HOOD RIVER COUNTY ENERGY PLAN

ADOPTED IN 2018

Photo by Sarah Moore

HOOD RIVER COUNTY ENERGY PLAN

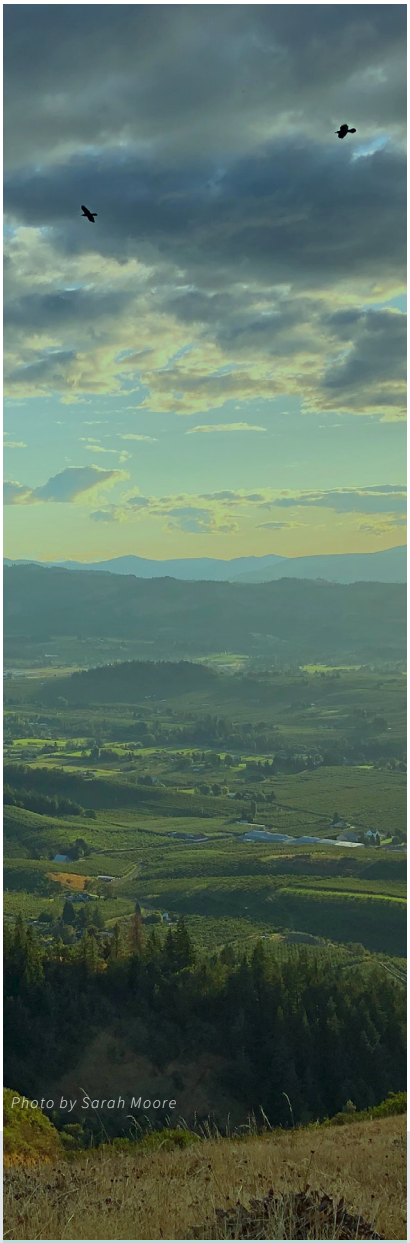

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS

This document is the result of the dedicated efforts of the Hood River County Energy Plan Steering Committee from November 2016 to September 2017. The solutions outlined in the plan were designed by and for the Hood River County community.

Hood River County Energy Plan Steering Committee
Becky Brun, City of Hood River Councilor*
Joe Giordano, Oregon Clean Power Cooperative*
Cathy Higgins, Research Director at New Buildings Institute*
Kate McBride, City of Hood River, Council President*
Les Perkins, Hood River County Commissioner*
John Roberts, Hood River County Development Director and RARE supervisor*
Deanna Busdieker, City of Cascade Locks Councilor
Pat Bozanich, Waste Prevention Resources owner
Peter Cornelison, City of Hood River City Councilor
Jennifer Euwer, Hood River County Planning Commissioner
Jess Groves, Port of Cascade Locks Commissioner
Dale Hill, Hood River Valley Residents Committee
Anne Medenbach, Port of Hood River Development and Property Manager
Eric Strid, Columbia Gorge Climate Action Network Convener
Claudia Munk-Von Flowtow, Key Development, Chief Operating Officer
Polly Wood, Hood River Valley Residents Committee
Carl Zerfing, City of Cascade Locks Councilor
Peter Zurcher, Columbia Gorge Climate Action Network
* Indicates member is also part of the Executive Committee

A special thanks goes to Marla Harvey, Hood River Energy Plan Coordinator, for moving this effort forward. The development of the Hood River County Energy Plan was supported with funding from the following partners:

Hood River County
City of Hood River
Port of Hood River
City of Cascade Locks
Port of Cascade Locks
Energy Trust of Oregon
Ford Family Foundation
RARE Americorps Program

Its contents are solely the responsibility of the Hood River County Energy Plan Steering Committee and do not represent the official views of any of the funders.

In addition to Steering Committee members, thank you to the following organizations for contributing time and information to this plan: Cascade Locks Municipal Utility, Energy Trust of Oregon, Farmers Conservation Alliance, Farmers Irrigation District, Forth Mobility, Hood River Electric Co-Op, Mid-Columbia Economic Development District, Northwest Natural, Oregon Department of Transportation, PacifiCorp, Sustainable Northwest, Wyeast RC&D.

EXECUTIVE SUMMARY

Photo by Becky Brun

The residents of Hood River County, Oregon, have a long-standing interest in energy efficiency and renewable energy development—as a means to reduce energy costs, hedge their bets against rising energy costs in the future, and increase the community's resilience to warming temperatures and both natural and human-caused disasters. Concerns about climate change and its adverse effects are also growing every day. Because of the groundwork they've already laid, Hood River County residents have a significant opportunity to plan our energy future in a way that works for us. The community can invest in an energy future that provides good, local jobs, generates clean power, saves taxpayers money, and sets us up to be a refuge in times of emergency. Hood River County can join other model communities like Lake County, Oregon, which is on target to save residents $9 million dollars over 10 years through investments in clean, renewable energy.

Climate change threatens to significantly impact the natural environment and resources on which Hood River County's economy and livability depend. Warming temperatures are already impacting Hood River County. Vanishing snowpack, declining stream flows, severe storms, prolonged drought, and increasing wildfire risks threaten public health, agriculture, food security, business-supply-chains, recreation, tourism, and quality of life.

These impacts are projected to become much more severe in coming decades. And the threat of man-made and natural disasters—ranging from oil train derailments to wildfires to earthquakes—is more imminent than ever. The county's dependence on out-of-state energy sources makes us vulnerable during emergencies, as well as to volatile price changes from national and international markets.

Hood River County, along with other government bodies throughout the region, has a responsibility to address the risks associated with climate change and natural disasters. We also have a responsibility to look at our energy use—one of the community's biggest expenses—and determine ways to more efficiently and cost-effectively procure and use it.

Recognizing that the ability to solve these complex problems requires collaboration and communication with public and private partners, Hood River County in 2016 invited local partners and stakeholders to jointly develop the Hood River County Energy Plan. In doing so, we joined a growing list of communities around the U.S. and the world that are addressing climate change and energy concerns with a long-term vision and plan.

The 12-month process that produced this Plan involved more than two dozen volunteers and required hundreds of hours of research and discussion. This blueprint will help our community work toward three goals:

1. **Reduce fossil fuel use in Hood River County.** Specifically, replace 30%, 50%, and 80% power generated from fossil fuels with clean, renewable energy in buildings, water systems, and transportation by 2030, 2040, and 2050 respectively= as compared with 2016 levels.

2. **Improve resilience and energy independence.** Specifically, generate 50% of the county's energy needs from local, diversified energy sources and increased storage capacity by 2050. Increase overall capacity, price security, energy generation, control and stability; and provide key services in the event of emergency.

3. **Increase investment in local power.** Specifically, strategically develop and utilize $25 million in revolving funds by 2025 to enable local projects and create a business environment that supports our Energy Plan goals. Benefit the local economy by increasing investment in clean energy technologies and decreasing out-of-region and out-of-pocket expenditures. Keep dollars spent and dollars saved on energy in the community.

*Local is defined as owned and operated in Hood River County.

VISION STATEMENT

The Hood River energy Plan is a blueprint to improve community resilience, increase energy independence, and increase economic benefits related to energy use in Hood River County while reducing emissions from the burning of fossil fuels.

SCOPE

The Hood River County Energy Plan addresses the energy generated and used within Hood River County. It includes objectives and strategies to address energy use efficiency, energy source, local energy generation, energy impacts of personal and mass transit, and the infrastructure decisions impacting energy use.

- **Buildings: Design, Construction, and Occupancy**
- **Transportation and Land Use**
- **Agriculture and Water**
- **Community-Scale Solutions**

All objectives, strategies, and potential actions aim to help the people of Hood River County increase investment in energy efficiency and renewable energy projects: achieve energy generation control, stability and price security, and provide key services in the event of emergency.

NEXT STEPS

In early 2018, Hood River County, the City of Hood River, the Port of Cascade Locks and the Port of Hood River adopted the Hood River Energy Plan's goals by resolution. Adoption of the plan will require continual public involvement, assistance from subject-matter experts, and public and private sector leadership.

This document does not provide a specific pathway for achieving the plan's goals. The strategies and actions pursued will vary by government agency and special district. However, the Hood River Energy Plan Steering Committee looks forward to working with the county, cities, ports, and other local partners to create the Implementation Plan, a process by which priority projects will emerge, along with specific plans of action and a list of needed resources.

It's recommended that the county and other agencies use the Energy Plan as a guiding document and, when determined appropriate, incorporate the Energy Plan's goals, strategies, and actions into the following types of plans: comprehensive plans, water master plans, master plans (parks, buildings, stormwater, etc), regional transportation plans, land use code, building department permitting and SDC fee structure, and utility plans.

The creation of the Hood River County Energy Plan has already demonstrated that only by working together can we succeed.

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INTRODUCTION

HOOD RIVER, OREGON: A CLEAN ENERGY PIONEER

Hood River County, Oregon, is located about 60 miles east of Portland in the heart of the Columbia River Gorge National Scenic Area. It's well known for its rich agricultural land, access to nature, entrepreneurial spirit, and distinct communities.

There has long been a community-wide will to invest in clean-energy solutions that save citizens money, help protect the natural environment and enhance the local economy. In the early 1980s, the Hood River Conservation Project offered free weatherization measures to eligible homes throughout the county. The $20 million program funded by the National Resources Defense Council, Bonneville Power Administration, and Pacific Power & Light was a huge success. Among the 3,500 eligible households, 91% received an assessment and 85% of the eligible households implemented at least one of the recommended measures.

Since then, both public and private investments in energy efficiency and renewable energy in Hood River County have continued to grow. For example, the Energy Trust of Oregon paid Hood River County residents and businesses more than $7.8 million in incentives for clean energy projects between 2002 and 2016.

EXAMPLES OF LOCAL, CLEAN ENERGY PROJECTS

(Local is defined as owned and operated in Hood River County.)

- Hood River Middle School 's Music and Science building is the first public school building in the United States to be net-zero-energy certified.
- The Hood River County Parks and Recreation District solar water system at the pool was the largest grant-funded project of its kind in state history.
- The Tofurky food manufacturing plant located at the Port of Hood River is one of the few LEED Platinum-certified food manufacturing facilities in the world.
- The Farmers and Middle Fork Irrigation districts' community-owned and operated hydroelectric facilities generate approximately 17% of Hood River County's electricity and bring $3 to $4 million dollars to the county each year.
- At the Diamond Fruit Company Co-Op, energy-efficiency upgrades saved the company more than $50,000 annually, improved its equipment performance, and made the company more competitive globally. Such projects allow Hood River Electric Co-Op to defer distribution system improvements by slowing load growth while continuing to serve growing customer needs.
- The City of Hood River Public Works building's new rooftop solar project is one of the first community-financed renewable energy projects in Oregon, saving the City an estimated $97,000 over 25 years.

CHALLENGES AND OPPORTUNITIES AHEAD

Our planet's average temperature is rising. Rising temperatures impact weather and climate, leading to extreme heat waves and drought, dwindling snowpack and stream flow, severe storms and flooding, an increase in wildfires, and more. These affects are occurring more regularly and threaten local industries such as food production, tourism, manufacturing, and outdoor recreation.

In addition to warming temperatures, disasters—both natural and human-caused—are also a threat to our way of life. Hood River County imports all its liquid fuels from out of state. This means that severe winter storms, wildfires, and train derailments, or a massive natural disaster such as the Cascadia Subduction Zone earthquake could leave Hood River County without gasoline, diesel, and propane. The county's dependence on out-of-state fuels also leaves us vulnerable to volatile price changes from national and international markets.

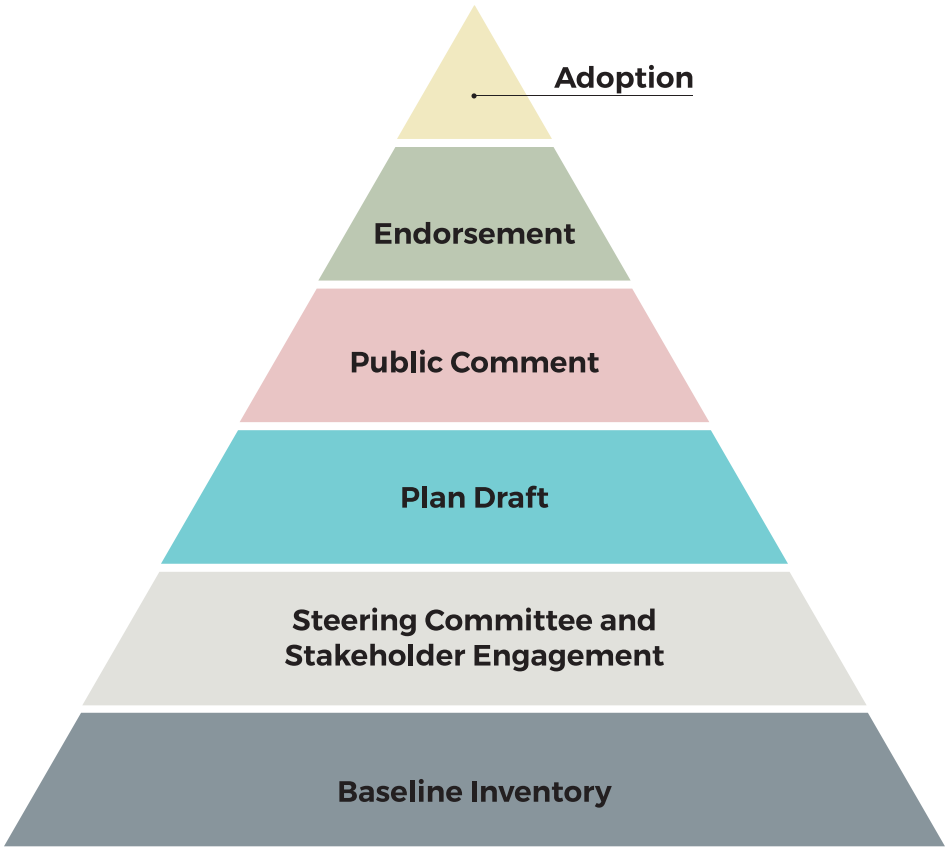
Meanwhile, rapid changes in energy markets are also opening new possibilities for communities when it comes to energy generation and purchasing decisions. The falling prices of advanced technologies, including solar panels and energy-storage systems, challenge conventional models of centralized power plants and present opportunities for distributed energy generation and control systems. Technology price reductions are also making electric vehicles and autonomous vehicles a rapidly cost-competitive option with a growing number of projections suggesting a worldwide transition to electric vehicles within 15 years.

