unprecedented risk.[57] Forestry workers, whose jobs may be crucial to preventing fires, have the highest fatality rate of any civilian occupation at 92 per 100,000 full-time equivalents (FTE), 28 times higher than the national average.[58] These workers face dangerous conditions such as falling trees, exposure to pesticides, and extreme weather.[59] Since 2019, Oregon Occupational Safety and Health Administration (OSHA) has conducted 156 inspections of logging companies, yielding more than 290 violations and fines of about $230,000.[60]

Workers in post-fire cleanup face a different but equally hazardous set of risks. With inadequate respiratory protection, lack of decontamination procedures, and insufficient medical surveillance, post-fire cleanup workers risk toxic exposures to silica, lead, and formaldehyde.[61] Research demonstrates systematic disparities affecting Latino workers in particular, including wage theft, inadequate health insurance, insufficient safety training, and variable contractor standards.[62]

Oregon lacks a regulatory system to sufficiently protect workers involved in forestry and post-fire cleanup activities. While Oregon OSHA maintains basic rules for logging operations and wildfire smoke exposure, these rules remain restricted in scope, lack standardized enforcement, and are mainly reactive instead of preventive.[63] The general requirements for protective gear and training do not cover the unique hazards that workers encounter while performing post-fire recovery and remote forest thinning operations, such as chemical exposure and prolonged physical strain and emergency medical response deficits in remote areas.[64] In addition, enforcement practices vary between employers and worksites, as documented in post-fire cleanup evaluations and forestry workforce studies.[65]

**OREGON LACKS A REGULATORY SYSTEM TO SUFFICIENTLY PROTECT WORKERS INVOLVED IN FORESTRY AND POST-FIRE CLEANUP ACTIVITIES.**

Adding to these issues, Oregon's workers' compensation data shows that agriculture, forestry, and construction workers experience 14-29% increased injury rates at temperatures of 75°F or higher.[66] Furthermore, agriculture, forestry, fishing and hunting workers accounted for

9 fatal workplace injuries in Oregon in 2023, representing 17% of all fatal workplace injuries in the state.[67] While Oregon's firefighters can access streamlined insurance coverage for certain cancers after working for at least five years forestry workers who are exposed to the same toxic substances during prescribed burns and post-fire operations remain without these protections.[68]

**AS WILDFIRES INCREASINGLY THREATEN WORKERS AND COMMUNITIES ALIKE, OREGON CAN LEAD THE NATION IN SAFEGUARDING THOSE WORKERS WHO RISK THEIR LIVES TO FIGHT AND MANAGE THE CONSEQUENCES OF WILDFIRES USING FOUR LINKED COMPONENTS.**

As wildfires increasingly threaten workers and communities alike, Oregon can lead the nation in safeguarding those workers who risk their lives to fight and manage the consequences of wildfires using four linked components: establish occupational coverage, which undergirds all strengthened worker protections; improve worker protections and labor standards for forestry workers; strengthen worker protections and labor standards for post-fire clean-up workers; and establish an approved contractor list for wildfire cleanup efforts.

### ESTABLISHING PRESUMPTIVE OCCUPATIONAL DISEASE COVERAGE LEGISLATION

According to Oregon's existing statute, non-volunteer firefighters employed directly by government agencies who have worked for five years or more and are diagnosed with certain cancers (brain, colon, stomach, testicular, prostate, multiple myeloma, non-Hodgkin lymphoma, throat, mouth, rectal, breast, leukemia) are assumed to have an occupational disease if they are diagnosed within seven years of leaving their job. But coverage under this bill still leaves many workers without protection.[69] Recently, H.B. 4113 (2022) added bladder and gynecologic cancers to the state's presumptive coverage, reflecting an understanding that presumptive coverage must change based on epidemiological evidence.[70]

However, forestry workers and private contractors have no such presumptive coverage.[71] While firefighting protections are expanding, forestry workers – who face the same smoke and chemicals exposure during and after wildfires – remain entirely excluded from presumptive rights.

Oregon should therefore expand comprehensive presumptive occupational coverage legislation that extends workers' compensation coverage for full-time firefighters to all workers involved in wildfire suppression, forestry mitigation, and post-fire cleanup operations – including seasonal and contract workers, forestry workers and prescribed burn contractors for all – occupational cancers and respiratory diseases linked to smoke and toxic chemical exposure. Employment thresholds to trigger this coverage must also be altered to reflect the realities of these occupations. Regardless of sector or employment status, this framework ensures equitable occupational disease protections under state law. It serves as the foundation for all three components below.

### STRENGTHENING PROTECTIONS FOR FORESTRY WORKERS

Many forestry workers face systemic issues impacting their economic and physical wellbeing, including inadequate safety training, musculoskeletal disorders, and wage theft.[72] Research identifies a range of factors contributing to injuries among forestry workers. Workers may lack sufficient training experience, encounter equipment hazards, face pressure to maintain unsafe production speed and work excessively long shifts, and face difficult environmental conditions.[73] Addressing these risks requires policy changes in five categories: safety standards, worker training, health benefits, fair wages, and workers' compensation. The table below summarizes proposed policy changes.

## PROPOSED ENHANCED STANDARDS

| Protection Area | Required Changes |
|---|---|
| Safety Standards | • Update OAR 437-007 for chainsaw vibration protection<br>• Mandate no-cost, employer-provided comprehensive protective gear: head, eye, hand, foot protection, and NIOSH-approved respirators (smoke, silica, chemicals) with enforcement provisions<br>• Limit shifts to 10 hours maximum<br>• Set up smoke-free break areas with required breaks of 24 hours between shifts |
| Worker Training | • Require comprehensive safety training meeting OSHA 1910.266 (logging operations) standards, including chainsaw operation, equipment safety, and hazard recognition<br>• Mandate annual certification renewal with hands-on testing<br>• Cover critical hazards (falls, transportation, equipment safety) |
| Health Benefits | • Require employer-provided health insurance<br>• Establish medical surveillance programs for forestry workers and mobile health clinics for rural workers |
| Fair Wages | • Eliminate dangerous piece-rate pay<br>• Require state contractor registration<br>• Establish anonymous worker reporting systems<br>• Guarantee prevailing wage rate on all public contracts |
| Workers' Compensation | • Adopt presumptive occupational disease coverage for forestry and post-fire cleanup workers based on Oregon's H.B. 4113 (2022) model, including all covered cancers, plus occupational respiratory diseases (silicosis, mesothelioma, lung cancer). Extend coverage to 10 years after last exposure for diseases with long latency periods.<br>• Establish mechanism for periodic updates based on epidemiological evidence, similar to H.B. 4113 (2022)<br>• Require disability benefits comparable to firefighters, including wage replacement rates, duration of benefits, and supplemental disability payments<br>• Require employer-funded medical surveillance programs with long-term health screenings and baseline evaluations<br>• Accelerate claims process for respiratory conditions caused by smoke exposure<br>• Include coverage for mental health conditions related to job-related trauma |

Improve Standards for Post-Fire Cleanup responds
Policy changes must also be made in order to safeguard post-fire cleanup workers from these occupational hazards, which are not specifically covered by existing regulations.[74] The following evidence-based measures protect workers from being exposed to toxins such as formaldehyde or vapors, while also preventing them from carrying toxins home to their families.[75]

### PROPOSED ENHANCED STANDARDS

| Protection Area | Required Changes |
|---|---|
| Respiratory Protection | Adopt phase-based requirements for respiratory protection:<br>• First phase (0-2 hours): specialized masks with high-efficiency filters for chemical vapors)<br>• Cooling phase (2-72 hours): industrial-grade respirators with multi-contaminant filtration<br>• Cold phase (72+ hours): advanced particulate filters with vapor protection<br>Require air monitoring systems for formaldehyde detection |
| Body Protection | Require comprehensive body protection, including:<br>• Full-body protective coveralls with integrated head protection<br>• Chemical-resistant gloves with reinforced outer layer<br>• Steel-toed safety boots with protective covers<br>• Impact-resistant goggles for chemical splash protection |
| Decontamination Protocols | Mandate site-based decontamination facilities and practices, including:<br>• Handwashing stations at all cleanup sites<br>• Required washing before eating, drinking, or leaving work areas<br>• Mandatory footwear changes to prevent off-site contamination<br>• Systematic cleaning procedures for all protective equipment |
| Medical Programs | • Establish health surveillance systems, including monitoring regular silica exposure and periodic testing for heavy metal exposure<br>• Conduct evaluations for respiratory equipment use<br>• Require fit-testing for all respiratory protection devices |
| Workers' Compensation & Occupational Disease Coverage | • Establish presumptive coverage for conditions related to silicosis, lead poisoning, and chemical exposure for workers who clean up after a fire<br>• Extend cancer presumption to post-fire cleanup contractors exposed to formaldehyde and other Group 1 carcinogens<br>• Require full monitoring of occupational diseases, with at least 15 years of coverage after exposure, to find hidden diseases<br>• Require automatic medical cost coverage for all work-related exposures without burden of proof<br>• Set up faster claims processing for respiratory conditions that are work-related. |