CREATING THE HOOD RIVER COUNTY ENERGY PLAN

Hood River County, along with other government bodies throughout the region, has a responsibility to address the risks associated with climate change and natural disasters. We also have a responsibility to look at our energy use—one of the community's biggest expenses—to determine ways to more efficiently and cost-effectively procure it. Recognizing this, Hood River County in 2016 invited local partners to jointly develop the Hood River County Energy Plan. In doing so, we joined a growing list of communities around the country and the world that are addressing climate change and energy concerns with a long-term vision and plan.

To jumpstart the process, five local government bodies, along with the Energy Trust of Oregon, jointly funded a Resource Assistance for Rural Environments (RARE) coordinator. John Roberts, Hood River County Community Development Director, supervised the RARE Coordinator. representatives from Hood River City Council and County Commission, and citizen volunteers helped shape and manage her work plan. They also worked to ensure plan cohesion, explore funding opportunities, and report back to partner organizations. This group became known as the Hood River Energy Plan Executive Committee.

HOOD RIVER COUNTY ENERGY PLANNING PROCESS



PLAN OUTREACH METRICS

- 50+: Number of people who attended the Hood River Energy Plan Kickoff Workshop in November 2016.
- 300: Number of volunteer hours spent determining Hood River County's baseline energy use.
- 500+: Number of volunteer hours spent on plan development and community outreach.
- 2,000: Number of hours spent by RARE Coordinator on committee. coordination, research, outreach, and development.
- 3: Number of Hood River Energy Plan town hall meetings.

PLAN ORGANIZATION

Photo by Dan Kleinsmith

The Hood River Energy Plan presents goals, objectives, strategies, and potential actions for reducing fossil fuel emissions related to energy use in Hood River County. Its focus is on increasing investment in energy efficiency and locally-produced, renewable energy, and providing key services in the event of an emergency. It is organized into four focus areas:

- **Buildings: Design, Construction, and Occupancy**
- **Transportation and Land Use**
- **Agriculture and Water**
- **Community-Scale Solutions**

For each focus area, the plan includes objectives, strategies, and potential actions for achieving the plan's overarching goals. The objectives, strategies and potential actions were developed by subcommittee members with input from subject matter experts and organizations. The objectives, strategies, and potential actions within each focus area are presented in order of priority based on the Energy Plan Steering Committee's recommendations. However, actions will be prioritized during the development of the Implementation Plan. The goals, objectives and strategies are presented by focus area, but they are, in reality, interconnected and overlapping. Energy efficiency is a priority within all focus areas.

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HOOD RIVER COUNTY 2016 BASELINE INVENTORY

Photo by Patrick Fore

BACKGROUND

For this plan, “energy” refers to power or heat produced from fuels or processes and used for a variety of applications, including transportation, heating, cooking, and electricity generation. In Hood River, energy is largely consumed in the form of natural gas, electricity, gasoline, and diesel fuel. Hood River County residents purchase just under 50% of their electricity from Bonneville Power Administration (BPA), which provides electricity largely from hydro and nuclear resources. That electricity is sold to customers in Hood River County through Hood River Electric Co-Op and the City of Cascade Locks Electric Department (City Light). Pacific Power supplies the rest of the county’s electricity, which is generated by a mix of coal, natural-gas, renewables, and hydro (see Figure 2).

The Hood River Energy Plan sets measurable goals for fossil fuel emissions and energy reduction: Replace 30%, 50%, and 80% of power generated from fossil fuels with clean, renewable energy in buildings, water systems, and transportation by 2030,2040, and 2050 respectively as compared with 2016 levels.. It also calls for generating 50% of the county’s energy needs within the county from local, diversified sources and energy storage by 2050. In order to track our community’s

progress toward meeting those goals, the Baseline Subcommittee was tasked with completing a baseline energy and fossil fuel emissions inventory. In doing so, they compiled energy use data for Hood River County using information from 2016 and trends in usages in recent years. The Baseline Inventory is the result of many hours of work from volunteers Eric Strid, Peter Zurcher, and Dale Hill, retired experts in technology and mathematics.

SCOPE

This energy inventory baseline includes the following:

- Electricity consumption (measured in kilowatt hours (kWh) or megawatt hours (MWh), supplied by three utilities, i.e. Pacific Power, Hood River Electric Co-Op (HREC), and City of Cascade Locks Electric Department (City Light), as well as from photovoltaic (PV) systems.

- Natural gas energy consumption (measured in therms and converted to kWh) supplied by Northwest Natural (NW Natural).

- Energy consumed in transportation (measured in gallons of gasoline and diesel, energy content is converted to kWh) as calculated by the state-approved MOVES model (explained later).

- Energy generation within the county, by hydroelectric plants in two irrigation districts, i.e. the Farmers Irrigation District (FID) and the Middle Fork Irrigation District (MFID), and by distributed PV systems.

- In addition, the energy inventory baseline discusses some of the energy cost implications, i.e. what portion of the money spent on energy stays within the County and contributes to the local economy. It also addresses greenhouse gas emissions from the burning of fossil fuels used in the county's energy mix.

- The energy inventory baseline did not include the energy used to produce consumer goods and foods outside Hood River County (HRC) but consumed by residents. Such energy is difficult to track and, generally, the community has much less control over such energy usage compared to "sector-based" energy usage as listed above (electricity, natural gas, and transportation fuels).

In this report, renewable energy is defined as anything qualifying towards Oregon's most recent Renewable Portfolio Standard. This includes wind energy; solar PV and solar thermal energy; wave, tidal, and ocean thermal energy; geothermal energy; certain biomass products, including woody biomass and animal manure; landfill gas and other biogases; small hydropower; and thermal energy. The

Federal Columbia River Power System hydro-electric projects do not meet this definition as they are not small, certified, low-impact hydro.

DATA PROVIDED BY:

- Pacific Power, a division of PacifiCorp, is an investor-owned utility, serving approximately 1.8 million customers in six states. Pacific Power is a subsidiary of Berkshire Hathaway Energy. In Hood River County, Pacific Power currently serves 7,324 customers.

- Hood River Electric Co-Op (HREC), a member-owned organization founded in 1945. Following a period of increasing competition between Pacific Power and HREC in the 1960's, an arrangement for allocating exclusive service territories was negotiated and subsequently approved by the Oregon Public Utility Commission. Today HREC serves approximately 3,500 accounts owned by more than 2,300 members. Currently, HREC exclusively buys its electricity from BPA.

- City of Cascade Locks Electric Department (City Light), which is owned by the City of Cascade Locks, consists of the Pyramid substation and over 72 miles of distribution lines. City Light purchases power from BPA. City Light currently serves 852 customers.

- NW Natural, an investor-owned utility founded in 1859 as Portland Gas Light Co., today serves more than 730,000 homes and businesses in 107 communities in Oregon and Southwest Washington. It currently has 3,947 customers in Hood River County.

- Motor Vehicle Emission Simulator (MOVES), an emissions modeling system that estimates emissions and vehicle miles traveled for mobile sources at the national, state, and county level. MOVES is a required tool for generating energy, emissions, and fleet information; it has been developed over a period of nearly two decades by the Environmental Protection Agency (EPA). MOVES uses vehicle registration data by vehicle type; estimates vehicle miles traveled by using the amount of state roads in the county; and multiplies by published fuel consumption data per vehicle type. It has been shown that these default assumptions represent the actual fuel consumption with sufficient accuracy.

HOOD RIVER COUNTY 2016 ENERGY BASELINE DATA

2016 Energy Use

- Hood River County consumed a total of 272,500 MWh of electricity. Pacific Power supplied 51.1%, HREC supplied 41.2%, City Light supplied 7.1%, and PV

systems supplied 0.6% (estimate based on installed systems). Both HREC and City Light receive their electricity from BPA.

- Hood River County consumed a total of 5.403 million therms of natural gas corresponding to 158,308 MWh of energy. No effort has been made to estimate the consumption of propane and other bottled gases, which are known to be used widely in the agricultural industries to power frost fans and heaters during frost season, among other uses.

- Transportation fuel consumption in Hood River County, as calculated by the MOVES model for 2016, was about 11.963 million gallons of gasasoline and 8.87 million gallons of diesel, corresponding to 400,053 MWh and 336,905 MWh, respectively. No effort has been made to estimate the consumption of heating oil and other coal or oil based fuels, or of airplane fuels consumed at the airport and non-transportation fuels consumed by agricultural operations.

In summary, in 2016 HRC consumed a total of 1,167,766 MWh of energy, or 48.5 MWh per capita. Of this total energy consumption, electricity accounted for 23.3%, natural gas for 13.6%, gasoline for 34.3%, and diesel for 28.9%, as shown in Figure 1.

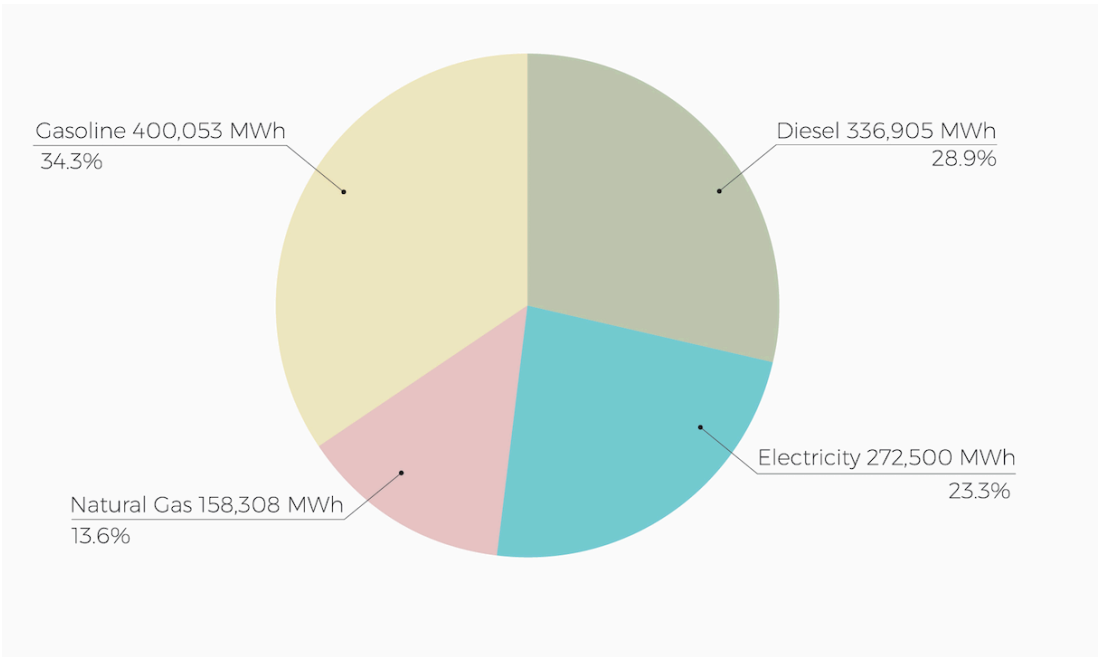

Figure 1: Hood River County's 2016 energy consumption by fuel type.

A more detailed look at the electricity sources is given in Table 1 and Figure 2 below. The last column in Table 1, "BPA power sources" shows the mix of power

	Totals	Pacific Power	HREC	CLM	HR PV	BPA Power Sources
Coal	77,994,530	77,994,530				
Natural Gas	33,426,227	33,426,227				
Hydro	125,209,376	13,927,595	94,834,350	16,447,432		84.50%
Renewables	16,642,769	13,927,595	1,010,070	175,180	1,529,924	0.90%
Nuclear	13,037,747		11,110,770	1,926,977		9.90%
Unspecified	6,189,638		5,274,810	914,828		4.70%
Totals	**272,500,286**	**139,275,946**	**112,230,000**	**19,464,416**	**1,529,924**	**100%**

TABLE 1: Details of electricity sources (kWh) for Hood River County for 2016.

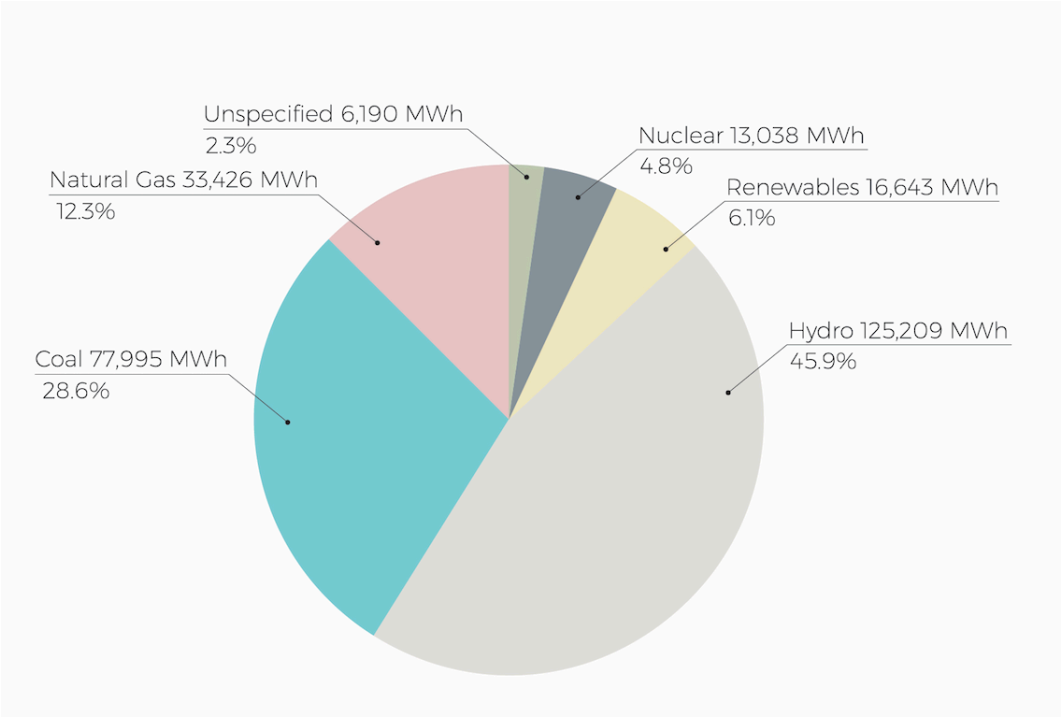

Figure 2: Distribution of electric energy sources for Hood River County in 2016

distributed by HREC and City Light, which is dominated by Federal Columbia River Power System hydro-electric projects. Pacific Power's fuel mix numbers are based on a typical year but it varies based on hydro and other resource availability.