### APPROVED CONTRACTOR LIST FOR WILDFIRE CLEANUP

Currently, Oregon lacks specific pre-qualification standards for wildfire cleanup contractors, despite the fact that workers conducting this clean-up must operate heavy machinery.[76] In fact, currently, unions such as the International Union of Operating Engineers have taken on the informal role of training these workers to work on such equipment (personal communications, J. Anderson, January 30, 2025). The state also faces

significant gaps in contractor oversight; specifically with forestry self-reported lists,[77] contractor compliance with state laws,[78] and informal hiring practices.[79]

California's pre-qualification framework could be a successful model to mitigate these issues.[80]

California's recycling and waste management agency, CalRecycle, has a two-phase system for disaster cleanup, pre-approving qualified contractors during non-emergency times, enabling them to rapidly deploy on specific work assignments in times of emergency.[81]

### PROPOSED OREGON PRE-APPROVED CONTRACTOR SYSTEM

| Area | Requirements |
|---|---|
| Safety Standards | • Verified OSHA compliance<br>• Appropriate insurance coverage levels<br>• Documented safety programs with measurable outcomes |
| Professional Expertise | • 3,000 hours logging experience<br>• Extensive training in Forest Practice law<br>• Supervision by Registered Professional Forester for large projects |
| Post-Fire Cleanup Safety | • Federal 40-hour HAZWOPER certification for hazardous material removal<br>• State-specific Hazardous Substance Removal certifications |
| Documented Compliance with Labor Standards | • Prevailing wage compliance<br>• Comprehensive insurance coverage |
| Contractor Evaluation | • Uniform rating system using standardized questionnaires and financial statements, public contractor names with private detailed information |
| Continuous monitoring | • Clear suspension procedures for infractions, wage audits, safety inspections, performance reviews, and annual recertification |
| Workers' Compensation Requirements | • Proof of workers' compensation insurance that includes:<br>  • Coverage for presumptive cancer and occupational diseases caused by smoke exposure<br>  • Insurance for cancers of the female reproductive system (breast, ovarian, cervical, and uterine)<br>  • Coverage for bladder and respiratory diseases<br>• All claims for occupational diseases must be reported to the state workers' compensation registry and the occupational health surveillance system. |

## HOW UTILITIES ARE INVESTING IN GRID HARDENING TO HELP PREVENT WILDFIRES

Wildfire risks are increasing each year, prompting utilities such as Pacific Gas and Electric (PGE) and Pacific Power to expand their investment into grid hardening measures.[82] These efforts reflect a proactive commitment to public safety and responsible infrastructure management, working to protect the communities they serve from wildfire risk. Grid hardening against wildfire can include burying, covering or removing overhead power lines, installation of stronger poles, and vegetation management near grid equipment.[83]

As of 2025, PGE has undergrounded 1,000 miles of power lines in high fire-risk areas reducing the potential for wildfire ignition.[84] These and other grid hardening measures have reportedly helped the utility reduce its wildfire risks by over 8% since 2023.[85]

Pacific Power, a northwestern electric utility serving Oregon, is also taking grid hardening measures. In both Cave Junction and Grants Pass, Pacific Power has been working on wildfire prevention including undergrounding, installation of covered conductors and fire-resistant poles.[86] The utility plans to conduct 200 miles of line rebuild projects in the Cave Junction area as well as 500 miles of line rebuilds around the Grants Pass area. [87]

These grid hardening projects are carried out by a unionized workforce IBEW 125, ensuring that the work is performed by highly skilled and trained professionals, installing and maintaining critical components of building a safer and more reliable grid.[88]

Continued upgrades to Oregon's grid by a highly trained workforce are sorely needed. Wildfires cause widespread damage to communities and result in escalating economic losses. In 2024, it was estimated Oregon spent $350 million fighting wildfires across the state

Credit: IBEW Local 125

with risks and potentially costs increasing each year.[89] To maximize impact, communities, local governments, utilities, and labor unions should collaborate more closely to ensure targeted wildfire mitigation spending that protects communities while ensuring the economic stability of utilities to provide their communities with safe and reliable power.

Photo Credit: LiUNA Local 737

# LEADING ON CLIMATE WITH EQUITY & HIGH-ROAD UNION CAREERS

RECOMMENDATION

# EXPAND WORKFORCE DEVELOPMENT SUPPORT SERVICES TO CREATE A DIVERSE, EQUITABLE GREEN UNION ECONOMY

- **Oregon should leverage existing programs to create opportunities for women, people of color, and other underrepresented groups in the future green energy economy.**

In 2024, Wicks-Lim and Pollin assessed the labor impacts of the climate-focused federal funding from the Bipartisan Infrastructure Law, the Inflation Reduction Act, and the Creating Helpful Incentives to Produce Semiconductors and Science Act, and found that outsized labor demand could result from these packages, especially in the construction sector.[1] In Oregon alone, these packages could have created an additional 8,424 construction jobs on average per year.[2] Though the federal incentives promised by these packages has largely been clawed back or eliminated, these analyses still provide important perspectives on just how many jobs will be created in fighting the climate crisis – and how many workers will be needed.[3] In order to ensure that workforce development occurs at the scale necessary to support Oregon's clean energy transition, the trades most central to the state's goals will need to prioritize recruitment and retention. Luckily, Oregon's building trades are uniquely prepared to ramp up participation in apprenticeship programs, particularly among Oregonians from disadvantaged backgrounds.

As demand for apprentices increases, Oregon must expand support structures for those enrolled in apprenticeship and pre-apprenticeship programs, especially women, people of color, justice-involved individuals, and others who face additional barriers to enrollment, attendance, and completion. These barriers include, but are not limited to: financial hardships including lack of adequate income during training period and inability to afford Personal Protective Equipment (PPE), tools, and appropriate clothing;[4] lack of access or ability to afford childcare or transportation;[5] and scheduling issues due to external responsibilities such as childcare or parole appointments.[6] Mitigating these barriers through the provision of wraparound services is associated with completing apprenticeship programs.[7]

## EXPAND PROVEN PROGRAMS TO PROVIDE WRAPAROUND SERVICES

To meet its labor demand while creating a more diverse and equitable union clean energy workforce, Oregon should expand existing models for apprenticeship/pre-apprenticeship retention and workforce diversity. Specifically, Oregon should expand its Highway Construction Workforce Development Program into a wide-reaching Clean Energy Construction Workforce Development Program, allocating funding to both (a) widen eligibility for all construction apprentices in the state to receive programmatic support, and (b) bolster funding for pre-apprenticeship supports. Since its establishment in 2010, the Highway Construction Workforce Development Program, which is funded through Oregon Department of Transportation (ODOT) and administered by Oregon Bureau of Labor and Industries (BOLI), has helped notably improve apprenticeship completion rates for key underrepresented demographics.[8] It has done so largely by providing apprentices

in targeted trades or on active highway construction projects – as well as a small group of pre-apprentices – with access to a variety of supportive services. Though the specific menu of services have changed over time, it has generally included: childcare payments, ready items such as tools or protective equipment, travel support, hardship assistance, and several non-financial services.

**WRAPAROUND SUPPORT SERVICES SEEM PARTICULARLY USEFUL FOR WOMEN AND PEOPLE OF COLOR — WOMEN OF COLOR ESPECIALLY — WHO RECEIVED SUCH SERVICES AT MUCH HIGHER RATES THAN WHITE MEN.**

Wilkinson and Kelly's most recent evaluation found that, compared to apprentices that received no supportive services, apprentices that received any of the supportive services offered through the program were 10% more likely to complete their apprenticeship.[9] The single service that was most effective in improving completion rates overall was childcare funding, which alone increased the likelihood of apprenticeship program completion by 10%.[10] The Highway Construction Workforce Development Program also helped specifically target underrepresented groups. For instance, wraparound support services seem particularly useful for women and people of color – women of color especially – who received such services at much higher rates than white men.[11] Moreover, Latinx, Black, and Native men in highway trades were all more likely to complete their apprenticeship on time due to the program.[12] Finally, Wilkinson and Kelly's analysis points toward the importance of union-backed apprenticeship and pre-apprenticeship programs for creating opportunities for underrepresented groups: "As seen in prior reports, completion rates are significantly higher among apprentices working in union trades, including among Black, Latinx, and Asian men, and among women" (p.10).[13] This is mirrored by the findings from Petrucci discussed in the breakout box *Understanding Registered Apprenticeship: the Union Difference* on page 17.[14]

### TARGET PUBLIC DOLLARS TO HIGH-QUALITY PRE-APPRENTICESHIP

Oregon should adopt robust standards for pre-apprenticeship to ensure that public investments through expanded wraparound services supports high-quality programs that lead to high-road union jobs. Modeled on legislation in California and Maryland, Oregon should limit registered pre-apprenticeship status to programs that have Memoranda of Understanding with bona fide labor organizations such as labor unions, building trades councils, joint apprenticeship trading committees, and MC3 providers.[15] Oregon should also make grant funding exclusively available to programs with a demonstrated history of success. Oregon can additionally condition funds on post-graduation outcomes. Oregon can also look toward other models to enact its vision of high-quality pre-apprenticeship: legislation in Maine requires pre-apprenticeships receiving public funds to place participants in apprenticeships with a compensation package of at least $35 per hour (with annual cost-of-living adjustments), provide comprehensive support services, and demonstrate that graduates are employed or represented by a labor organization within six months of graduation.[16]

| Program | Cost |
|---|---|
| Expansion of Support Services for Apprentices | $2,529,166/year |
| Expansion of Support Services for Pre-Apprentices | $10,450,000/year* |

** This cost assumes that all of the state's 58 pre-apprenticeship programs opt in to receive equal funding. Once pre-apprenticeship standards are tightened, costs per year will be lowered.*

RECOMMENDATION

# ENSURE ALL CLEAN ENERGY WORKERS HAVE ACCESS TO WORKER PROTECTIONS AND LABOR STANDARDS THROUGH IMPROVED ENFORCEMENT

- **Updating Oregon's enforcement regime with models such as co-enforcement, public payroll reporting, and contractor/subcontractor affidavits while also filling funding gaps for the Bureau of Labor and Industries will ensure the state delivers on the promise of high-quality jobs through the clean transition.**

With landmark legislation such as H.B. 2021 (2021), H.B. 4059 (2022), H.B. 3031 (2023), and HB4080 (2024) which establishes robust labor standards for existing and emerging clean energy technologies from supply chain to construction, Oregon has established itself as a leader in the union clean energy space.[17] Yet even with this strong foundation, workers – especially those in emerging industries – risk being left behind due to a weak enforcement regime. After decades of underfunding, an imperiled Oregon Bureau of Labor and Industries (BOLI) now faces a severe capacity shortage that leaves its mission of enforcing labor standards, worker protections, and civil rights in crisis.[18] In order to protect this generation of climate workers – as well as the next – Oregon must fully fund BOLI while also updating its enforcement tools and improving transparency to ensure that all contractors, subcontractors, and developers deliver on the promise of high quality jobs across the green economy and beyond.

## ENSURE ADEQUATE FUNDING FOR THE BUREAU OF LABOR AND INDUSTRIES

The strongest labor standards in the country would still leave workers vulnerable without adequate funding for enforcement. In BOLI's 2024 and 2025 State of the Worker Reports, outline many of the symptoms resulting from its chronic underfunding.[19] By the start of 2025, the number of staff employed by the agency has dropped by nearly 30% since the 1980s from 214 to 150, despite a near doubling of the Oregon workforce.[20] BOLI was also forced to implement a wage threshold, due to its inability to process wage claims, made workers with annual salaries of $52,710 or more ineligible for wage theft investigations in October of 2024.[21] When such a wage threshold was first proposed, it was predicted to effectively reduce the number of wage claims investigated by about 17%.[22] Relatedly, the 2024 State of the Worker Report highlighted that BOLI was forced to dismiss many worker protection claims related to civil rights, anti-retaliation, and whistleblower policies; and it expected to dismiss hundreds more before the end of the year.[23]

Inevitably, these funding and staffing shortfalls have the potential to limit enforcement of existing and future worker protections and labor standards as the state grows its clean energy workforce. While BOLI received a historic $19 million investment from the legislature this past session, paving the way for lifting the income threshold on wage claims and hiring more staff, this

investment failed to deliver on full and permanent funding Oregon's legislature must continue to sustain and restore BOLI's funding and staffing levels.[24]

## SUPPORT CO-ENFORCEMENT MODEL TO PROTECT FUTURE CLIMATE WORKERS' LABOR RIGHTS

Beyond fully funding BOLI to meet its current needs and clarifying its role in enforcing labor standards on non-public projects, Oregon should replicate and expand the scope of its strategic co-enforcement model. Specifically, BOLI should form a strategic co-enforcement unit for private covered projects that mandate workforce and contractor labor standards and extend their purview beyond wage violations to violations of the entire suite of required labor standards on such projects. This would build on recent labor movement wins such as S.B. 426 (2025), which enables unrepresented employees, their representatives, or the Attorney General to hold owners and direct contractors liable for unpaid wages and fringe benefits for the large majority of construction projects – public or private.[25]

To facilitate the work of this strategic unit, Oregon must also require public reporting for all relevant employment and payroll records, with requisite ease of accessibility to said records. As such, certified payroll reporting should be recentralized at BOLI rather than continue to be disaggregated across public agencies. Additionally, following the precedent set by S.B. 426 (2025), the state should require certified payroll reporting for any projects that must comply with prevailing wage rate standards, not just public works or public improvement contracts.[26]

Implementing this targeted strategic co-enforcement model could allow fewer labor violations to fall through the cracks as a result of BOLI's limited capacity, while also freeing up time for BOLI's staff. Moreover, this model would also formalize the role many unions have already taken on in terms of supporting enforcement.

Co-enforcement models such as California's Private Attorney Generals Act (PAGA), which empowers private actors with the ability to sue employers for labor violations and enables them to receive a portion of the penalties that would have typically gone to the state in return, have proven effective. Following PAGA's implementation, the number of violations identified per investigation dramatically increased: between 2018 and 2021, workers in California filed 4,208 PAGA notices, nearly three times the number of inspections performed by the state's Bureau of Field Enforcement in that time.[27] PAGA has also yielded substantial revenue gains for the state's Labor and Workforce Development Agency, raising over $209 million in penalties in fiscal year 2022-2023.[28]

## IMPROVE CONTRACTOR & SUBCONTRACTOR ACCOUNTABILITY FOR PUBLIC PROJECTS

Alongside initiatives to improve Oregon's enforcement mechanisms, Oregon should develop a process that builds in accountability for the state government's contractors and subcontractors. Based on Jobs to Move America's U.S. Employment Plan (USEP), Oregon should require that contractors and subcontractors outline their workforce plans – including factors such as compensation, apprenticeship recruitment, workforce training plans, and more – when they bid for public funding.[29] Requiring contractors to submit these plans during the application process ensures that they will propose the strongest plans possible as they attempt to win funding. Such a policy also enables the state to hold contractors and subcontractors responsible for non-compliance.

The Los Angeles Metro, the Chicago Transit Authority, and Amtrak have all adopted the USEP, resulting in thousands of high-road jobs.[30] Additionally, research has shown that adopting such a policy has not significantly impacted the number of bidding contractors or project prices.[31] Use of the USEP would further strengthen a co-enforcement model, making the high standards contractors promise at the outset of a project clear and readily available for comparison to workers' lived experience.

RECOMMENDATION

# LEVERAGE PUBLIC DOLLARS TO SUPPORT A DIVERSE, UNION, CLEAN ENERGY ECONOMY

- **Best value procurement can ensure public dollars invest in sustainability alongside high-quality jobs.**

The State of Oregon has significant purchasing power, approving more than $121.26 billion in expenditures in the 2023-2024 budget, and has a responsibility to ensure taxpayers' dollars are used ethically, efficiently, and create the best value for the state.[32] Currently, Oregon requires that all public entities follow standardized procurement rules, either through adopting the Model Rules or prescribing their own.[33] These rules must broadly align with a competitive bidding model that ensures contracts provide "optimal value to the contracting agency" and are consistent with market practices.[34] Public construction contracts must be awarded to the lowest "responsible" bidder, where responsibility is based on financial, material, and equipment expertise, as well as having "integrity" and all necessary licenses and certifications.[35] It does not include job creation or other requirements for the jobs that are created.

A 2021 law gives state agencies the power to designate a public improvement contract as a "community benefit project," which may contain certain labor standards.[36] This tool is not yet widely used, but it has set the stage for contracts like the Regional Workforce Equity Agreement of 2022 (RWEA), which advances construction workforce equity in the Greater Portland metropolitan area through workforce agreements between municipalities and building trades unions.[37] However, for most public procurements, the State does not consider other factors that affect value to its residents, such as the broad environmental and social impact of its procurements, or specifics like the type of jobs that its contracts support.