ENERGY GENERATED IN HOOD RIVER COUNTY

- Currently, two of Hood River County's irrigation districts, Farmers Irrigation District (FID) and Middle Fork Irrigation District (MFID) generate a sizable amount of electric energy through their in-conduit hydro electric generators. Both districts likely have some potential to grow their generation, but the most potential for more in-county generation exists with East Fork Irrigation District, which has not piped its water distribution system and therefore has a significant potential to integrate in-conduit micro-turbines to save water, generate electricity, and increase efficiency of irrigation pumps. In 2016, FID generated 21,156 MWh of hydro-electricity, while MFID generated 25,476 MWh, all of which they sold to Pacific Power.

- In addition, there is also a small but growing segment of distributed PV energy generation which, in 2016, amounted to 1,530 MWh. The majority of this, 1,322 MWh, or 86%, was incentivized through Energy Trust of Oregon.

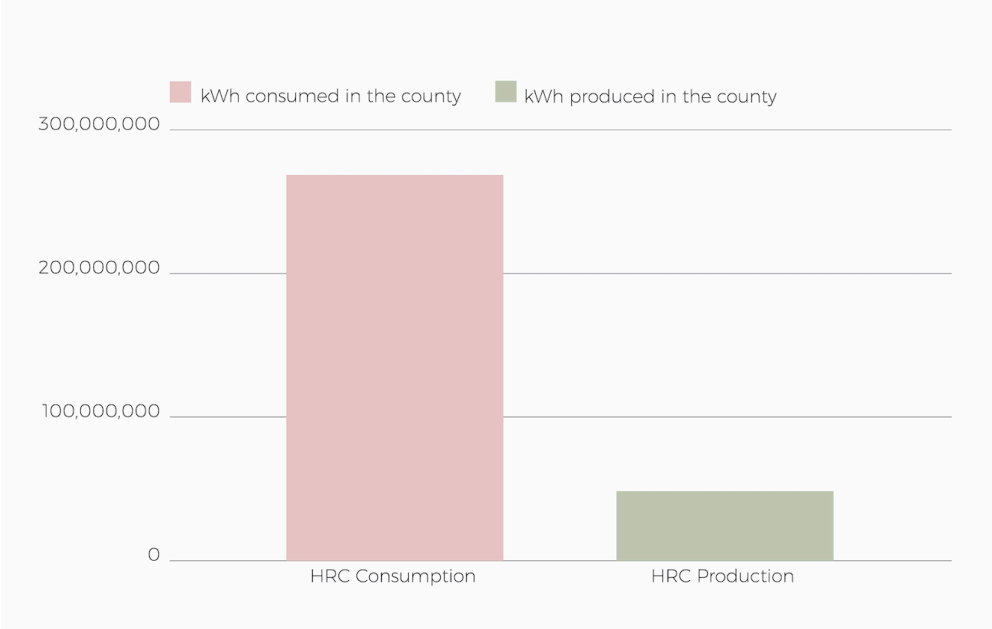

Figure 3: Out-of-county sources (supplied through Pacific Power, BPA, (pink)) in 2016 and in-county electric energy production (generation by FID, MFID, PV (green)).

Figure 3 shows the amount of energy consumed and produced in Hood River County. Currently, both FID and MFID sell their hydro electricity to Pacific Power. The production by FID and MFID amounts to ~17% of the electricity use in HRC.

ECONOMIC IMPLICATIONS

Figure 4 shows the total money spent on energy in Hood River County (HRC) by energy source. The portions that remain in the county and add to the local economy are rough estimates based on associated construction, maintenance, service, salaries of in-county employees, and other related in-county jobs. For example, we estimate that of the total sales ($13,927,595) of electricity by Pacific Power, 10% (green portion of bar) would stay inside the county through maintenance-related work while 90% would leave the county (red portion of bar). A significant portion (35%) of the sales by HREC and (50%) of the sales by City Light would stay within the county since these providers are located in the county and most of their employees live in HRC. Not described below, but also important, are the economic impacts of local generation. For example, sales from in county FID and MFID hydro-generators attract and reinvest $3,250,000 into the local economy each year and reduce the amount of dollars spent on energy that leave the county.

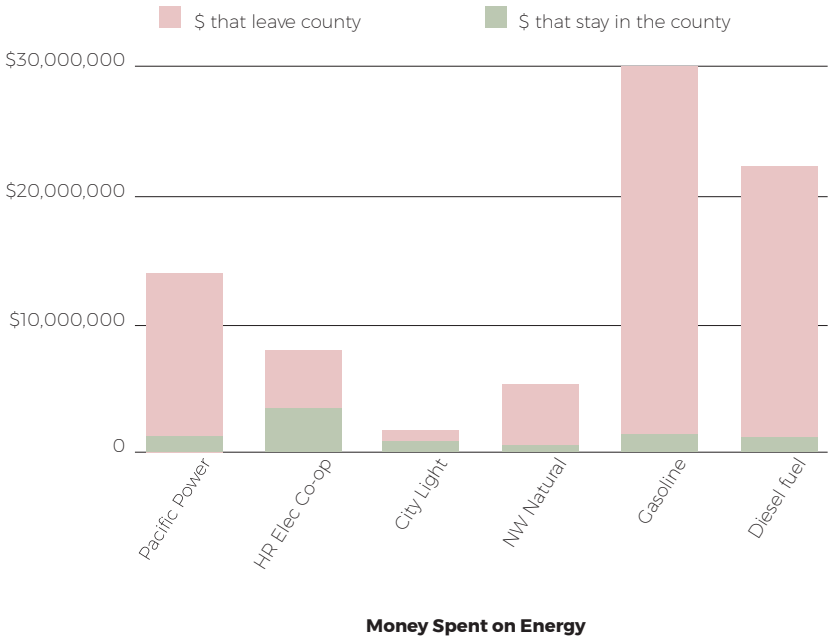

Figure 4: Money spent on energy in Hood River County in 2016.

ECONOMIC BURDEN

National studies show that individuals and families experience hardship when they spend more than 6 % of their income on energy bills (a phenomenon known as energy burden). A high energy burden can lead to families choosing between heating and other vital necessities like food and medicine that can increase health problems associated with stress. It can also lead to health problems such as asthma, respiratory problems, heart disease, arthritis, and rheumatism, due to poorly heated homes. As low income individuals often live in older homes with poor insulation and aging and inefficient appliances, they are more likely to spend more per-square-foot of their income on energy.[2] Hood River County residents, whose annual income puts them at 50% of the federal poverty level, owe more than 24.4%[3] of their income on energy. This is higher than Oregon's average of 22.7%. Energy burden is worsened during the peak winter heating and summer cooling seasons, when energy bills can comprise nearly 30% of a low-income household's monthly income.

EMISSIONS FROM THE BURNING OF FOSSIL FUELS

Combustion of fossil fuels generates greenhouse gas (GHG) emissions, inluding the portion of electricity that is generated from burning fossil fuels or natural gas, as well as the direct combustion of gasoline and diesel in transportation. It is common to measure the amount of GHG generated in "metric-tons of CO_2 equivalent" or MTCO2e, which accounts for CO_2 as well as the warming potential of other gases, such as methane. In order to compare different forms of energy (gasoline, different forms of electricity, natural gas, etc.) an "emission coefficient" is associated with each form of energy unit (gallons of gasoline, kWh, therms, etc.) to calculate an equivalent amount of MTCO2e generated by such units.

- Pacific Power's generation mix (in 2016) was 56% coal, 24% natural gas, 10% hydro, and 10% non-hydro renewables leading to a greenhouse gas conversion factor of 0.73 MTCO2e/MWh.
- In 2015, HREC and City Light bought their power from BPA. BPA's generation mix (also for 2016) was 84.5% hydro, 9.9% nuclear, 0.6% wind, 0.1% natural gas, 0.1% biomass and waste, and 4.8% non-specific purchases leading to a greenhouse gas conversion factor of 0.015 MTCO2e/MWh.
- Natural gas, as provided by NW Natural, has a greenhouse gas conversion factor of 0.0053 MTCO2e/therm or 0.181 MTCO2e/MWh.
- Gasoline has a greenhouse gas conversion factor of 0.01 MTCO2e/gallon, while diesel's factor is a little higher, i.e. 0.0112 MTCO2e/gallon.

Some of this data is summarized in Table 2 below.

	Coal	Hydro	Nat Gas	Nuclear	Non-Hydro Renewables	Wind	Non-Specific	Biomass and Waste
Pacific Power	56	10	24		10			
HR Elec Co-op*		84.5	0.1	9.9		0.6	4.8	0.1
Cascade Locks*		84.5	0.1	9.9		0.6	4.8	0.1

*This is BPA's electric energy production mix.

Table 2: Hood River County's Electric Energy Mix in %

Because of the very different sources of electricity generation, the total GHG contribution by the three electricity providers in Hood River County are vastly different. The City of Cascade Locks Electric Department and Hood River Electric Co-Op (both buying from BPA) generated only 292 MTCO2e or less than 0.1% and 1,683 MTCO2e or 0.5% of total HRC emissions, respectively, but supplied 1.7% and 9.6% of total energy used (Table 3), respectively. In contrast, Pacific Power's electricity sales generated 101,671 MTCO2e or 28.9% of the total HRC emission while supplying 11.9% of Hood River County's energy used. This large amount of greenhouse gas is due to the high portion of coal-generated electricity in Pacific Power's portfolio. However, the main contributor to the County's GHG emissions is transportation with over 62% of the total (Figure 5).

Any effort to reduce our GHG emissions from energy consumption has to consider scenarios that reduce our dependence on coal-generated electricity (which will be phased out per state legislation by 2030), electricity generated by fossil natural gas, and the replacement of combustion engine cars with electric cars or other zero-emission vehicles or fuels. Also, switching building heating systems from natural gas to heat-pumps will reduce the county's dependence on outside energy sources and somewhat reduce greenhouse gas emissions.

	MTCO2e	% of total HRC emissions*	% of total HRC energy use*
Pacific Power	101,671	28.9	11.9
HR Elec Co-Op*	1,683	0.5	9.6
Cascade Locks*	292	<0.1	1.7

*Total includes natural gas and transportation fuel

Table 3: Greenhouse gas emissions from HRC's electric energy providers

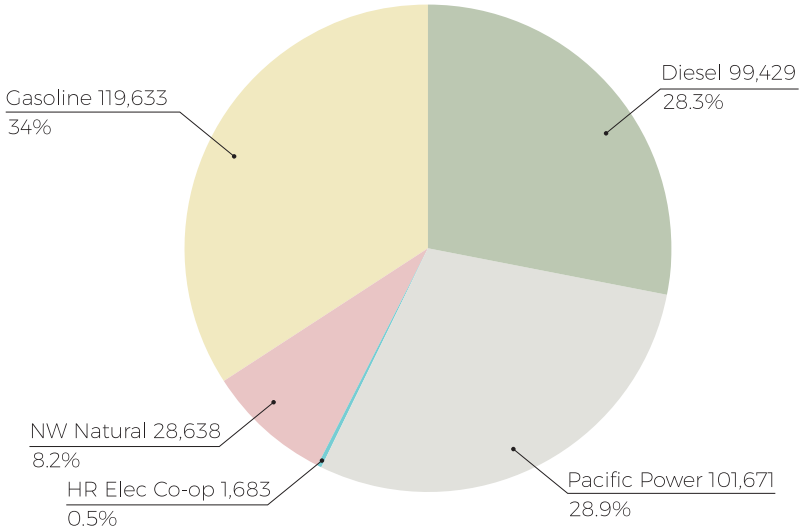

Figure 5: Greenhouse gas emissions (in MTCO2e) generated in Hood River County in 2016.

TOXIC EMISSIONS AND HUMAN HEALTH

The combustion of any fossil fuel except methane (natural gas) creates toxic emissions. The most important of these are PM2.5 particulates from diesel engines. While the worst air pollution is in urban areas, rural communities built near busy roads and highways also experience health degradations. The inventory does not estimate health affects in HRC, but the healthcare costs related to these toxic emissions are high and immediate.

HOOD RIVER COUNTY'S FUTURE ENERGY SCENARIOS

The Hood River County Energy Plan Steering Committee has created a basic spreadsheet for planning the main energy uses and sources in Hood River County through 2050. This section is an introduction to the inputs and outputs of the spreadsheet tool in its preliminary state. It must be stressed that the data shown herein only illustrates possible scenarios, and the committee is not ready to propose business-as-usual (BAU) or Energy Plan (Plan) numbers. In spite of the imprecise nature of these illustrative numbers, they demostrate the major energy flows in the county and what deployments can most affect progress toward the plan's long-range goals. The spreadsheet first calculates the total electricity load in Hood River County (HRC), using HRC population forecasts from Portland State University, HRC vehicle miles traveled (VMT) forecasts from the Oregon Department of Transportation (through the MOVES model), and various other

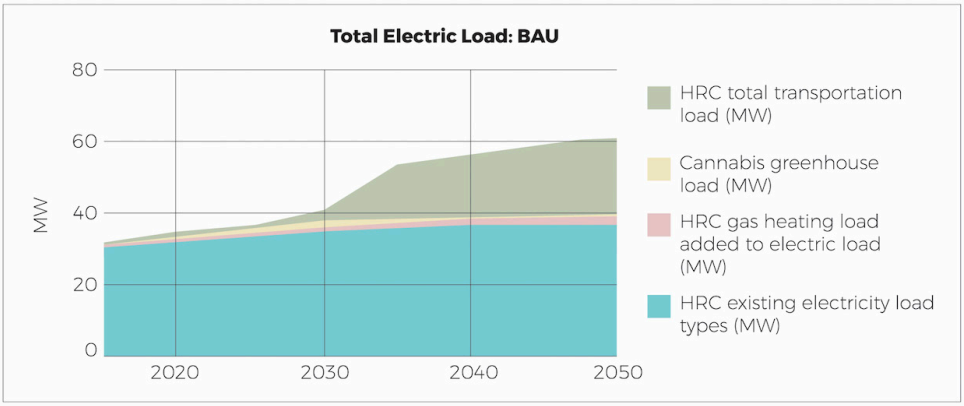

Figure 6a: Total estimated electric loads in HRC, assuming business as usual trends. Data is illustrative only.

information and user inputs. One of the user inputs is the energy efficiency trend expected in future years. In Figure 6a the BAU trend for existing load types (bottom layer) is assumed to be the same per capita energy trend that actually occurred from 2009 to 2016. Note that the projected population increases more than offsets the improved efficiencies, resulting in load growth. In Figure 6b the Plan trend shows the effect of twice the annual rate of efficiency improvements, which overcomes the population increases to decrease this load (bottom layer).