Oregon should revise its procurement laws, switching to a "best value" method that would require agencies to weigh factors beyond price and the current definition of "responsibility" in public contracts, with substantial enforcement and accountability for contractors who do not adhere to these terms. Jobs to Move America's aforementioned U.S. Employment Plan (USEP) is a successful model that states and localities have adopted across the country to put their public dollars to work creating high-quality, local jobs without significantly impacting price or competition.[38] Under the USEP, agencies evaluate bids based on multiple factors, not solely price, to ensure maximum public benefit from the procurement. Oregon should adopt a similar process, particularly for large contracts involving construction, manufacturing, or services. The bid review process should weigh past performance, reliability, and employment plans, including local job creation, support for workforce development, environmental and social impacts of the projects. This will incentivize bidders in all public contracts across the state, beyond those already party to the RWEA, to create career paths for underrepresented groups that pay livable wages, provide good benefits, and invest locally, while ensuring fair competition impact without raising overall project costs.[39]

# METHODOLOGY APPENDIX

## APPENDIX: JOB CREATION SUMMARY

| Recommendation | Project Type | Direct Jobs Through 2030 | Direct Construction Trades Jobs Through 2030 |
|---|---|---|---|
| **FUTURE-PROOFING OREGON'S ENERGY GRID & INDUSTRIAL ECONOMY** | | | |
| Build 36 GW of Clean Energy, 12.8 GW of Energy Storage, and Expanded Transmission Capacity by 2040 Using Union Labor | Solar Power | 82,000 | 18,000 |
| | Wind Power | 75,000 | 17,000 |
| | Hydropower Upgrades | 1,400 | 320 |
| | Energy Storage | 25,000 | 5,700 |
| | Transmission Expansion and Upgrades | 19,000 | 4,200 |
| Protect Union Jobs & Create Healthier Workplaces by Helping Manufacturing Facilities Meet Emissions Reduction Mandates | Grant Program to Target the Highest-emitters that Need the Most Support: Semiconductors, Cement, and Pulp & Paper | 1,900 | 570 |
| **BUILDING HEALTHY & RESILIENT COMMUNITIES** | | | |
| Transform Affordability and Job Quality in Housing Construction with Green Public Housing that Creates Union Jobs | Article X-IQ Bond Funding for a Good Jobs, Green Homes Pilot Public Housing Program | 6,200 | 2,100 |
| Lead by Example by Retrofitting and Installing Clean Technologies on Public Buildings With Union Labor | State Agencies | 13,000 | 3,500 |
| | Public Universities | | |
| | Public K-12 Schools | | |
| Decarbonize Oregon's Medium- and Heavy-Duty Vehicles by 2035 | Phase 1 Charging Infrastructure | 1,700 | 630 |

# APPENDIX: ANNUAL EMISSION REDUCTION SUMMARY

| Recommendation | Project Type | Goal Year | Annual Emissions Reduction in Goal Year | Gas Vehicles Driven For A Year | Homes Per Year |
|---|---|---|---|---|---|
| **FUTURE-PROOFING OREGON'S ENERGY GRID & INDUSTRIAL ECONOMY** | | | | | |
| Build 36 GW of Clean Energy, 12.8 GW of Energy Storage, and Expanded Transmission Capacity by 2040 Using Union Labor | Solar Power | 2040 | 11,100,000 MT $CO_2e$ per year | 2,600,000 | 1,490,000 |
| | Wind Power | | | | |
| | Hydropower Upgrades | | | | |
| | Energy Storage | | | | |
| | Transmission Expansion and Upgrades | | | | |
| Protect Union Jobs & Create Healthier Workplaces by Helping Manufacturing Facilities Meet Emissions Reduction Mandates | Grant Program to Target the Highest-emitters that Need the Most Support: Semiconductors, Cement, and Pulp & Paper | 2035 | 1,460,000 MT $CO_2e$ per year | 340,000 | 195,000 |
| **BUILDING HEALTHY & RESILIENT COMMUNITIES** | | | | | |
| Transform Affordability and Job Quality in Housing Construction with Green Public Housing that Creates Union Jobs | Article X-IQ Bond Funding for a Good Jobs, Green Homes Pilot Public Housing Program | 2035 | Not Applicable | Not Applicable | Not Applicable |
| Lead by Example by Retrofitting and Installing Clean Technologies on Public Buildings With Union Labor | State Agencies | 2040 | 296,000 MT $CO_2e$ per year | 12,500 | 3,500 |
| | Public Universities | | | | |
| | Public K-12 Schools | | | | |

# APPENDIX: ESTIMATED COST SUMMARY

| Recommendation | Project Type | Goal Year | Total Cost Per Year Through 2030 | Total Cost Through 2030 | Total Cost Through Goal Year |
|---|---|---|---|---|---|
| **FUTURE-PROOFING OREGON'S ENERGY GRID & INDUSTRIAL ECONOMY** | | | | | |
| Build 36 GW of Clean Energy, 12.8 GW of Energy Storage, and Expanded Transmission Capacity by 2040 Using Union Labor | Solar Power | 2030 | $2,700,000,000 | $13,500,000,000 | $13,500,000,000 |
| | Wind Power | 2030 | $2,490,000,000 | $12,400,000,000 | $12,400,000,000 |
| | Hydropower Upgrades | 2030 | $46,500,000 | $232,000,000 | $232,000,000 |
| | Energy Storage | 2030 | $839,000,000 | $4,190,000,000 | $4,190,000,000 |
| | Transmission Expansion and Upgrades | 2030 | $617,000,000 | $3,090,000,000 | $3,090,000,000 |
| Protect Union Jobs & Create Healthier Workplaces by Helping Manufacturing Facilities Meet Emissions Reduction Mandates | Grant Program to Target the Highest-emitters that Need the Most Support: Semiconductors, Cement, and Pulp & Paper.[a] | 2035 | $33,000,000 | $165,000,000 | $330,000,000 |
| **BUILDING HEALTHY & RESILIENT COMMUNITIES** | | | | | |
| Transform Affordability and Job Quality in Housing Construction with Green Public Housing that Creates Union Jobs | Article X-IQ Bond Funding for a Good Jobs, Green Homes Pilot Public Housing Program | 2035 | $266,000,000 | $1,330,000,000 | $2,660,000,000 |
| Lead by Example by Retrofitting and Installing Clean Technologies on Public Buildings With Union Labor | State Agencies | 2040 | $510,000,000 | $2,550,000,000 | $7,640,000,000 |
| | Public Universities | | | | |
| | Public K-12 Schools | | | | |
| Decarbonize Oregon's Medium- and Heavy-Duty Vehicles by 2035 | Phase 1 Charging Infrastructure | 2035 | $76,900,000 | $385,000,000 | $1,460,000,000 |
| | Phase 2 Charging Infrastructure | 2035 | Not applicable | Not applicable | |

a The cost reported for this recommendation represents only the share of the total cost that the grant program would cover and not the total cost of individual projects.

# APPENDIX METHODOLOGY SUMMARY

The authors used IMPLAN – an economic input output modeling software – to estimate job creation in this report. The 2023 IMPLAN model year was used for all analyses. Yearly direct job estimates were based on the average yearly cost of implementing the recommendation. Estimates through 2030 were based on the yearly direct jobs impacts multiplied by the five years from 2026 through 2030. Direct jobs and construction trades jobs estimates were independently rounded to two significant digits. The scope of the economic impact analyses in this report were restricted to direct effects only. IMPLAN's basic assumptions should be taken into account when interpreting job creation estimates in this report.

Job creation estimates include part-time and full-time jobs and are for one year; in other words, one job should be interpreted as one person working in a single job for one year. Construction trades job creation represents a subset of the total direct job creation estimated for each recommendation. Construction trades workers are defined as occupations that fall under the Standard Occupational Classification code "47-2000 - Construction Trades Workers," as defined by the Bureau of Labor Statistics for 2022. These occupations include electricians, laborers, painters, carpenters, and construction equipment operators among others.

Inflation adjustments for cost and jobs estimates in this report were made directly within IMPLAN unless otherwise noted. All final costs are reported in 2025 dollars. Costs were rounded to three significant digits. Cost estimates are based on current or near-term cost information and do not account for how costs will evolve. Consequently, cost estimates in this report are likely to overstate the cost of emerging technologies further into the future.

Annual emission reductions reported for recommendations are only applicable to the goal year and onwards. Emission equivalencies reported in the summary table are shown only for comparison and were estimated with the Greenhouse Gas Equivalencies Calculator.[1] Emissions were independently rounded to three significant digits. Unless otherwise noted, emission reductions include only scope 1 emissions (i.e. those emitted from a directly identifiable source).

Barring the analysis for the renewable energy buildout and unless otherwise noted, the costs and impacts of implementing the recommendations in this report were calculated independently of one another. Cost estimates and job creation estimates may shift due to changes in technology, supply chains, and markets. Any implementation of these recommendations in new policies should entail an additional review process to account for potential changes.

For questions about methodology, please contact Alec Goodwin, Economic Analysis Lead, (ag2539@cornell.edu).

# FUTURE-PROOFING OREGON'S ENERGY GRID AND INDUSTRIAL ECONOMY

**RECOMMENDATION**

## BUILD 36 GW OF CLEAN ENERGY, 12.8 GW OF ENERGY STORAGE, AND EXPANDED TRANSMISSION CAPACITY BY 2040 USING UNION LABOR

### FUTURE ELECTRICITY DEMAND

A high electricity demand scenario that assumes 100% decarbonization by 2050 was selected in the Regional Energy Deployment System (ReEDS) model.[2] The end use demand for electricity is corroborated by projections from the Standard Scenarios report.[3] A high hydrogen demand scenario was selected, which includes electricity demands for green hydrogen production for non-power sector use. While Oregon is presently a net-exporter of electricity, it only exported 0.36 TWh of electricity in 2023, which is less than a percent of the state's 62 TWh electricity supply.[4] Therefore, Oregon was represented as an energy independent system consisting of three load balancing areas, assuming fixed gas prices for the region for every modeled year.[b] [5] Transmission needs within Oregon are assumed to support electricity flows between balancing areas and enable interconnections of plants in different areas of the state to support overall energy demands.[6]

The renewable portfolio standard (RPS) was updated to 35% by 2030, 45% by 2035, and 50% by 2040 in the ReEDS model based on Senate Bill 1547.[7] A clean energy standard (CES) constraint was used to enforce a minimum of 80%, 90%, and 100% clean electricity generation to align with emission reduction targets set by Oregon for 2030, 2035, and 2040.[8] The CES percentages between target years were calculated using linear interpolation.

### CLEAN ENERGY CAPACITY

Recommendations for clean energy buildouts modeled for 2030, 2035, and 2040 account for the most recent annual data for the nameplate capacity of solar, wind, battery storage, hydropower, geothermal, and other generation sources installed in Oregon.[9] All capacity results assume the persistence of federal clean electricity investment tax credits (ITC), production tax credits (PTC), and hydrogen production tax credits from the IRA - with phase outs starting as late as 2032.[10] The ReEDS model optimizes capacity build outs based on projected system-wide costs and resource reliability while subject to specific constraints, such as penalties from RPS policies and restrictions to specific technologies.

Large scale solar and wind power were restricted to be built under a limited siting scenario in the ReEDS model, with capacity potentials corroborated by previous studies.[11] In order to ensure land-use from the scenario was below the maximum amount available for solar and wind power, a spatial analysis was conducted based on several datasets. Building outlines were downloaded from the FEMA USA Structures Database for Oregon and given a 50 ft buffer for solar installations and an 800 ft buffer for wind installations.[12] Flood zones are from FEMA's National Flood Hazard Layer (NFHL). The layer S_FLD_HAZ_AR was used and the designations Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30 were selected as representing the 100-year floodplain.[13] Railroads and Road lines are from the US Census Bureau TIGER/Line Shapefiles Inventory for 2023. Both roads and railroads were given a 60 ft buffer from the

b Modeling an individual state in ReEDS requires setting a fixed price assumption for natural gas, as no other regions are represented when modeling in isolation. ReEDS discloses that the northwestern balancing area of Oregon includes Vancouver, Washington, as this city is within 10 miles of Portland. Other than this city, no areas outside of Oregon are represented in the energy demand.

center line.[14] Water areas were selected from the USGS National Hydrography Dataset (NHD) from a combination of the layers NHDWaterbody and NHDArea.[15] Water Bodies were given a 50 ft buffer area. Wetlands were selected from the USFWS National Wetlands Inventory (NWI).[16] Wetlands were given a 100ft buffer area. Protected and preserved land was selected from the USGS Protected Areas Database (PAD-US). Particularly the Designation Types HCA, HCAE, SP, LHCA, MIL, MPA, NM, NP, NWR, SHCA, SCA, PHCA and the Local Manager of The Nature Conservancy were used as the selection criteria for protected land not eligible for installation.[17] Slope was calculated from USGS 3DEP DEM's at a 1/3 arc-second spatial resolution. Slope was calculated in percentage rise from the original elevation data. Slopes of 30% rise or greater were used as selection criteria for land not eligible for installation.[18] Wind Speed was from NREL's Wind Resource Database (WRDB). The BC-HRRR CONUS dataset was selected for the year 2022. Areas with wind speeds greater than 5 m/s at 140 m above ground were included as eligible areas for onshore wind installation.[19] All layers were projected into the coordinate system NAD 1983 (2011) Oregon Statewide Lambert (Intl Feet) before combination. The negative selection criteria were all merged and then erased from the overall boundary of the state, which is from the US Census Bureau Cartographic Boundary Files for 2024 at a 1:500,000 spatial resolution.[20] The maximum area for solar and wind installations were determined to be 35,552,443 acres and 25,235,445 acres respectively. A ratio of 7.7 acres/MW for solar and 17.3 acres/MW for wind were used to calculate theoretical maximum generation capacity based on land constraints.[21]

Distributed solar is represented by commercial and residential rooftop solar, and is based on the highest adoption trajectory available in the ReEDS model assuming a low PV cost scenario.[22] Offshore wind build-outs were based on market projections for Oregon floating offshore wind projects, as analyses of the industry and construction timelines indicated Oregon would not be able to achieve its original 3 GW goal by 2030.[23] Geothermal capacity results were cross referenced with multiple studies to ensure recommended developments did not fall outside of the range of technical potential available or deployments feasible by 2035 and 2040.[c] [24] Hydropower results greater than the state's present capacity were cross-referenced with Oregon's potential for hydropower plant upgrades to ensure that new capacity would only be added to existing sites.[25]

Battery storage capacities were limited to 4-h and 8-h duration storage, as the 4-h duration is consistent with averages of previous large-scale battery storage projects and the 8-h duration is consistent with projections from the Standard Scenarios report.[26] These battery projects are assumed to be large-scale, as they will predominantly support the deployment of large scale renewables. Hydrogen combustion turbines (H2-CT) are used as a representative technology for long-duration storage in ReEDS, assuming a minimum duration of 24 hours for hydrogen storage.[27]

Build-outs of new transmission infrastructure, including high-voltage direct-current (HVDC) lines with voltage-source converts (VSC) between balancing areas, were enabled without restriction in the model. New transmission capacity was determined by taking the difference between an unmodified mid-case scenario model result for 2025 versus the total capacity needed by each target year after incorporating all user constraints and assumptions in the model.[d]

Fossil fuel capacity is assumed to phase-out by 2040, including generators with low-capacity factors, using a zero-carbon emission constraint and enforcing generator retirements for 2040 in the ReEDS model. Pumped hydropower without a minimum 12-hour duration was barred from deployment in the model, as alternative energy storage technologies would be able to fulfill the same capacity needs.[28] All other assumptions regarding

c Geothermal potential and projections from the cited sources were reviewed and cross-checked with capacity results from the model.

d CJI ran a default scenario of the ReEDS model with no changes to model assumptions other than the representation of Oregon as an isolated system solved every five-years. Transmission capacity between balancing areas in this baseline scenario was 4.96 TW-mile.

the buildout of clean energy capacity were left in the default conditions of the ReEDS model.

## COSTS

Utility scale solar and onshore wind plant capital cost were assessed from costs per kilowatt for benchmark projects regionally adjusted for Oregon, assuming labor costs are consistent with wage rates in Portland.[29] Distributed solar costs were determined based on the median installation prices of residential and small non-residential scale systems in Oregon, weighted by solar potential for small building rooftops versus medium & large building rooftops.[30] Costs for hydropower upgrades were estimated using a nonlinear single-variable correlation based on the average level of capacity expansion per plant, assuming all of Oregon's present hydropower plants are able to upgrade their facilities.[31] The average expansion capacity was based on the upgrade projections for the modeled year divided by the number of hydropower plants in Oregon.[32] Costs for floating offshore wind and geothermal were scaled from capital costs reported in the Annual Technology Baseline (ATB) model, with data matched by representative resource classes for Oregon ReEDS results.[33]

Costs for 4-hour duration and 8-hour duration energy storage were based on ATB model capital costs for utility-scale battery storage projects scaled by the amount of capacity deployed in each balancing area multiplied by a regional cost factor.[34] Long duration energy storage costs were determined from capacity results and cost data for H2-CT plants and electrolyzers, adjusted with regional multipliers.[35] Electrolyzer capacities for producing hydrogen for energy storage were determined from projections for the amount of hydrogen demand from the electricity sector versus other sectors, assuming onsite electrolyzers operate with the same capacity factor as H2-CT at an efficiency of 56 kWh/kg-H2.[36] Energy storage costs assume stand-alone units, which could decrease if projects are co-located with renewable energy generation or deployed on retrofitted fossil fuel plant sites.[37]

Construction costs for grid infrastructure were estimated using the Jobs and Economic Development Impacts (JEDI) Transmission Line Model based on an estimated number of miles necessary for transmission projects assuming flat rural terrain for all lines.[38] Transmission reinforcement needs were converted from MW-mile to total line miles for the JEDI model analysis assuming a voltage of 500 kV and a capacity rating of 1,500 MW.[39] Siting costs for new substations, land, and environmental permits were excluded from the JEDI model scope and cost results were reduced by 50% to reflect the lower cost of upgrading lines versus developing new lines.[40] While spurlines in the ReEDS model are assumed to be 138 kV, the closest representation in the JEDI model is 115 kV rated at 150 MW of capacity.[41] The number of spurline projects needed by the target year were based on the capacity of new renewable energy plants assuming 150 MW interconnected per spurline. To represent individual projects, the total number of miles needed for 150 MW spurlines was divided by the estimated number of sites before input into JEDI, with cost results aggregated to represent the full cost of all transmission projects. The deployment of high-voltage DC lines was not costed, as the majority of these lines were found to be primarily deployed for grid reliability post-2035 and would not be built in prior years.[e]

## JOBS

IMPLAN industry 47 - "Construction of new power and communication structures" was used to model the economic impact of this recommendation based on the capital costs of solar, wind, hydropower, energy storage, and grid infrastructure needed by 2030.