Figure 6a and 6b depict two scenarios for the expected ramp in electric vehicle

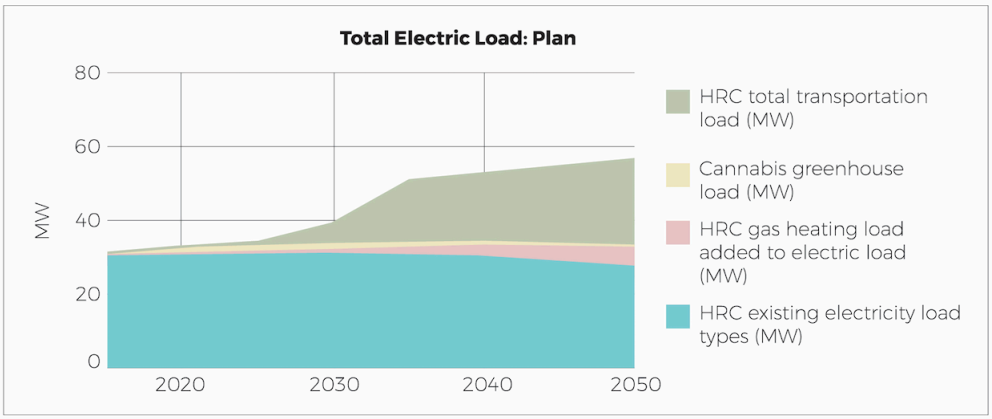

Figure 6b: Total estimated electric loads in HRC, assuming more efficiency improvements and an earlier ramp in electric vehicles.

(EV) charging loads as shown by the top layer in each Figure. The BAU case in Figure 6a assumes a ramp rate from Bloomberg New Energy Finance's (BNEF) 2017 EV forecast (BNEF's forecast is roughly in the center of various widely varying EV forecasts). The Plan case in Figure 6b assumes a slightly faster EV adoption rate. This illustrates that the largest changes in electric loads are from EVs; and the transition to EVs is also the largest impact on total energy use and fossil fuel reductions. In addition, the energy plan baseline committee identified trends suggesting new electric loads will come from gas loads transitioning to heat pumps[4], and, to a lesser degree, from cannabis growing facilities.

Figures 7a and 7b depict the total energy used in these illustrative BAU and Plan scenarios. In these figures, the bottom four layers show fossil fuel power sources, including coal- and gas-fired generation of electricity, gasoline, diesel fuel, and natural gas. The upper four layers show renewable generation from HRC-imported power from renewables and hydro, HRC hydro, additional local renewables, and renewable natural gas.

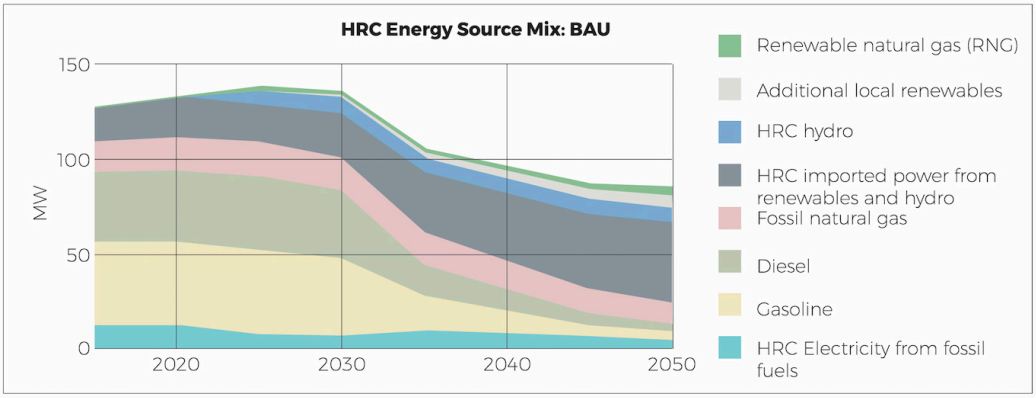

Figure 7a: Estimated total average power used by HRC in the BAU scenario (about 85.6 MW). The equivalent energy of fossil fuels is used to combine the different types of energy. Note that total energy drops dramatically from the electrification of transport even as the electric load increases, because an EV is four to five times as energy efficient as a gas or diesel vehicle.

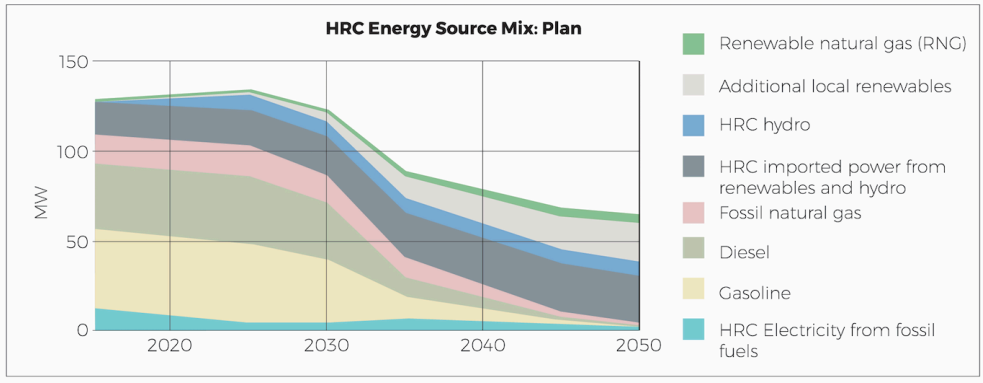

Figure 7b: Estimated total average power used by HRC in the Plan scenario (about 64.4 MW). In this scenario, money used for purchasing fossil fuels is dramatically reduced and about half of the money spent on energy stays within the county.

In addition to the quicker adoption of EVs, this Plan scenario calls for a larger build out of local renewable energy generation resources. This will result in more revenue staying in-county as well as greatly improved energy resilience for emergency situations. Note that in both scenarios, the EV transition dramatically decreases total energy used and shifts fossil fuels from the major energy source to a minor portion. In 2016, HRC spent around $80 million on energy (Figure 4); the shift to EVs and a build out of more local renewables will drastically cut spending on fossil fuels and keep much more of the energy spending in HRC.

While these figures are illustrative and subject to change based on changing energy market conditions and growth, to meet the Hood River County energy plan's 50% renewable energy generation goal, it is estimated that Hood River County would need to generate somewhere around 328,500 MWh in 2050. This number was found by averaging the 2050 estimated power for the Business as Usual scenario (85.6 MW) and the Plan scenario (64.4 MW), i.e. 75 MW multiplied by 0.5 (50%) and 8,760 (hours in a year).

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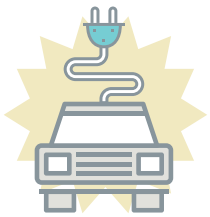
VISION STATEMENT

THE HOOD RIVER ENERGY PLAN IS A BLUEPRINT TO IMPROVE COMMUNITY RESILIENCE, INCREASE ENERGY INDEPENDENCE, AND INCREASE ECONOMIC BENEFITS RELATED TO ENERGY USE IN HOOD RIVER COUNTY WHILE REDUCING EMISSIONS FROM THE BURNING OF FOSSIL FUELS.

GOALS



FOSSIL FUEL REDUCTION

Replace 30%, 50%, and 80% power generated from fossil fuels with clean, renewable energy in buildings, water systems, and transportation by 2030, 2040, and 2050 respectively as compared with 2016 levels.

IMPROVE RESILIENCY AND ENERGY INDEPENDENCE

Generate 50% of the county's energy needs from local, diversified energy sources and storage capacity by 2050. Increase overall capacity, price security, energy generation control and stability, and provide key services in the event of emergency.

LOCAL INVESTMENT

Strategically develop and utilize $25 million in revolving funds by 2025 to enable local projects and create a business environment that supports the Energy Plan goals.

The Hood River Energy Plan addresses the energy generated or used within Hood River County. It includes objectives and strategies that address energy efficiency, energy sources, local energy generation, energy impacts of personal and mass transit, and infrastructure decisions impacting energy use. Specifically, this plan proposes objectives and corresponding execution strategies in four focus areas:

- **The Buildings: Design, Construction, and Occupancy** focus area addresses energy use in new and existing residential, commercial, and industrial buildings.
- **The Transportation and Land Use** focus area addresses the planning decisions and infrastructure that impact how people move from place to place with the goal of reducing the energy used in transportation.
- **The Agriculture and Water** focus area addresses the movement of agricultural water and the energy used or energy produced by that movement.
- **The Community Scale Solutions** focus area looks at how renewable energy generating facilities could be owned and operated in Hood River County.

All objectives and strategies aim to help Hood River County increase investment in energy efficiency and renewable energy projects; achieve energy generation control, stability, and price security; and provide key services in the event of an emergency.

This plan does not address energy used at the county's airport, nor does it look at associated emissions from agriculture, waste, or embodied energy and emissions in products that residents and businesses purchase.

While committees have done substantial research, given the evolving, fast-paced nature of our changing energy landscape, strategies and actions are subject to change as opportunities shift. **This plan is a blueprint to help the county maximize economic benefits and improve community resilience** by reducing emissions from the burning of fossil fuels.

SUMMARY OBJECTIVES FOR 2030*

**All objectives are set for 2030 levels compared to 2016 levels unless otherwise specified.*

A. BUILDINGS: DESIGN, CONSTRUCTION, AND OCCUPANCY

OBJECTIVE 1: INCREASE THE ENERGY EFFICIENCY OF NEW BUILDINGS BY 50%.

OBJECTIVE 2: INCREASE THE ENERGY EFFICIENCY OF EXISTING BUILDINGS BY 40%.

OBJECTIVE 3: ESTABLISH BUILDINGS THAT CAN BE ENERGY INDEPENDENT FOR TWO WEEKS.

B. TRANSPORTATION AND LAND USE

OBJECTIVE 1: INCREASE PLANNING METHODS AND TOOLS THAT ENHANCE TRANSPORTATION AND PEDESTRIAN CONNECTIVITY INTO ALL COMPREHENSIVE PLANS, LAND USE ACTIONS AND TRANSPORTATION DECISIONS.

OBJECTIVE 2: ENSURE HOOD RIVER COUNTY HAS MORE PER CAPITA ZERO AND LOW EMISSION VEHICLES THAN THE STATE AVERAGE.

OBJECTIVE 3: ENSURE SERVICE PROVIDERS MAKE A TIMELY TRANSITION TO ALTERNATIVELY POWERED FLEET AND EMERGENCY RESPONSE VEHICLES.

OBJECTIVE 4: ENSURE TRANSPORTATION SYSTEM IMPROVEMENTS ARE MADE IN THE REGION THAT SIGNIFICANTLY ENHANCE INTERMODAL CONNECTIVITY FOR LOCAL AND VISITOR TRAVEL.

OBJECTIVE 5: ENSURE LOCAL LAND USE ORDINANCES WITHIN THE URBAN GROWTH BOUNDARIES INCREASE TREE STREET-SCAPING REQUIREMENTS.

C. AGRICULTURE AND WATER

OBJECTIVE 1: REDUCE WATER LOSS.

OBJECTIVE 2: REDUCE ENERGY CONSUMPTION.

OBJECTIVE 3: INCREASE ENERGY PRODUCTION.

D. COMMUNITY SCALE SOLUTIONS

OBJECTIVE 1: HOOD RIVER COUNTY DEVELOPS ENERGY GENERATION RESOURCES TO MEET THE ENERGY PLAN'S GOAL TO IMPROVE RESILIENCY AND ENERGY INDPENDENCE BY MEETING 50% OF THE COUNTY'S ENERGY NEEDS FROM LOCAL DIVERSIFIED ENERGY SOURCES AND STORAGE CAPACITY BY 2050.

BUILDINGS

DESIGN, CONSTRUCTION AND OCCUPANCY

Photo by Larvick Media

INTRODUCTION

According to the Hood River County Baseline Inventory, Hood River County residents spend, on average, $1,200 year on energy bills. The average energy savings of buildings built to be 'high performance' is 32%; this means annual savings of almost $400 annually from an average home energy bill. Residential and commercial buildings of all sizes and types and in every U.S. climate zone have met Net Zero Energy outcomes and are clearly feasible in Hood River county. Trends in improved design, construction materials, technologies and operating practices continue to provide opportunities to increase the energy efficiency of the built environment.

Net Zero Energy

A net zero energy ready building integrates energy-efficient design with technologies to produce buildings such that 100% or more of their annual energy needs could be met using onsite renewable energy, whether or not renewable energy technology is currently installed.

What is the Buildings: Design, Construction, and Occupancy Focus Area?

This focus area looks at strategies and associated actions to reduce energy use in new and existing residential, commercial, and industrial buildings. Smart design and retrofits can reduce energy and water use in buildings, drive related increases in indoor environmental quality for occupants, and increase disposable income through reduced energy costs. The recommendations in this focus are are cross-cutting and focus on: codes and policies; incentives for improvement beyond code requirements; technical solutions; community-based programs; and increased communication with and training of building professionals. In most cases the building strategies and actions are able to make use of existing resources and partners to help Hood River County meet our 2050 goals. The Buildings subcommittee believes that Hood River area governments should lead by example in this area, especially since adopting these changes will save the community both money and resources. As a result, public buildings will provide a starting point for energy assessment and improvement.

Strategies for new buildings are introduced first because the opportunity for the greatest improvement happens during design and construction and, if not addressed, become a 'lost opportunity' after occupancy. Strategies to upgrade existing buildings present a much larger energy-savings potential, and a focus on retrofitting older inefficient structures will benefit a large segment of the community.

This plan uses 2030 as the target for all Hood River buildings. However, Oregon Executive Order 17-20, released after public review of this plan, created a more aggressive timeline to achieve Zero Net Energy Ready buildings as a standard practice for buildings across the state. Meeting this plan's goal of a 50% energy efficiency improvement in all Hood River County new construction buildings by 2030 will consider these new State targets during development of specific next steps and activities.

How does the Buildings Focus Area relate to the plan's three goals?

Goal 1: Reduce Greenhouse Gas Emissions

- In Hood River County (HRC), buildings account for 37.7% of the greenhouse gas emissions generated by the four HRC energy providers: Pacific Power, Hood River Electric Co-Op, City of Cascade Locks Electric Department, and NW Natural. Propane and other fuels are minor parts of fuel use.

- Although many in the Pacific Northwest consider our region's energy grid to be dominated by hydro-generated electricity, 41% of HRC's electrical consumption is derived from fossil fuels (Figure 2). This is due, in large part, to the power generated by Pacific Power coal and gas plants.

Goal 2: Improve Resiliency

- Longevity and comfort: Improving the energy efficiency of buildings typically includes such things as improving insulation levels and materials, using daylight instead of electric lighting, and increasing natural ventilation. These improvements also increase the time a building will remain comfortable during brief periods of power outage.

- Service stability: Essential services are more easily maintained in well-designed buildings because solar, with a direct home intertie, can provide energy to key home applications during outages if the system is designed appropriately.

- Grid security: Net zero energy designs can add storage capacity to capture excess renewable energy and utilize it in the event of an outage.

- Disaster preparedness: Community buildings designed to low and net zero energy standards can provide a comfortable refuge for citizens during catastrophic events and power outages, and require significantly less back-up energy than standard buildings. These buildings are more reliable when external resources are compromised and they are less expensive to maintain.

Goal 3: Increase Investment

- Improving the efficiency of buildings via upgrading materials and applying new technologies will bring new business to local contractors.

- Homeowners and businesses can apply their utility savings toward upgrades and keep their money in the community.

- Energy-efficient and solar-powered buildings are shown in national studies to have a greater asset value in financial pro-forma assessments[5].

How to measure progress as it relates to Buildings?

Progress can be measured by:

1. Per capita and per meter reduction of kWh and therms.
2. Per capita and per meter decrease in the cost of heating, cooling, and lighting buildings.

Greenhouse gases cannot be measured directly, but reductions in energy use will be calculated using standardized industry-vetted metrics for the average CO2 released by each fuel. This will require acquiring future energy data from each of the four HRC utilities and comparing it to the baseline established for the Energy Plan.

OBJECTIVE 1

INCREASE THE ENERGY EFFICIENCY OF NEW BUILDINGS BY 50%

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 3

Increase Local Investment

Strategies

1.1. **Adopt the highest-level energy codes.** Support the adoption of the highest level of energy and water codes at the state and national level.

1.2. **Create incentivized paths for going beyond code.** Create incentives to encourage builders/owners/designers to go 'beyond code' toward Zero Net Energy (ZNE) buildings.

1.3. **Identify technical solutions to increase energy & water efficiency.** Identify the most cost-effective and market-attractive building designs and technologies.

1.4. **Establish community-based ZNE programs.** Establish a "Hood River Zero Net Energy Home / Building" program to promote best-practice home and building design and integrate that with onsite generation.

1.5. **Utilize communications/marketing to support goals.** Increase public and practitioner awareness of the benefits of high-performance buildings and create recognition for exemplary homes, buildings, community members, companies and building operators.

Metrics

A. Number of building permit requests to use incentivized pathways.

B. Per capita and per meter reduction in average costs per utility customer.

C. Per capita and per meter reduction in average kWh, therms, and gallons of water.

Potential Actions Aligned with Strategies

1.1. **Adopt the highest-level energy codes.** Support the adoption of the highest level of energy and water codes at the state and national level.

1.1.a. Communicate HRC Energy Plan goals to the Governor's Regional Solutions representatives, and with state and national elected officials.

1.1.b. Advocate for the adoption of best-practice energy efficiency codes at the state level. This will allow Hood River governments to also adopt those codes.

1.1.c. Put Hood River County on the path to ZNE as the future-code goal for all buildings by 2030.

Projected Code Changes Necessary to Achive State of Oregon Climate Goals

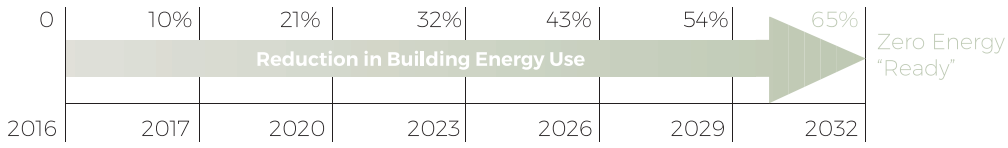


Figure 8 shows a projection of the amount of energy reduction to a building built to Oregon energy code in 2016 necessary to arrive at a ZNE Ready building in 2032 . This plan uses 2030 as the target for all Hood River buildings to be ZNE Ready. Oregon Executive Order 17-20, released after public review of this plan, created a more aggressive timeline to achieve Zero Net Energy Ready buildings as a standard practice for buildings across the state. Meeting this plan's goal of a 50% energy efficiency improvement in all Hood River County new buildings by 2030 will consider these new State targets during development of specific next steps and activities.

1.2. **Create incentivized paths for going beyond code.** Create incentives to encourage builders/owners/designers to go 'beyond code' toward Zero Net Energy (ZNE) buildings

1.2.a. Build new public buildings, particularly schools, to ZNE-ready[6] standards.

1.2.b. Institute a priority-permitting process for buildings participating in beyond-code programs.

1.2.c. Prioritize technical inspections of buildings participating in beyond-code programs.

1.2.d. Reduce system development charges or provide other financial incentives to encourage the construction of new homes built to specified green-rating or other certification systems.

1.3. **Identify technical solutions to increase energy and water efficiency.** Identify the most cost-effective and market-attractive building designs and technologies.

1.3.a. Develop and implement a plan to establish 'best-in-class' and beyond-code energy and water efficiency development with specific activities such as workshops, campaigns, industry alliances etc.

1.3.b. Consult with an energy analysis firm to quantify local options.

1.3.c. Establish an advisory group focused on green-building practices.

1.3.d. Gather list of cost-effective new construction measures from Energy Trust of Oregon (ETO) and other partners.

1.4. **Establish community-based ZNE Program.** Establish a Hood River Zero Net Energy Home/Building Program to increase the use of best practice home and building design. Promote advanced strategies for combining energy efficiency with onsite generation.

1.4.a. Develop a local education and recognition program focused on making 100% of new buildings ZNE by 2030.

1.4.b. Establish Hood River program guidelines focused on: increasing the efficiency of energy and water use, adopting onsite energy generation, and improving indoor air quality in both residential and commercial buildings.

Ex: Passive house program for new residential, Living Buildings and LEED for commercial. Roof slope and orientation, storm water runoff bio swales, electric vehicle charging, use of increased native plants for shading and carbon offset.

1.4.c. Educate designers/builders/owners about: a) green-building techniques, products and designs; and b) good business practices, including providing health benefits, determining the total cost of ownership, watching market trends, avoiding unnecessary risk, and reducing insurance costs.

1.4.d. Investigate opportunities to create an energy enterprise zone to encourage aggregated market opportunities for businesses and reduced costs for consumers.

1.5. **Utilize communications/marketing techniques to promote best practices and those using them.** Increase public and practitioners awareness of the benefits of high performance buildings and create a recognition program to promote those using them.

1.5.a. Create or feature a one-stop-shop website to connect residents and building owners to the benefits of high-performance buildings.

1.5.b. Support the efforts of "navigator(s)" to help community members access loans, rebate incentives, and other financing tools for commercial or industrial projects.

1.5.c. Create recognition opportunities for energy-efficient buildings and builders; local newspapers and events are potential outlets.

1.5.d. Collaborate with educational partners to offer seminars and forums focused on the importance of: energy audits, using good weatherization techniques, and incorporating the best building processes for low carbon residential, commercial, and industrial buildings.

1.5.e. Equip builders and realtors with outreach strategies that effectively detail the long-term cost savings and quality-of-life improvements of high performance buildings.

1.5.f. Collaborate with partners and stakeholders to conduct targeted, sector-specific, outreach campaigns. Topics may include: how to increase energy efficiency in residential buildings or how to conduct high-touch outreach to industrial folks about Strategic Energy Management.

OBJECTIVE 2

INCREASE ENERGY EFFICIENCY OF EXISTING BUILDINGS BY 40%

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 3

Increase Local Investment

Strategies

2.1. **Public facilities lead by example.** Public jurisdictions conduct an inventory of energy use and retrofit opportunities and implement cost effective upgrades.

2.2. **Work with partners** to identify and address high priority opportunities for reduced energy use in energy burdened communities and industries.

2.3. **Leverage existing resources.** Expand use of existing resources including incentive programs for building upgrades and retrofits.

2.4. **Conduct local market and retrofit technology assessments.** Identify and prioritize building types and match them with the most cost-effective, market-attractive, building upgrade and retrofit technologies.

2.5. **Establish community-based direct-install retrofit programs,** whereby local contractors are a one-stop resource for homes or business to evaluate, select, implement, and finance efficiency upgrades.

2.6. **Utilize communications/marketing techniques to promote best practices and those using them.** Increase public and practitioner

awareness of the benefits of high performance buildings and create a recognition program to promote those using them. Implement actions identified in 1.5.a. through 1.5.f.

Metrics:

A. Per capita and per meter reduction in energy costs per utility customer.

B. Increase in local, energy-efficiency related spending.

C. Per capita and per meter reduction in kWh, therms, and gallons of water.

Potential Actions Aligned with Strategies

2.1. **Public facilities lead by example**.

- 2.1.a. Public entities conduct energy audits of each of their buildings and screen for highest priority energy upgrades.
- 2.1.b. Public entities review opportunities and fiscal resources for implementing improvements.
- 2.1.c. Public entities implement improvements.

2.2. **Work with partners to identify and address high priority opportunities for reduced energy use in energy burdened communities and industries.**

2.3. **Leverage existing resources.** Expand use of existing resources including incentive programs for building upgrades and retrofits.

- 2.3.a. Create a county energy website that consolidates and clarifies information on programs and incentives to improve the energy resilience of existing buildings.
- 2.3.b. Publicize these opportunities using local media such as newspapers and local partners.
- 2.3.c. Develop a strategy to distribute energy-saver kits in conjunction with energy education. Focus on going where average people are found, for example at local grocery stores and county fairs.

2.4. **Conduct community market and retrofit technology assessments.**

Identify and prioritize building types and sectors and match them with the most cost-effective, market-attractive, building upgrade and retrofit technologies.

2.4.a. Complete a countywide survey to prioritize building types and sectors.

2.4.b. Determine the top ten buildings per sector (historic, retail, office, etc.) with the greatest opportunity for energy improvement.

2.4.c. Identify the retrofit solution sets for the top ten buildings identified above.

2.4.d. Facilitate energy audits for buildings at time of sale if greater than 10 years since construction.

2.4.e. Partner with Columbia Gorge Community College to produce a workforce-training program to produce energy auditors within the county.

2.5. **Establish community-based direct-install retrofit programs.**

2.5.a. Establish a “Hood River Home/Building Energy Upgrade” program to improve the efficiency of energy and water use in existing buildings and to increase the use of on-site renewable energy.

2.5.b. Identify customers that can be ‘clustered’ to receive proximity discounts for energy installations (neighborhood, upper valley, waterfront, The Heights, etc.)

2.6. **Utilize communications/marketing techniques to promote best practices and those using them.** Increase public and practitioner awareness of the benefits of high performance buildings and create a recognition program to promote those using them.

2.6.a. Create or feature a one-stop-shop website to connect residents and building owners to the benefits of high-performance buildings.

2.6.b. Support the efforts of a “navigator(s)” to help community members access loans, rebate incentives, and other financing tools for commercial or industrial projects.

2.6.c. Create recognition opportunities for energy-efficient buildings and builders; local newspapers and events are potential outlets.

2.6.d. Collaborate with educational partners to offer seminars and forums focused on the importance of energy audits using good weatherization techniques and incorporating the best building processes for low-carbon residential, commercial, and industrial buildings.

2.6.e. Equip builders and realtors with outreach strategies that effectively detail the long term cost savings and quality-of-life improvements of high performance buildings.

2.6.f Collaborate with partners and stakeholders to conduct targeted, sector-specific outreach campaigns. Topics may include: how to increase energy efficiency in residential buildings or how to conduct high-touch outreach to industrial building owners about Strategic Energy Management.

OBJECTIVE 3

ESTABLISH BUILDINGS THAT CAN BE ENERGY INDEPENDENT FOR TWO WEEKS IN A DISASTER SITUATION

ALIGNMENT WITH PLAN GOALS

GOAL 2

Increase Resilience

Strategies

3.1. **Identify communities at greatest risk in the event of a natural disaster.**

3.2. **Work with Hood River County disaster preparedness staff** to identify buildings to be designated for public use in an emergency.

3.3. **Evaluate how to improve** the energy-efficiency and energy-producing infrastructure of these buildings so they remain comfortable during a long-term electrical blackout. Establish HRC community resiliency centers. Make the improvements identified above.

Metrics:

A. Number of buildings and square feet identified.

B. Number of buildings and square feet upgraded.

C. Number of days buildings can remain energy independent.

Potential Actions Aligned with Strategies

3.1. **Identify communities at greatest risk in the event of a natural disaster.**

3.2. **Work with Hood River County disaster preparedness staff** to identify buildings to be designated for public use in an emergency.

- 3.2.a. Determine what qualities are needed for places designated as public shelters, for example: size, room configurations, number of bathrooms, utilities and street access.
- 3.2.b. Identify buildings that meet these criteria.

3.3. **Evaluate how to improve** the energy-efficiency and energy-producing infrastructure of these buildings so they remain comfortable during a long-term electrical blackout.