## EMISSIONS

Oregon's fossil fuel plants emit 11,139,684 MTCO2e.[42] Clean energy, storage, and grid infrastructure outlined in this recommendation could reduce 10,418,577 MTCO2e per year by 2035 and achieve the state's zero emission target for 2040.

e Based on modeling results from the ReEDS analysis.

RECOMMENDATION

# PROTECT UNION JOBS & CREATE HEALTHIER WORKPLACES BY HELPING MANUFACTURING FACILITIES MEET EMISSIONS REDUCTION MANDATES

## SCOPE

Emissions data was retrieved from large-scale industrial facilities from 2023, excluding power plants, petroleum & natural gas systems, and waste facilities.[43] The scope of decarbonization was narrowed down to the top three most carbon intensive industrial sectors - pulp & paper, cement, and semiconductor manufacturing. Out of these three sectors, the eight highest-emitting facilities were decarbonized with on-site technologies. Emission reduction pathways were limited to electrification of process heating and carbon capture & sequestration (CCS) for three pulp & paper facilities releasing more than 100,000 MTCO2e per year.[44] The scope of decarbonization pathways for Oregon's semiconductor manufacturing facilities emitting more than 100,000 MTCO2e per year was limited to electrification of process heating and reductions of fluorinated gas emissions.

## COST

### Electrification of Process Heating

Data on emissions and rated heating equipment for Installing heat pumps for industrial heating costs between €500-1500 per thermal kW of capacity.[45] The cost was converted to USD for a 2022 dollar year using an average currency exchange rate of $1.05 per euro.[46] Heat electrification costs were scaled linearly based on the total maximum rated heat input capacity of equipment listed by three pulp & paper mills and four semiconductor manufacturing facilities in the Greenhouse Gas Reporting Program.[47] For semiconductor facilities, a median cost of €1000 per kW was assumed. Electrification costs for pulp & paper mills were determined using a weighted average of the upper and lower bound of the cost range, based on the percentage of combustion emissions for a standard pulp & paper mill attributed to high temperature processes and low/median temperatures respectively.[48] The level of electrification assumed for pulp & paper facilities was constrained to meet the minimum level of emission reductions necessary for the 50% industry-wide emission reduction after accounting for the emission reductions of other industrial processes within the scope of the recommendation and evaluating costs per MTCO2e reduced for a 2025 dollar year.

### Efficiency, Material Management, and CCS

A capital cost of €85 per metric ton of annual cement production capacity was used to decarbonize cement processes, assuming a total oxy-combustion system paired with CCS.[49] Costs for installing air-separation units for oxygen enrichment and CCS units are assumed to be the same for both a new and retrofitted cement plant. The cost was converted using an average exchange rate of $1.14 USD per Euro, based on Q4 2021 data.[f] [50] In a region inclusive of Oregon and five other states, about 3,378,012 metric tons of cement were produced.[51] Out of these states, only Oregon, Utah, and Washington contributed to cement production.[52] Assuming the economic contribution of cement production in the state is proportional to its annual production capacity, it is estimated Oregon produces 646 thousand tons per year as Oregon's share is calculated to be 19% of the three states' cement markets.[53] Decarbonization costs were scaled by the state's estimated 646 thousand metric tons of annual cement production.

Costs for CCS at pulp & paper mill plants were calculated based on the total capital cost of implementing solvent-based CO2 at a capture rate of 90%, equivalent to a 196,000 MTCO2 reduction per year for the referenced plant.[54] An estimate of $100 per MTCO2 was used for the capital cost of reducing 116,663 MTCO2 from manufacturing processes listed in Subpart AA of the three pulp & paper facilities emission reports, assuming costs scale linearly with respect to MTCO2 captured.[55] Fluorinated gas recycling for the semiconductor manufacturing industry at a 50% recycling rate was cost at a rate of $23.53 per MTCO2e.[56] The cost

f Cost after converting from Euro to U.S. Dollar, average of October, November, and December 2021.

was scaled by 50% of the total MTCO2e for sulfur hexafluoride, nitrogen trifluoride, hydrofluorocarbons, perfluorocarbons, and other fluorinated greenhouse gases associated with electronics manufacturing.[57]

### Government Share of Costs

The government cost share for decarbonizing pulp & paper and semiconductor manufacturing process heating is assumed to be 50% based on assessments that indicate that a majority of decarbonization pathways, including electrification and CCS, will need to be supported with equal levels of public and private investment.[58] The cement decarbonization process involves a combination of efficiency measures and carbon capture, which should receive at least 40-50% support from government investment.[g 59] A weighted average government cost share of 44% was assumed based on the split of capital costs for air separation units versus carbon capture processing units onsite.[60] The public share of costs for recycling and conserving fluorinated gas in the semiconductor industry is assumed to be 30%, as this reduction method is expected to be used sooner than other decarbonization practices.[h 61]

#### JOBS

IMPLAN industry 51 - "Construction of other new nonresidential structures" was used to model economic impacts for all decarbonization pathways within the recommendation scope, as these processes involve significant retrofits and installations of new equipment. While some decarbonization pathways for the semiconductor industry may involve some repair construction work, such as reducing fluorinated gas leakages, these projects still require new equipment installations for significant emission reductions.[62]

#### EMISSIONS

Emissions from all non-fossil fuel and non-waste facilities were 2,914,864 MT CO2e in 2023.[63] Decarbonization strategies for the three most emissive sectors were balanced to achieve the lowest cost per MTCO2e reduction necessary for a 50% decrease in overall industrial facility emissions in Oregon. Financially supporting the decarbonization pathways would reduce at least 1,457,432 MTCO2e per year by 2035 if implemented.

# BUILDING HEALTHY & RESILIENT COMMUNITIES

**RECOMMENDATION**

## TRANSFORM HOUSING AFFORDABILITY AND JOB QUALITY IN HOUSING CONSTRUCTION WITH GREEN PUBLIC HOUSING THAT CREATES UNION JOBS

#### BOND MODEL

CJI built a simple bond model to understand the yearly bond proceeds that could be devoted to a social housing program. The simulated bond program was assumed to be under Oregon's existing XI-Q bonding authority, which is limited by the constitutional cap of 1% of the state's Real Market Value and the state's overall de facto limit of 5% on debt service, as advised by the Oregon State Debt Policy Advisory Commission.[64] Bonds were assumed to be issued each year for 10 years on a 20 year term with a 4% coupon. For the purposes of this analysis, SDPAC's recommended maximum annual amount of debt issuance of $1.112 billion used as the overall limit on G-O bonds for each of the 10 years of the program.[65] This limit, rather than the constitutional limit, was the limiting factor in the analysis. The model was used to understand the amount of funding that could be directed to building social housing without breaching either of these two limits.

g CJI reviewed the referenced sources and determined that any cement decarbonization methods that go beyond standard fuel efficiency will require greater levels of public investment, such as CCS.

h Older funding models for decarbonization technologies, such as Canada's Decarbonization Incentive Program, supported 30% of investment costs. CJI reviewed the referenced sources and determined that most methods for reducing fluorinated gas emissions in the industry – including recycling, abatement, or conservation of gases - would be more near term compared to alternate decarbonization pathways.

For the purposes of this analysis, we assumed a baseline of $600 million per biennium in LIFT bonds; under this social housing policy, $200 million would be shifted from LIFT to the social housing program each biennium. Based on an analysis of Oregon budget documents spanning 2015 to 2025, we assumed $620 million per biennium in XI-Q bonds not devoted to social housing or LIFT, and $630 million in additional other state supported General Obligation bonds. With these assumptions, we found the state could issue approximately $277 million in XI-Q bonds for social housing each year in nominal dollars.