- 3.3.a. Secure funding for clean-energy back-up systems to power key services in priority buildings.
- 3.3.b. Prioritize seismic upgrades to essential buildings and include upgrade elements such as black-start circuit isolating infrastructure to allow buildings to use local energy.
- 3.3.c. Identify the energy loads necessary to maintain essential services in a disaster.
- 3.3.d. Identify and prioritize upgrades to essential services to extend operational time in an emergency.

3.4. **Establish HRC community resiliency centers.**

- 3.4.a. Identify businesses willing to allow their property to be physically upgraded to become resiliency centers.
- 3.4.b. Develop agreements with these willing building owners to provide services in the event of an emergency. Develop agreements with these willing building owners to provide services in the event of an emergency and create pass through language for optional explanation of the building's role and inclusion at sale of home or facility.
- 3.1.c. Identify best practices to create energy-resilient homes with the option to become energy independent.
- 3.1.d. Identify funding sources to retrofit these structures so they can remain operational in the event of an emergency.

TRANSPORTATION AND LAND USE

INTRODUCTION

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of 19 statewide planning goals that prioritizes managing urban growth, maintaining farm and forest land, and protecting natural resources[6].

This one-of-a-kind planning program prioritizes compact urban development within Urban Growth Boundaries and includes a focus on transportation system planning. In the context of the state's planning program, developing robust walking, bicycling, and public transportation systems has been acknowledged as an important goal within Hood River County to ensure our community offers livability and accessibility to all residents.

The ability, ease, and manner of moving people and things from place to place, has significant energy and health implications. Internal combustion engines, for example, are an inefficient way to power vehicles, and combustion of diesel and gasoline in these cars greatly reduces air quality. Moreover, prices for these fuels are volatile and their importation has public consequences. On the other hand, active transportation, including walking, biking, and public mass transit, provides low-cost and energy efficient alternatives to single-occupancy vehicles.

As in most of the United States, Hood River County residents primarily transport themselves using single-occupancy, internal-combustion-powered vehicles. However, a growing number of studies predict a rapid worldwide transition to a new transportation system utilizing zero-emission electric vehicles; self-driving vehicles; and more reliance on non-motorized transit. This transition, if not properly planned for, could result in major impacts to Hood River County, its residents and visitors.

What is the Transportation and Land Use focus area?

This focus area addresses how good planning and smart infrastructure choices can help people move from place to place more effectively. When we make transportation more efficient, we reduce air pollution, reduce our dependency on external energy sources, and improve the resiliency of our institutions. To optimize transportation system efficiency, the recommendations in this focus area include: changing Hood River County land use planning's orientation to focus on people-friendly, instead of car-friendly neighborhoods; prioritizing connectivity as a basis for land use decisions; making government transportation fleets more energy-efficient; and improving active transportation options, including bike, pedestrian, and public transportation options. This focus area also recommends improving landscaping within Hood River County's urban footprint as strategically-planted trees can make buildings more energy-efficient, reduce storm water management issues, and improve air quality and neighborhood livability.

How does the Transportation and Land Use focus area relate to the plan's three goals?

Goal 1: Reduce Greenhouse Gas Emissions

- While it is a challenge to directly measure the fossil fuel emissions of transportation within the county, the transportation sector is the greatest contributor of greenhouse gases in Oregon[7]. Considering the already high penetration of hydro power in Oregon's electric fuel mix, transitioning to alternatively powered electric vehicles would immediately improve the County's greenhouse gas footprint.

- Livable, compact communities within urban growth boundaries connected by healthy transportation alternatives reduce fossil fuel use and emissions.

- Landscaping buffers and best practices that protect farm (particularly perennial crops such as fruit orchards and vineyards) and forest land create a carbon-capturing capacity that mitigates fossil fuel emissions.

Goal 2: Improve Resiliency

- **Smooth adaption to transforming global transportation models**. A growing number of projections predict a transformation in the transportation industry from single-occupancy, internal-combustion-engine vehicles to electric vehicles (EVs) along with large scale deployment of self-driving vehicles. Such a transition offers many community benefits, but also presents challenges when it comes to infrastructure and policy. Hood River County can make decisions that will guide this process toward a people-friendly

transportation system by focusing on connectivity between transport options.

- **Improve public health.** Developing welcoming and safe streets will encourage more people to walk and bike and will decrease chronic diseases like obesity. Zero-emission vehicles and increased public transit will lower emissions and improve air quality.

- **Improve disaster preparedness and increase grid stability.** Developing welcoming and safe streets will encourage more people to walk and bike and will decrease chronic diseases like obesity. Zero-emission vehicles and increased public transit will lower emissions and improve air quality. Today's electric vehicles already have enough battery power to run an average American home for 24 hours. At the same time, electric vehicles can give grid managers unprecedented ability to make the electricity system more efficient through ancillary services. For example, smoothing our electric demand and adjusting charging levels to maintain voltage and frequency. [8]

- **Improve disaster preparedness.** Communities can minimize disaster-caused disruptions by designing communities in such a way that the majority of daily trips can be made on foot or on bicycle.

Goal 3: Increase Local Investment

- Hood River County residents spend approximately $52 million on diesel and gas each year with over 95% of those dollars leaving the county. Replacing older vehicles with all-electric, or zero-emission vehicles that can use locally generated power, stimulates the local economy.

How to measure progress as it relates to Transportation and Land use

Given the difficulty of tracking transportation trends within Hood River County, progress for this focus area must be measured in alternative ways. Following are some suggestions.

1. Increase in the number of zero and low emission vehicle registrations in the county.
2. Increase in the number of EV charging stations or other zero-emission vehicle infrastructure.
3. The cities and county and track walk and bike scores within urban growth boundaries through surveys and studies.
4. Increase in the number and accessibility of alternative transit systems (ranging from buses to easily accessible bike rentals, etc.)
5. Increase in the number of tourists and residents using alternatively powered transportation to explore Hood River County.

OBJECTIVE 1

INCREASE PLANNING METHODS THAT ENHANCE TRANSPORTATION AND PEDESTRIAN CONNECTIVITY INTO ALL COMPREHENSIVE PLANS, LAND USE ACTIONS AND DECISIONS.

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 2

Increase Resilience

GOAL 3

Increase Local Investment

Strategies

1.1. **Update jurisdictional comprehensive plans** to reflect progressive urban planning techniques within urban growth boundaries.

1.2. **Update development and zoning codes** to to reflect urban planning techniques that address livability and density within urban growth boundaries and make pedestrian connectivity a top priority.

1.3. **Invest in infrastructure that supports this transition.**

Explanation:

Through its statewide planning program, Oregon prioritizes a number of progressive planning techniques. Complete Streets, Blue Zones and 20 Minute Neighborhoods are examples of other planning techniques that Hood River County cities could adopt. These techniques encourage mixed-use development that make walking, bicycling, and public transportation into safe and convenient choices inside urban growth boundaries.

Metrics

A. Number and quality of updates to comprehensive plans.

B. Number of updates to land use and zoning code.

C. Number of updates to design review criteria.

D. Funds in budget to support shift away from single-occupancy vehicle travel.

E. Number of incentives to prioritize urban planning techniques.

F. Decrease in number of car trips for non-work reasons .

G. Miles of bike and pedestrian paths built.

OBJECTIVE 2

ENSURE HOOD RIVER COUNTY HAS MORE PER CAPITA ZERO AND LOW EMISSION VEHICLES THAN THE STATE AVERAGE.

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 2

Increase Resilience

GOAL 3

Increase Local Investment

Explanation:

On October 24, 2013, the Governor of Oregon, in partnership with seven other governors, signed a memorandum of understanding committing to coordinated action to ensure the successful implementation of their state zero-emission vehicle (ZEV) programs. ZEVs include pure-battery-electric vehicles, plug-in hybrid electric vehicles, and hydrogen fuel cell electric vehicles. The Hood River County Energy Plan calls for an increased per-capita ownership of zero- and low-emission vehicles than the state average.

Hood River County recognizes that a growing number of studies predict a rapid worldwide transition to a more energy-efficient, cost-effective transportation system with electric vehicles dominating fleets worldwide. The county also recognizes the unique resiliency benefits of diversifying fleets with zero-emission vehicles. This is why the Hood River County Energy Plan primarily focuses on strategies to increase electric vehicle deployment. However the plan does not favor any specific zero-emission vehicle technology.

Strategies

2.1. **Conduct research.** Pursue best knowledge about the potential impacts of autonomous vehicles, transportation-as-a-service models and ZEVs in Hood River County.

2.2. **Support most beneficial transportation transition scenarios.** Identify and pursue opportunities to facilitate a smooth transition to ZEV transportation models.

2.3. **Jurisdictions lead by example**. Jurisdictions serve as examples by transitioning fleets to ZEVs.

2.4. **Invest in transition infrastructure.** Invest in infrastructure that supports this transition.

2.5. **Conduct targeted outreach campaigns.** Support programs that encourage the use of ZEVs, and prioritize opportunities that expand transportation access.

Metrics

A. Number of ZEVs registered in Hood River County.

B. Number of policies in place to support ZEV and low-emission car ownership.

Potential Actions Aligned with Strategies

2.1. **Conduct research.** Pursue best knowledge about the potential impacts of autonomous vehicles, transportation as a service models, and ZEVs in Hood River County.

- 2.1.a. Conduct and review research to determine residents' transportation needs, behaviors, and requirements, and determine barriers to alternative transportation modes.
- 2.1.b. Develop an advisory committee that tracks trends in the transition to alternatively-powered vehicles and recommends best practices to support local transition.
- 2.1.c. Encourage zero-emission transportation alternatives.

2.2. **Support most beneficial transportation transition scenarios**. Identify and pursue opportunities to facilitate a smooth transition to zero- and low-emission-vehicle transportation models.

2.2.a. Identify and pursue opportunities to facilitate a smooth transition to zero-emission transportation models.

2.2.b. Advocate for transportation policies at the state and national levels that support Hood River County needs and encourage a just and speedy transition to low-carbon, cost-effective transportation alternatives.

2.3. **Jurisdictions lead by example.** Jurisdictions transition their transportation fleets to zero- and low-emissions vehicles.

2.3.a. Compare zero-emission vehicle prices and values when considering new fleet purchases

2.4. **Invest in transition infrastructure.** Invest in infrastructure that supports transition.

2.4.a. Identify and pursue infrastructure supporting alternative use vehicles, including but not limited to, electric-vehicle charging stations.

2.5. **Conduct targeted outreach campaigns.** Support programs that encourage the use of alternatively-powered vehicles; prioritize opportunities that expand transportation access.

2.5.a. Create an outreach campaign to promote the benefits of zero- and low-emission vehicles.

2.5.b. Support alternative purchasing campaigns to fund individual zero- and low-emission vehicles or jointly held lease programs.

OBJECTIVE 3

ENSURE THAT HOOD RIVER COUNTY MAKES A TIMELY TRANSITION TO ALTERNATIVE-POWERED EMERGENCY RESPONSE VEHICLES.

ALIGNMENT WITH PLAN GOALS

GOAL 2

Increase Resilience

Strategies

3.1. **Evaluate existing HRC transportation fleet resources.**

3.2. **Transition priority vehicles to alternative-powered vehicles.**

Potential Actions Aligned with Strategies

3.1. **Evaluate existing HRC transportation fleet resources.**

- 3.1.a. Conduct county inventory including vehicle data, fuel reserve levels, and related infrastructure (fueling spots, storage facilities, etc.).
- 3.1.b. Investigate alternative-fuel vehicle options, evaluating value in disaster situations, risk profiles, cost impacts, and implications of proposed alternatives.
- 3.1.c. Identify fleets within the county where alternatively powered vehicles are cost effective and encourage their adoption (irrigation districts, etc.).

3.2. **Transition priority vehicles to alternatively powered vehicles.**

3.2.a. Coordinate with local jurisdictions to ensure that, in an emergency, there is adequate infrastructure for priority vehicles to operate for at least two weeks without external re-supply.

3.2.b. Partner with allies to update disaster response plans to include the necessary capital and operational plans to incorporate alternative fuel fleets or partnerships.

OBJECTIVE 4

ENSURE HOOD RIVER COUNTY MAKES TRANSPORTATION SYSTEM IMPROVEMENTS THAT ENHANCE CONNECTIVITY FOR LOCAL & VISITOR TRAVEL.

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 3

Increase Local Investment

Strategies

4.1. **Connect communities.** Support efforts to provide accessible alternate transportation options to different communities within the county.

4.2. **Utilize communications/marketing to support goals**: Coordinate with state and local stakeholders to ensure alternative transportation options, such as bike trails, mass transit, and electric vehicle charging stations, are well known.

Metrics

A. Connectivity of bike lanes, electric vehicle infrastructure, etc.

B. Miles of pedestrian and bike paths in Hood River County.

C. Number of trips taken per year by mass transit in Hood River County.

Potential Actions Aligned with Strategies

4.1. Connect communities. Support efforts to provide accessible alternate transportation options to different communities within the county.

- 4.1.a. Coordinate with transit partners to ensure mass transit opportunities are funded to effectively serve and connect Hood River County communities.
- 4.1.b. Support efforts to extend service of Columbia Gorge Express and Columbia Area Transit, especially encouraging stops in Cascade Locks.
- 4.1.c. Pursue alternative transportation and tourism partnerships.

4.2. Utilize communications/marketing to support goals. Coordinate with state and local stakeholders to ensure alternative transportation options such as bike trails, transit, and electric vehicle charging stations, are well known.

- 4.2.a. Create or feature a one-stop-shop website to connect visitors and residents to car-free Hood River County resources.
- 4.2.c. Support partner campaigns to encourage car-free visitor travel throughout the Columbia River Gorge National Scenic Area.
- 4.2.d. Investigate the feasibility of supporting infrastructure geared toward low- or zero-emission visitor travel.

OBJECTIVE 5

ENSURE HOOD RIVER HAS THE HIGHEST CALIBER STREET TREE-SCAPING POLICIES WITHIN URBAN GROWTH BOUNDARIES.

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 2

Increase Resilience

GOAL 3

Increase Local Investment

Strategies

5.1. **Retain and plant good-caliber trees and pursue de-paving efforts.**

5.2. **Plan parks to coincide with new and revitalized neighborhoods and commercial nodes.**

5.3. **Incorporate tree canopy initiative changes** into land use design criteria, comprehensive plan updates, code updates and land use review criteria.