New debt service cost was calculated as the amount of additional debt service that would be required under the baseline scenario. Consequently, new debt service costs are calculated on a yearly issuance of $177 million (nominal) for ten years.

### Total Cost and State Subsidy Per Unit of Existing Affordable Housing Units:

To determine total cost per unit and total state subsidy per unit of existing new affordable housing construction, CJI examined data included in the "Exhibit A: Approved Projects" and "Exhibit B: Proposed Projects" sections of Oregon State Housing Stability Council Materials Packets from May 2024 to June 2025.[66]

Estimates for average per-unit cost and per-unit state subsidy were calculated for new construction projects only. Project costs were adjusted using IMPLAN deflators for 52 - "Single-family Homes" for non-multi-family affordable housing and IMPLAN code 53 - "Apartment buildings, condos" for multi-family units.[67] To determine average per-unit cost, a weighted average was calculated using inflation-adjusted per–unit costs per project weighted by the number of units for each project, equaling $462,687 per unit of new affordable housing construction.

To determine average per-unit state subsidy, a weighted average was calculated using 2025 inflation-adjusted per–unit state subsidies per project weighted by the number of units for each project, equaling $309,371 per unit of new affordable housing construction.

State-specific subsidies included in the data used to calculate overall state subsidy amounts were: 501c3 Conduit Revenue Bonds, the Agriculture Workforce Housing Tax Credit, Article XI-Q Local Innovation and Fast Track (LIFT) Bonds, the General Housing Account Program (GHAP) and the GHAP Veterans, the Oregon Affordable Housing Tax Credit, the Oregon Multifamily Energy Program, and the Permanent Supportive Housing (PSH) Program.[68]

### Social Housing Units Constructed:

Construction costs, in units of dollars per square foot ($/ft$^2$), were sourced from a 2019 addendum to a report on multi-residential construction costs for various construction types across multiple U.S. geographies.[69] Cost estimates were inclusive of typical union wages in Portland and based on a model multifamily building (4 stories, 100,000 GSF total space). The average cost of type II-B construction types (Light Gage Steel Framing, Masonry and Precast, Precast Construction, Insulated Concrete Form Walls and Precast Plank, ICF Walls and ICF Concrete Floor Alternate) was averaged and used to estimate construction costs on a per-unit basis based on the model multifamily building.

From model multifamily residential buildings detailed in the *Inclusionary Housing Calibration Study* (for the city of Portland) by BAE Urban Economics, a rentable space/total space ratio of 0.8 was assumed for the model building.[70] A rental unit size of 952 ft$^2$ was assumed, based on the U.S. Census Bureau's Characteristics of New Housing data for the Western census region.[71]

An inflation scaling factor of 1.15 was applied to construction cost estimates based on a 2019 report by the U.S. Government Accountability Office (U.S. GAO) that found factors specific to federally funded construction projects resulted in a 15-25% cost increase compared to similar private-sector projects.[72]

## JOBS

IMPLAN industry 53 - "Construction of new multifamily residential structures" was used to model the economic

impact of this recommendation. The 2026-2030 real cost used as the input for the model.

### Operating Subsidy:

To create a representative social housing household, CJI analyzed American Community Survey microdata.[73] Each social housing apartment building was assumed to draw half of its households from the first quintile of renter household income in Oregon and half of its households from the second quintile; each household would pay 30% of its gross income in rent. Based on these assumptions, tenant rental revenue per unit was taken at approx. $6,547 per year, or about $546 per month.

We assumed an operating cost of $9,909 per unit of social housing per year based on publicly accessible, public housing-specific financial documents posted by a number of Oregon's housing authorities (North Bend Housing Authority, Homes for Good Housing Agency, and Home Forward).[74] It is assumed that operating expenses are primarily made up of the following: administrative costs, utilities, and maintenance.

Operating subsidy per unit was calculated by taking the difference between operating expense per unit and tenant rental revenue per unit. The total operating subsidy each year required by the social housing authority from the state was calculated using the total number of units in operation in a given year; to account for construction timelines, we assumed a delay of roughly 3 years from when bonds are issued to when the social housing authority would begin to require operating subsidies. For example, units funded by bonds issued in 2026 would not begin to require subsidy until 2029. All figures are in 2025 dollars and were adjusted using the Consumer Price Index for All Urban Consumers (CPI-U) unless otherwise noted.

RECOMMENDATION

# LEAD BY EXAMPLE BY RETROFITTING AND INSTALLING CLEAN TECHNOLOGIES ON PUBLIC BUILDINGS WITH UNION LABOR

## COST SAVINGS AND ANNUAL SPENDING ESTIMATES FOR SCHOOLS UNDER THE PUBLIC PURPOSE CHARGE (PPC) PROGRAM

CJI used PPC school project data collected and published by the Oregon Department of Energy (ODOE) to determine estimated cost savings and annual PPC spending.[75] Data published includes annual estimated cost savings per school project as well as S.B. 1149 or PPC funds spent per project. Annual estimated cost savings and S.B.1149 funding spent were calculated for all projects in a given year for each year included in the dataset (2012-2023). Dollar values for annual estimated cost savings amounts per year were adjusted to 2025 dollars using the Consumer Price Index for All Urban Consumers.[76] Dollar values for S.B. 1149 funds spent were inflation-adjusted using IMPLAN 55 - "Maintenance and repair of Educational buildings, museums, libraries, and dormitories".[77] Inflation-adjusted cost savings per year were added together to produce an estimated cost savings of $6,800,453.05 from 2012-2023. Inflation-adjusted average annual spending under PPC is $7,766,980.08/year.

## ANNUAL VALUE OF ENERGY PRODUCED, TOTAL INSTALLED SOLAR CAPACITY, AND ANNUAL SPENDING UNDER THE 1.5% GREEN ENERGY TECHNOLOGY (GET) PROGRAM

CJI used 1.5% GET data collected and published by ODOE to determine annual value of energy produced and total solar capacity installed, which included project description, technology type, actual amount spent on GET project, annual kilowatt-hours (kWh) produced, annual value of energy produced, and sum of capacity of solar array in kilowatts (kW), among other categories.[78] Projects categorized as deferred, consolidated

projects, projects assumed to be duplicates, and projects missing data for actual amount spent on GET project were removed from the dataset.[i] Additionally, where data was missing from the sum of capacity of solar array category, where possible, (a) total capacity as stated directly in the project description was used to fill in this data; or (b) an estimate of total capacity was produced based where the number of panels and rating per panel were provided in the project description by multiplying these two figures together. Projects marked as photovoltaic for which no kW value could be determined were also removed.

To determine total solar capacity installed under the program, kilowatt capacity for all projects were summed to produce an estimated total solar capacity of 10,906 kW or 10.9 megawatts. To determine the average annual value of energy produced, annual value of energy produced for all projects in a given year was calculated for each year included in the dataset (2013-2024). These values, adjusted to 2025 using the Consumer Price Index for All Urban Consumers, were used to determine the average or mean value of energy produced per year under the program, equal to $1,580,790.58/year.[79] This same methodology was used for producing an estimate of average annual spending under the program of $5,184,232.58/year.

### ESTIMATED ANNUAL SPENDING ON GREEN TECHNOLOGIES UNDER AN UPDATED 5% GET PROGRAM

To estimate new spending under an updated 5%, GET program, the following formula was used to produce an estimated annual spending of $17,280,775.28/year: new rate/current rate x average annual spending, or 5/1.5 x $5,184,232.58.

### STATE-OWNED BUILDINGS COST

Square footage data on the state's owned-building stock was pulled from Oregon's 2025-2027 state agency facility plans.[80] Building stock (on a per-agency basis) is delineated between buildings with current replacement values (CRVs) over $1million, and under $1 million. Buildings with areas less than 5,000 GSF were excluded from weatherization/electrification cost estimations. Leased space was not considered for any calculation. Buildings belonging to the Oregon Department of Corrections (ODC), the Oregon Military Department (OMD), and the Oregon State Police (OSP) are not within the scope of this recommendation and are not included in cost calculations/estimates.

Cost factors (in dollars per square foot) for building electrification and weatherization were sourced from a 2022 report by Rosen Consulting Group, *New York Building Electrification and Decarbonization Costs*.[81] On the basis of climate zone similarity, it is assumed that these cost estimates would be similar in, and applicable to the state of Oregon.[82] Electrification cost ranges include the purchase and installation of ground source heat pump units, heat pump water heaters, and potential infrastructural and electrical upgrades. Weatherization (building shell upgrades) include adding varying levels of wall and roof insulation, window glazing, and infiltration reduction measures.[83] The midpoint of the reported cost range for office building electrification ($17-$24 per square foot in 2022 USD) was applied to the filtered subset of the state's building stock to estimate total electrification cost.