Explanation:

Trees can lower urban air temperature and, when planted strategically, help shade buildings and reduce the energy needed to cool buildings by up to 30%. Strategic tree placement in urban areas encourages alternative modes of transportation, like walking and biking, by making commuting in these ways a more desirable option. In addition to energy use, bioswales and tree roots soak up excess water, reducing energy demands on stormwater management systems[9]. In addition, asphalt that is shaded by trees doesn't experience the dramatic heat of summer, prolonging asphalt life.

Metrics

A. Number of comprehensive plans updated.
B. Number of land use and zoning codes updated.
C. Number of design review criteria codes updated.

AGRICULTURAL WATER USE

DESIGN, CONSTRUCTION AND OCCUPANCY

Photo by Sean Estergaard

INTRODUCTION

The Hood River County Water Planning Group was formed in 2008 with a mission to assess future water needs for threatened and endangered aquatic species, irrigated agriculture, and recreation in the Hood River Basin. The Group includes the County, the Hood River Watershed Group, major irrigation and water districts, the Hood River Soil and Water Conservation District, environmental groups, the Confederated Tribes of the Warm Springs, state and federal resources agencies, and local resource specialists.

In 2013, the Group secured over $500,000 in grants to undertake a Basin Study for Hood River County. The comprehensive study covered water demands in the Basin, the potential effects from climate change on water supply, and the potential of water conservation, groundwater use, or additional surface water storage to mitigate for any negative impacts from supply or demand changes in the future. The report also documented major water rights and water use in the Basin. In conjunction with the Basin Study, the Hood River Basin Water Conservation Assessment was created to inform a comprehensive basin-wide water conservation strategy[10]. Since 2013, efforts have been made to undertake recommended water conservation, energy production, and energy conservation measures throughout Hood River County.

What is the Agriculture and Water Focus Area?

This focus area addresses the movement of agricultural water and the energy used or energy produced by that movement. This includes a look at the efficiency of on-farm water use and the secondary benefit of using fewer fertilizers, herbicides, and insecticides when water use is reduced to just what the crop needs. This focus area will not analyze the energy used to transport agricultural products as that is captured in the transportation section. The majority of the Agriculture and Water focus area recommendations have already been identified through previous work by the Hood River Water Planning Group and its members. Because a significant amount of energy is used to transport water for irrigation, this focus area follows the Hood River Water Conservation Assessment recommendations and primarily addresses water use in Hood River County irrigation systems. The domestic and industrial water systems within Hood River County are almost entirely pressurized through gravity and thus present very little opportunity for energy conservation.

These recommendations focus on water system improvements that will minimize the amount of water pumped or delivered to farms (and therefore the amount of energy used) while maximizing the harvesting of energy available within the pressurized water systems. Moving water can either be energy producing or energy consuming; the goal is to produce as much energy as possible while consuming as little as possible.

How does the Agriculture and Water Use Focus Area relate to the plan's three goals?

Goal 1: Reduce Greenhouse Gas Emissions

- **Reducing the amount of energy required** to move water reduces the greenhouse gas emissions required to create that energy. Generating electrical energy by using the power of water in motion further offsets those emissions.

Goal 2: Improve Resiliency

- **Grid stability**. Minimizing energy use while maximizing energy production reduces the burden on the rest of the electrical grid and improves community resiliency. As irrigation systems become more efficient and less dependent on outside energy sources (through minimizing power use and maximizing production) the system becomes less reliant on outside energy sources and more self-sufficient. More efficient water delivery systems are also less likely to be damaged in the event of a natural disaster and are less vulnerable to drought (pipes in the ground are far less likely to be damaged in natural disasters than open canals), making both the food production and energy production systems more resilient. Finally, if the local grid were configured properly, the energy produced within the water system could be used as an islanded power source during a major natural disaster.

- **Reduced need for chemical use.** Reducing the amount of fertilizers, herbicides, and insecticides used to produce our food improves water quality and reduces potential harm to wildlife and agricultural workers.

Goal 3: Increase Local investment

- Water system improvement projects create both valuable permanent infrastructure improvements and temporary construction jobs. Investing in infrastructure that produces energy within water systems provides consistent revenue that stays in the local economy. Operating and maintaining these systems creates family-wage jobs for skilled employees.

How to measure progress as it relates to AGRICULTURE AND Water Use?

Progress can be measured by:

1. Total annual kWh used to move water.
2. Total annual kWh produced within water systems.
3. Gallons of water conserved through on-farm and conveyance efficiency.
4. Miles of pipe installed. Miles of open canal converted to pipe.
5. Dollars spent on infrastructure improvements.
6. Dollars returned to the community from sales of power (Irrigation District Revenue) and invested in local infrastructure.
7. Dollars saved through energy conservation due to pressurized systems or centralized pumping.

OBJECTIVE 1

REDUCE WATER LOSS

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 2

Increase Resilience

GOAL 3

Increase Local Investment

Strategies

1.1. **Pipe open ditches.** Continue to pipe open conveyance and distribution systems.

1.2. **Convert on-farm systems.** Continue to convert on-farm irrigation systems to the most efficient technologies available.

1.3. **Identify technical solutions for water efficiency.** Identify the most cost-effective and market-attractive technologies for “best-in-class” water savings and water efficiency.

1.4. **Utilize communications/marketing to support goals.** Increase public awareness of the benefits of water conservation through piping of ditches and on-farm application improvements.

Metrics

A. Number of gallons conserved.

B. Number of miles of open conveyance and distribution systems piped.

C. Amount of kWh of energy conserved.

Potential Actions Aligned with Strategies

1.1. **Pipe open ditches.** Continue to pipe open conveyance and distribution systems.

- 1.1.a. Complete engineering plan to completely pipe and pressurize systems.
- 1.1.b. Secure funding for highest priority sites.
- 1.1.c. Implement piping projects.
- 1.1.d. Monitor water savings.

1.2. **Convert on-farm systems**. Continue efforts to convert on-farm irrigation systems to the most efficient technologies available.

- 1.2.a. Support on-going efforts to secure funding for landowner assistance.
- 1.2.b. Continue to research and identify the latest available technology.
- 1.2.c. Monitor water and energy savings.

1.3. **Establish technical solutions for water efficiency.** Identify the most cost-effective and market attractive technologies for 'best-in-class' water savings and water efficiency.

- 1.3.a. Support the Water Planning Group and Hood River Watershed Group in continuing their work to identify most appropriate solutions and technologies.
- 1.3.b. Look for local opportunities to refine or adapt existing technologies, or develop new ones, and create jobs or businesses around those technologies.

1.4. **Utilize communications/marketing to support goals.** Increase public awareness of the benefits of water conservation through piping of ditches and on-farm application improvements.

- 1.4.a. Support and collaborate with local non-profits, special districts, and government entities to promote benefits and share success stories.

OBJECTIVE 2

REDUCE ENERGY CONSUMPTION

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 2

Increase Resilience

GOAL 3

Increase Local Investment

Strategies

2.1. **Pipe open ditches**. Continue to pipe open conveyance and distribution systems to capture the head potential and pressurize through gravity.

2.2. **Pressurize distribution system.** Pressurize distribution system using gravity or centralized pumping facilities.

2.3. **Identify technical solutions for energy efficiency.** Identify the most cost-effective and market attractive technologies for energy efficient pumping.

2.4. **Utilize communications/marketing to support goals.** Increase public awareness of the benefits of energy conservation through pressurization and centralized pumping

Metrics

A. Number of pumps eliminated.

B. Amount of kWh of energy conserved.

Potential Actions Aligned with Strategies

2.1. **Pipe open ditches.** Continue to pipe open conveyance and distribution systems to capture the head potential and pressurize through gravity.

- 2.1.a. Complete engineering plan to completely pipe and pressurize systems with an eye to the potential to eliminate pumps.
- 2.1.b. Secure funding for highest priority sites.
- 2.1.c. Implement piping projects.
- 2.1.d. Monitor energy savings.

2.2. **Pressurize distribution system.** Pressurize distribution systems using gravity or centralized pumping facilities.

- 2.2.a. Complete engineering plan to pressurize distribution systems for East Fork Irrigation District, Dee Irrigation District, and Mount Hood Irrigation District.
- 2.2.b. Collect data to determine current energy used for pumping (mostly completed).
- 2.2.c. Calculate energy savings through gravity pressurization and centralized pumping facilities.
- 2.2.d. Secure funding.
- 2.2.e. Implement pressurization projects.
- 2.2.f. Monitor energy savings.

2.3. **Establish technical solutions for energy efficiency.** Identify the most cost-effective and market attractive technologies for energy-efficient pumping.

- 2.3.a. Help the Water Planning Group and Hood River Watershed Group identify the most appropriate solutions and technologies.
- 2.3.b. Look for local opportunities to refine or adapt existing technologies or develop new ones and create jobs or businesses around those technologies.

2.4. **Utilize communications/marketing to support goals.** Increase public awareness of the benefits of energy conservation through pressurization and centralized pumping.

2.4.a. Support and collaborate with local non-profits, special districts, and government entities to promote benefits and success stories.

OBJECTIVE 3

INCREASE ENERGY PRODUCTION

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 2

Increase Resilience

GOAL 3

Increase Local Investment

Strategies

3.1. **Install in-conduit hydropower production facilities.** Continue to capture the energy produced by water moving through water infrastructure.

3.2. **Produce power at pressure reducing valves.** Replace pressure reducing valves with turbines.

3.3. **Establish technical solutions for energy efficiency.** Identify the most cost-effective and market attractive technologies for small-scale generation.

3.4. **Utilize communications/marketing to support goals.** Increase public awareness of the benefits of energy conservation through pressurization and centralized pumping.

Metrics

A. Amount of kWh produced.

B. Amount of revenue realized.

Potential Actions Aligned with Strategies

3.1. **Install in-conduit hydropower production facilities.** Continue to capture the energy produced by water moving through water infrastructure.

- 3.1.a. Complete engineering analysis of potential hydropower sites.
- 3.1.b. Secure funding for highest priority sites.
- 3.1.c. Implement hydropower projects.
- 3.1.d. Monitor energy production.

3.2. **Produce power at pressure reducing valves.** Replace pressure reducing valves with turbines.

- 3.2.a. Collect location, flow, pressure, proximity to transmission, or power appetite analysis for all irrigation and domestic water systems.
- 3.2.b. Identify sites that are suitable for existing technologies.
- 3.2.c. Identify power sales or net-metering options.
- 3.2.d. Secure funding.
- 3.2.e. Implement projects.
- 3.2.f. Monitor energy production.

3.3. **Identify technical solutions for energy efficiency.** Identify cost-effective and market-attractive technologies for small-scale generation.

- 3.3.a. Look for local opportunities to refine or adapt existing technologies or develop new ones and create jobs or businesses around those technologies.

3.4. **Utilize communications/marketing to support goals.** Increase public awareness of the benefits of energy conservation through pressurization and centralized pumping.

- 3.4.a. Collaborate with local non-profits, special districts, and government entities to promote benefits and success stories.

COMMUNITY SCALE SOLUTIONS

Photo by Common Energy

INTRODUCTION

Purchasing electricity to run buildings, irrigation pumps, industrial plants and other facilities is a known cost for municipalities, residents and businesses in Hood River County. Depending on where they live, county residents purchase electricity from a variety of sources including Pacific Power (Hood River), Hood River Electric Co-Op (Odell/Parkdale) and the City of Cascade Locks Electric Department. In 2016, Hood River County Residents spent $23,333,909 on electricity to run their homes and facilities (Figure 4). Oregon has rules governing how electricity is generated and delivered within the state. For example, Oregon's Renewable Portfolio Standard (RPS) requires that 50 percent of the electricity Oregonians use come from certified renewable sources by 2040. The original RPS was adopted in 2007, when just 2 percent of Oregon's electricity needs were met with renewables. In March 2016, the passage of Oregon Senate Bill 1547 increased Oregon's Renewable Portfolio Standard requirement to 50 percent renewables by 2040[11]. In Hood River County our renewable options include solar, micro-hydro, geothermal, woody biomass, methane recovery, and wind.

What is the Community Scale Solutions focus area?

This focus area looks at how renewable energy-generating facilities could be owned and operated in Hood River County. While public utilities are working to meet the state's 50 percent certified renewable by 2040 goal, the Hood River County Energy Plan Steering Committee is exploring options to help Hood River County meet that goal sooner using locally produced renewable energy. To do this, the Community Scale Solutions subcommittee investigated solutions that currently exist such as partnering with renewable energy cooperatives to install renewable energy projects on publicly owned buildings (i.e. community owned solar systems on publicly owned buildings). They also investigated opportunities, such as Community Choice Aggregation (CCA). The recommendations in this focus area propose further investigating all financing options and pursuing models that best serve Hood River County, especially those that spread benefits equitably throughout the community.

EXAMPLE Financing Methods FOR LOCALLY OWNED ENERGY PROJECTS

Community financed solar is a solar power installation that accepts capital from individual investors and provides them with a return on their investment as well as tax benefits. This allows more people to access the financial benefits of renewable energy generation.

On-bill crediting (recently introduced in Oregon public utility territories), allows investors to purchase a portion of a shared renewable energy project and receive a credit on their utility bill for the value of the kWh generated.

Clean energy revolving funds are pools of capital from which loans can be made for clean energy projects—as loans are repaid, the capital is then reloaned for another project.

Bulk solar purchasing programs (also known as 'solarize') such as the GO! Solar initiative (2015-2017) boost the number of locally, independently-owned solar systems by reducing the financial and logistical barriers that homeowners may experience when considering investing in rooftop solar.

Community Choice Aggregation (CCA) is a system that allows cities and counties to aggregate the buying power of individual customers within a defined jurisdiction in order to secure renewable energy supply contracts. CCAs are public, not-for-profit entities that enable city and county governments to pool (or aggregate) the electricity demand of their communities for the purpose of supplying electricity. A CCA buys and/or develops power on behalf of the residents, business, and government electricity users in its jurisdiction. One barrier is that CCAs are currently not legal in the state of Oregon.

How does the Community Scale Solutions focus area relate to the plan's three goals?

Decrease Greenhouse Gas Emissions

- The largest source of greenhouse gas emissions from human activities in the United States is from burning fossil fuels for electricity, heat, and transportation, according to the U.S. Environmental Protection Agency (EPA). How energy is produced directly affects greenhouse gas emissions. According to data aggregated by the International Panel on Climate Change, life-cycle global warming emissions associated with renewable energy—including manufacturing, installation, operation, and maintenance, as well as dismantling and decommissioning—are minimal.

Improve Resiliency

- **Grid Stability.** The price of solar and other renewable energy costs are dropping substantially, resulting in rapid expansion of renewable energy. Expansion of distributed energy through renewables strengthens the electric grid's stability.

- **Economic Development.** Community choice aggregation (CCA) provides communities with local control over their energy supply, allowing them to increase the amount of electricity procured from renewable sources. As more and more companies set their own renewable energy goals, they will be looking for the cheapest and most efficient ways to procure renewable power. CCAs provide consumer choice where none currently exist and have also resulted in competitive (lower) electrical rates.

- **Job Creation.** When renewable energy projects are built locally and owned by a CCA, they provide local jobs and economic returns to local businesses/developers.

Increase Local Investment

- Models such as CCA and community-owned solar introduce competition into the energy market, which helps drive down costs, stimulate new energy investments, and diversify power choices.

How to measure progress as it relates to Community Scale Solutions?

In 2016, Hood River County generated 17.8% of its annual 270,970,362 kWh of power locally (Figure 3).

Progress can be measured by:

1. Percent increase of locally-produced and locally-owned renewable energy, measured in annual kWh output.

2. Amount of increased money that stays in Hood River County as a result of locally owned energy production.

OBJECTIVE 1

HOOD RIVER COUNTY DEVELOPS ENERGY GENERATION RESOURCES TO MEET THE ENERGY PLAN'S GOAL TO IMPROVE RESILIENCY AND ENERGY INDEPENDENCE BY MEETING 50% OF THE COUNTY'S ENERGY NEEDS FROM LOCAL DIVERSIFIED ENERGY SOURCES AND STORAGE CAPACITY BY 2050.

ALIGNMENT WITH PLAN GOALS

GOAL 1

Decrease Greenhouse Gas Emissions

GOAL 2

Increase Resilience

GOAL 3

Increase Local Investment

Strategies

1.1. **Complete a feasibility analysis to understand the potential effects of community choice aggregation in Hood River County.**

1.2. **Identify and begin developing X gigawatt hours of renewable energy projects in Hood River County.**

1.3 **Increase funding opportunities for public and privately owned renewable energy projects.**

Potential Actions Aligned with Strategies

1.1. **Complete a feasibility analysis to understand the potential effects of community choice aggregation in Hood River County.**

1.1.a. Evaluate public resources. Identify publicly and privately owned facilities, including land, suitable for renewable energy generation.

1.1.b. Complete and review economic and production assessments for properties.

1.1.c. Identify partnerships and funding opportunities.

1.2. **Identify and begin developing 328,500 megawatt hours of renewable energy projects in Hood River County.**

1.2.a. Evaluate resources suitable for renewable energy generation. Identify suitable publicly and privately owned facilities, including land.

1.2.b. Complete economic and production assessments for potential energy sources (wind, solar, hydro) for properties.

1.2.c. Identify partnerships and funding opportunities that expand access to renewable energy for all citizens.

1.2.d. Utilize communications/marketing efforts to meet goals.

1.3 **Increase funding opportunities for public and privately owned renewable energy projects.**

1.3.a. Research cost-effective financing and ownership models.

1.3.b. Prioritize development opportunities that expand access of renewable energy ownership, including shared renewable energy projects.

1.3.c. Work with partners to develop a clean-energy financing strategy. Strategy will identify and prioritize financing opportunities supported by both the government and the private sector.

1.3.d. Utilize communications/marketing efforts to meet goals.

Metrics

A. Per capita reduction in money spent on energy per utility meter.

B. Reduced cost to supply municipal energy (city-, county-, and port-owned buildings).

C. Per capita increase in kWh and therms generated by renewable energy sources.

D. Reduction in kWh rate to the public and private consumers.

E. Number of new jobs created in Hood River County related to clean energy production.

F. Number of public-private partners working together toward meeting clean energy goals.

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NEXT STEPS

The Hood River Energy Plan Steering Committee will present this plan to all local government agencies and special districts, and invite each of them to adopt the plan's goals and vision. That's the first step, usually done by resolution, in a process that continues to rely on public involvement, subject matter experts, and public and private sector leadership.

This document does not provide a specific pathway for achieving the plan's goals. The strategies and actions that are pursued will vary by government agency and special district. However, the Hood River Energy Plan Steering Committee looks forward to working with the county, cities, ports, and other local partners to create the Implementation Plan, a process by which priority projects will emerge, along with specific plans of action, and a list of resource needs.

It's recommended that the county and other agencies use the Energy Plan as a guiding document and incorporate the Energy Plan's goals, strategies and actions into the following types of plans: comprehensive plans, master plans (parks, buildings, stormwater, water, etc.), regional transportation plans, land use code, county building department permitting and SDC fee structure and utility plans.

The creation of the Hood River County Energy Plan has already demonstrated that only by working together can we succeed.

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GLOSSARY

20-minute neighborhoods Places where residents have easy, convenient access to many of the places and services they use daily including grocery stores, restaurants, schools, and parks, without relying heavily on a car. They are characterized by a vibrant mix of commercial and residential uses all within an easy walk. They have higher concentrations of people and are complete with the sidewalks, bike lanes, and bus routes that support a variety of transportation options.

Autonomous vehicles (AVs) *Vehicle automation refers to the ability of a vehicle to operate with reduced or without direct human operation. Autonomous vehicles are the subset of automated vehicles where self-driving operation is possible, often intended to mean with limited or no connection to nearby vehicles or infrastructure.*

Biomass: *When referring to fuel, biomass is a plant-derived fuel from clean and untreated wood such as brush, stumps, lumber ends and trimmings, wood pallets, bark, wood chips or pellets, shavings, sawdust and slash, agricultural crops, biogas, or liquid biofuels, but excludes materials derived in whole or part from construction and demolition debris.*

Bioswale: *A vegetated depression that can temporarily store storm water, reduce flooding, clean water, and encourage infiltration.*

Carbon dioxide (CO2): *The major heat trapping gas whose atmospheric concentration is being increased by human activities. It also serves as the yardstick for all other greenhouse gases. The major source of CO2 emissions is fuel combustion, but they also result from clearing forests and burning biomass. Atmospheric concentrations of CO2 have been increasing at a rate of about 0.5 percent a year, and are now more than 30 percent above pre industrial levels.*

Carbon sink: *A natural or artificial reservoir like soil, a forest, a landfill, a wood structure or other biomass related product that stores carbon from the atmosphere.*

Cascadia Subduction Zone earthquake: *The world's largest faults are associated with subduction zones and have produced earthquakes in the M 9+ range. The last great earthquake on the Cascadia Subduction Zone occurred in 1700, just over 300 years ago. Geologists have found evidence for at least 40 great Cascadia earthquakes during the past 10,000 years—and estimate they occur irregularly at intervals anywhere between 200 and 800 years. The next Cascadia earthquake may be similar to the earthquake that set off the 2004 Indian Ocean tsunami. It could cause strong ground shaking from northern California to southern Canada lasting for up to five minutes. It will also produce a tsunami that could affect not only our coast, but other countries throughout the Pacific Basin.*

Climate: *The average state of the atmosphere including typical weather patterns for a particular region and time period (usually 30 years). Climate is the average, long term weather*

Climate change: *A significant change from one climatic condition to another, often used in reference to climate changes caused by the increase in heat trapping gases since the end of the 19th century.*

Cost effective*: A criterion that specifies that a technology or measure delivers a good or service at equal or lower cost than current practice, or the least cost alternative for reaching a given target.*

Complete Streets: *Streets designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities. There is no singular design prescription for Complete Streets but they may include sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, roundabouts, and more.*

Electric vehicles (EVs): *are vehicles which use one or more electric motors for propulsion. They range in size and use from bicycles with electric assist, to motorcycles, to cars and trucks.*

Embodied energy: *The total expenditure of energy involved in the creation of a product. This includes the energy to extract raw materials (lumber, iron, etc.), process, package, transport, install, and recycle or dispose of products.*

Emissions: *The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.*

Energy efficiency: *Often described as the least cost energy resource, energy efficiency measures like insulating a home or installing LED light bulbs, allow systems to complete a task, like heating or cooling, with less energy.*

Energy Trust of Oregon (ETO): *A nonprofit organization that helps certain utility customers in the Pacific Northwest improve their energy efficiency and tap renewable sources. ETO was set up to administer public purpose funds that are collected from customers for new cost -effective conservation, new market transformation, and the above market costs of new renewable energy resources. In Hood River County, ETO works to help the customers of Pacific Power and NW Natural, save and generate clean energy and connect those utility customers to Energy Trust programs and services. For more information: http://energytrust.org.*

Enterprise Zones: *These zones exempt businesses from local property taxes on new investments for a specified amount of time, which varies among the different zone programs. Sponsored by city, port, county, or tribal governments, an enterprise zone typically serves as a focal point for local development efforts.**EPA:*** *The United States Environmental Protection Agency.*

Fossil fuel: *Fossil fuel is a general term for buried combustible geologic deposits of organic*

materials, formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years. A major concern is that they emit CO2 when burned, significantly enhancing the greenhouse effect.

Generation: *The process of making electricity. The term may also refer to energy supply.*

Greenhouse gas (GHG): *Commonly abbreviated GHG, a term used for gases that trap heat in the atmosphere. The principal greenhouse gases that enter the atmosphere as a result of human activity are carbon dioxide, methane, and nitrous oxide. Others include, but are not limited to, water vapor, chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), ozone (O3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6).*

Hydrogen fuel cell vehicle (FCEVs): *Fuel cell vehicles use hydrogen gas to power an electric motor. Unlike conventional vehicles, which run on gasoline or diesel, fuel cell cars and trucks combine hydrogen and oxygen to produce electricity, which runs a motor. The exhaust of a hydrogen fuel cell is water or water vapor.*

In-conduit hydropower: *Existing tunnels, canals, pipelines, aqueducts, and other manmade structures that carry water and are fitted with electric generating equipment. Conduit projects often qualify as small hydro, and are able to extract power from water without the need for a large dam or reservoir. Conduit projects are efficient, cost-effective, and environmentally friendly, as they are able to generate electricity from existing water flows, exploit synergies with infrastructure already in place and often requiring less of a capital investment.*

Kilowatt-hour (kWh): *A unit of energy equivalent to one kilowatt (kW) of power expended for one hour.*

Land use: *Human determined arrangements, activities, and inputs undertaken in a certain land type, the social and economic purposes for which land is managed (e.g., grazing, timber extraction, recreation, and conservation).*

LEED: *Leadership in Energy and Environmental Design, a program of the United States Green Building Council and a commonly used green building standard.*

Megawatt hour (MWh): *A unit of energy equal to 1,000 Kilowatt hours (kWh). It is equal to 1,000 kilowatts of electricity used continuously for one hour. It is approximately equivalent to the amount of electricity used by about 330 homes during one hour.*
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Metric-tons of CO2 (MTCO2e): *A measure used to compare the emissions from various greenhouse gases based upon their global warming potential.*

Methane (CH4): *A hydrocarbon that is a heat trapping gas carrying a global warming potential recently estimated at 24.5. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and oil, coal production and incomplete combustion of fossil fuels.*

Motor Vehicle Emission Simulator (MOVES): *An emissions modeling system that estimates emissions vehicle miles traveled for mobile sources at the national, state, and county level.*

Natural gas: *A fossil fuel that occurs as underground deposits of gases consisting of 50 to 90 percent methane (CH4) and small amounts of heavier gaseous hydrocarbon compounds like propane (C3H8) and butane (C4H10).*

ODOT: *Oregon Department of Transportation.*

Photovoltaic (PV): *A solar power technology that converts sunlight into electricity.*

Plug-in electric vehicle (PEVS): *Any motor vehicle with rechargeable battery packs that can be charged from the electric grid and the electricity stored on board drives or contributes to drive the wheels for propulsion.*

PM2.5 (particle pollution): *Refers to atmospheric particulate matter (PM) that have a diameter of less than 2.5 micrometers, which is about 3% the diameter of a human hair. Owing to their minute size, particles smaller than 2.5 micrometers are able to bypass the nose and throat and penetrate deep into the lungs and some may even enter the circulatory system. Studies have found a close link between exposure to fine particles and premature death from heart and lung disease.*

Power: *Energy amount per time (usually hours) that is available for doing work; the time rate at which rate is performed. It is measured in horsepower, watt, or BTU per hour. Electric power is the product of the electric current and volts.*

Power Purchase Agreements: *A contract between two parties, one which generates electricity (the seller) and one which is looking to purchase electricity (the buyer).*

Pressure reducing valves: *High water pressure can rupture pipes, damage fixtures, injure people, and waste water and energy. Pressure reducing valves are used in pipes to lower pressure and reduce these concerns.*

Stakeholder: *A person or entity that would be affected by a particular action or policy.*

Therms: *A unit of energy containing 100,000 British thermal units (BTU). 1 therm equals 29.3 kWh.*

Transportation as a Service: *Also known as Mobility-as-a-Service (MaaS), describes a shift away from personally owned modes of transportation and towards mobility solutions that are consumed as a service. Two common examples of this model are Uber and Lyft.*

Vehicle miles traveled (VMT): *A measurement to determine the amount of automobile traffic—can also be used to calculate greenhouse gas emissions.*

Zero emission vehicles: *include pure battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and hydrogen fuel cell electric vehicles (FCEVs). These vehicles generate no, or insignificant emissions to run. Whether or not an electric vehicle is truly zero emission depends on the energy sources used to charge the vehicle.*

Zero net energy: *A net zero energy building annually produces as much energy through onsite renewable systems as it uses. A zero net energy ready building integrates energy-efficient design and technologies to produce buildings such that 100% or more of their annual energy needs could be met using onsite renewable energy whether or not renewable energy technology is currently installed.***Transportation as a Service:** *Also known as Mobility-as-a-Service (MaaS), describes a shift away from personally owned modes of transportation and towards mobility solutions that are consumed as a service. Two common examples of this model are Uber and Lyft.*