Weatherization measures were only recommended for state agencies with energy use intensities (EUIs) greater than 35 kBtu/ft$^2$ per year. A deep energy retrofit for an agency below the cutoff EUI would result in an agency EUI below net-zero ready (NZR) EUI targets. It is assumed that NZR performance targets for small-medium office buildings (10,000 GSF - 100,000 GSF) published by both the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the National Renewable Energy Laboratory (NREL) are appropriate for post-retrofit building stocks.[84] It was also assumed that these targets are applicable to buildings within the 5,000-10,000 GSF range.

i Note that project 16-1 was not removed as it was improperly categorized as deferred and green measures were in fact installed at the building

Given that the majority of the buildings in the Oregon State Government Buildings GEOhub dataset are located in climate zone 4C, it was assumed that the majority of cumulative state agency GSF is also located in climate zone 4C – therefore, only basic shell weatherization was recommended for agencies above the EUI cutoff.[85]

Paired solar PV and battery storage costs were derived based on a modeled commercial ac-coupled PV-plus-storage system with a 4-hour lithium-ion battery (500 kW installed solar; 300 kW installed battery storage) detailed in a 2022 NREL report.[86] NREL reported a total cost of $1.437 million for the modeled system, from which a cost factor on a $/kW was derived ($2,874/kW installed solar). The cost factor includes: PV module, Lithium-Ion Battery Cabinets, Solar Inverter, Battery Central Inverter, Electrical and Structural BOS, Installation Labor and Equipment, EPC Overhead, Sale Tax, Permitting Fee, Interconnection Fee, Contingency, Developer Overhead, and EPC/Developer Net Profit.

Commercial PV power density was estimated using NREL's report on solar PV technical potential in the United States.[87] Utilizing the Oregon State Government Buildings and Building Footprints GEOhub ArcGIS datasets, available state-agency rooftop area was estimated from a ratio of building footprint to total building area, for a subset of the state-owned building stock. That ratio was applied to the entire filtered state-owned buildings dataset (for buildings greater than 5,000 gross square feet). It was assumed that 50% of the available roof area would be suitable for solar PV installations.

## STATE-OWNED BUILDINGS EMISSIONS REDUCTION

Grid decarbonization was assumed for the purpose of calculating emissions reduction. Consequently, public building emissions reductions correspond to the reduction in natural gas usage achieved through the program and do not account for potential emissions from fossil fuel electricity generation. Annual energy use by agency can be found on the building energy use dashboard hosted by the Department of Administrative Services.[88] Natural gas usage had to be estimated for the Department of Education and the Public Employees Retirement System headquarters. For these agencies, a natural gas energy intensity was established from the U.S. Energy Information Administration's 2018 Commercial Buildings Energy Consumption Survey (CBECS) – the natural gas intensity for office buildings in mixed-mild climate zones (climate zone 4C) was used to estimate natural gas usage from agency-reported gross square footage.[89] The Oregon Health Authority reported annual natural gas usage was used to establish a natural gas intensity (kBtu/GSF) for the agency. Since the Junction City Main Building (229,816 GSF) was excluded from decarbonization cost estimates, the agency's natural gas intensity was multiplied by the adjusted square footage to estimate the agency's natural gas usage minus the Junction City Main Building. Lastly, a carbon dioxide emissions factor of 52.91 kilograms carbon dioxide per million Btu was used to estimate annual emissions for all agencies, based on reported and estimated annual natural gas consumption.[90]

## PUBLIC UNIVERSITIES COST

It is recommended that public universities decarbonize through the installation of campus-wide thermal energy networks. Cost values from a 2019 geothermal networks feasibility study were sourced from Massachusetts residential and commercial geothermal installation data – on the basis of climate zone similarity, it is assumed that these cost estimates are applicable to Oregon.[91] For the purpose of decarbonization cost estimates, university campuses were classified as medium-density, mixed-use land areas; all university buildings were classified as "commercial." From Table III-I (PSS Composition and Characteristics) of the feasibility study, a characteristic commercial building area of 13,500 square feet was used to calculate low- and high-end cost estimates (in dollars per square foot) for commercial geothermal conversion (utilizing table IV-6: Estimated Commercial Conversion Costs for the Medium Density Mixed-Use PSS). Average installation cost (in dollars per square foot) was calculated according to the data in Table IV-I (Characteristics for Existing Vertical and Horizontal GSHP Systems Installed in Massachusetts).

### PUBLIC UNIVERSITIES EMISSIONS REDUCTION

Grid decarbonization was assumed for the purpose of calculating emissions reduction. Consequently, public university emissions reductions correspond to the reduction in natural gas usage achieved through the program and do not account for potential emissions from fossil fuel electricity generation. University-reported annual scope I emissions data was primarily sourced from University of New Hampshire's Sustainability Indicator Management and Analysis Platform (SIMAP), as well as the Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment and Rating System (STARS).[92] According to Oregon Institute of Technology's 2023 strategic energy management (SEM) report, the university did not use any on-site natural gas, meaning that the university produced no scope 1 emissions.[93] Annual emissions were estimated for Eastern Oregon University, and Western Oregon University.

### PUBLIC K-12 SCHOOLS COST

Square footage data on Oregon's public K-12 building stock was obtained from Michael Lammers at the Oregon Department of Education.[94] Deep shell weatherization was recommended for K-12 schools in climate zone 5B, while basic shell upgrades were recommended for K-12 schools located within climate zone 4C.

From ArcGIS analysis of FEMA's USA Structures database, Pre-K-12 buildings in Oregon were estimated to have approximately 98,362,320 $ft^2$ of roof space (based on building footprints).[95] Assuming K-12 schools classify as "medium and large buildings", it was assumed that 50% of the available roof area would be suitable for solar PV installations.[96]

### PUBLIC K-12 SCHOOLS EMISSIONS REDUCTION

Grid decarbonization was assumed for the purpose of calculating emissions reduction. Consequently, public K-12 emissions reductions correspond to the reduction in natural gas usage achieved through the program and do not account for potential emissions from fossil fuel electricity generation. Annual natural gas usage was estimated for the entire K-12 building stock. Natural gas energy intensities were sourced from CBECS – for education buildings in cool and mixed-mild climate zones – and used to estimate natural gas usage across the K-12 building stock.[97]

### PUBLIC EV CHARGING COSTS

The U.S. DOE Alternative Fuels Data Center's (AFDC's) Electric Vehicle Infrastructure (EVI)-Pro Lite daily charging need tool was utilized to determine the state's charging infrastructure needs associated with its 2025 goal.[98] Full support for plug-in hybrid electric vehicles was assumed. The AFDC's Alternative Fueling Station Locator was utilized to estimate the share of private workplace (commercial) Level 2 chargers allocated toward state government agencies.[99] Cost factors were sourced from a 2023 NREL report on estimating the country's LDV demand for EV charging infrastructure (L1 residential, L2 residential, L2 commercial, DC 150 kW, DC 250 kW, and DC 350+ kW).[100] The mid-points of the reported cost ranges for commercial L2 charging units and associated installation were used.

### JOBS

IMPLAN industry 55 - "Maintenance and repair construction of nonresidential structures" was used to model the economic impact of building electrification and weatherization retrofits, as well as the conversion of university buildings to ready them for thermal energy networks. IMPLAN industry 51- "Construction of other new nonresidential structures" was used to model the economic impact of the installation of thermal energy networks at public universities. IMPLAN industry 50 - "Construction of new commercial structures, including farm structures" was used to model the economic impact of EV chargers. IMPLAN industry 47 - "Construction of new power and communication structures" was used to model the economic impact of spending for solar and battery installation.

RECOMMENDATION

# DECARBONIZE OREGON'S MEDIUM- AND HEAVY-DUTY VEHICLES BY 2035

## COST

The Oregon Transportation Electrification Infrastructure Needs Analysis outlines the additional electric vehicle infrastructure that the state would need to meet its electric vehicle goals. Of the three projection scenarios based on economic recovery from COVID-19 shutdowns, the base case was selected for our calculations since neither slow recovery nor rapid recovery accurately fit the economic trajectory of the past five years; the base case scenario was a reasonable middle-of-the-road scenario for our assessments.[101] Stage 1 prioritizing urban areas would comprise both Transit and School buses, and Local Commercial and Industrial Vehicles. Local Commercial and Industrial Vehicles were determined to use DCFC (150kW) chargers and Transit and School buses, a combination of DCFC (50kW) and Public Level 2 chargers. Stage 2 prioritizing transportation corridors would consist of Long-Haul Trucking vehicles, using DCFC (350kW) chargers. The supplemental Oregon Guide for EV Charging Deployment gives estimated equipment, installation and total cost values for each charger type. The 50th percentile cost estimate was chosen as a representative value for total cost.[102] These values are shown in 2022 dollars. The cumulative total of the two stages by 2035 would be $1,059,445,650, not adjusted for inflation.

## JOBS

IMPLAN industry 50 - "Construction of new commercial structures, including farm structures" was used to model the economic impact of this recommendation.

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