

Environmental Stewardship

We believe NW Natural has an important role to play in helping our region move to a low-carbon, renewable-energy future.



NW Natural’s core value of environmental stewardship is a driving force behind the business decisions we make every day and the plans we make for our future. We believe climate change is today’s challenge—an imperative that requires our collective action. We’re committed to helping achieve deep decarbonization in our region by:

- Lowering energy use through aggressive energy efficiency and decreased consumption
- Reducing the carbon intensity of conventional natural gas across the value chain
- Evolving our supply to include renewables in the pipelines, while encouraging the development of public policies to facilitate the transition to renewables

We believe the gas infrastructure in place today will be an asset in the clean-energy economy, and using the existing pipeline makes the energy transition as affordable as possible for customers. We are working to shape a future in which renewable molecules delivered and stored in the gas system provide our customers with a cost-competitive, carbon-neutral energy option.

Building on a Legacy of Environmental Leadership

In the 1980s, NW Natural and its regulators committed to modernizing our infrastructure, and today our system is **one of the tightest, lowest-emitting systems in the nation**. We’re proud of our history of environmental leadership. We were one of the first gas utilities in the U.S. to replace all cast iron and bare steel pipe in our system; to adopt a rate structure that encourages energy conservation; and to provide customers with

a voluntary program that allows them to offset some or all of the emissions.

Our aggressive pipe replacement program has yielded important results: An Environmental Defense Fund study led by Washington State University found that methane emissions on our system were 90% lower than Environmental Protection Agency (EPA) assumptions at that time³, and our system’s fugitive emission levels are below the EPA national average for distribution companies. Reducing emissions is crucial not only for gas utility systems, but also for electrical power generation, which accounts for more gas use than direct residential and commercial customers combined in the United States.

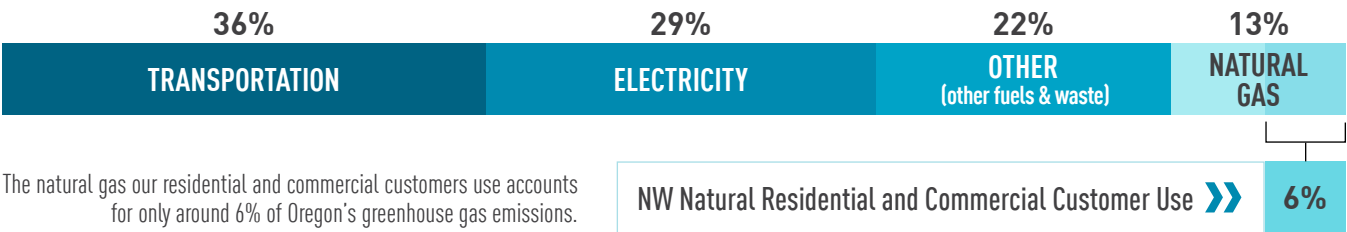
Today, natural gas is the cleanest energy option that can reliably meet our home’s biggest energy needs. We believe natural gas and our modern energy future in the Pacific Northwest, and we’re proud to continue our legacy of environmental leadership.

³ 2013 study led by Washington State University and the Environmental Defense Fund
⁴ Reported by ONE Future using latest available data (2012) from EIA and greenhouse gas reporting program from EPA
⁵ MMscf of methane emissions per MMscf of methane throughput
⁶ Greenhouse gas emissions expressed in metric tons CO₂e
⁷ Scope 2 Facility Electricity Emissions represent 12 months of electricity usage at the 18 main facilities operated by NW Natural. Due to the meter reading dates on the utility bills this value is approximate. The emissions are expressed in metric tons of CO₂e.

2020 NATURAL GAS DISTRIBUTION SYSTEM EMISSIONS	NW NATURAL	INDUSTRY AVERAGE ⁴
Fugitive Methane Emissions Rate ⁵	0.1%	0.26%
Scope 1 Emissions ⁶	92,043	N/A
Scope 2 Facility Electricity Emissions ⁷	2,312	N/A

TODAY OUR NATURAL GAS SYSTEM IS A POWERHOUSE	
NW Natural’s pipeline system	<ul style="list-style-type: none">• Delivers more energy than any other utility in Oregon• Meets 74% of home heating needs in the areas we serve• Provides 90% of energy needs for our residential space and water heat customers on the coldest winter days
2x the energy	During winter peak-demand periods, the NATURAL GAS SYSTEM DELIVERS about TWICE AS MUCH ENERGY as the electric system

OREGON GREENHOUSE GAS EMISSIONS BY SECTOR



Source: Oregon DEQ In-Boundary GHG Inventory preliminary 2019 data.

On Track to Meet or Exceed Our Carbon Savings Goal

In 2016, we established a 30% carbon savings goal to be achieved by 2035, based on 2015 emissions associated with our own operations and the use of our product by customers.⁸ In addition to the actions we have taken operationally, this voluntary goal has been a catalyst for us to lead beyond our walls by building public policy coalitions that support innovation and new thinking.

Energy Efficiency

Energy efficiency is a powerhouse for reducing emissions. Since 1970, the average NW Natural residential customer has cut their emissions in half. From conservation to technological innovation, energy efficiency accounts for the single largest savings toward our low carbon pathway goal, and we are driving to increase that savings in the coming years. In our 2020 IRP update we project that emissions are likely to be cut by another 50% or more by 2050 from 2020 levels.

NW Natural was one of the first gas utilities in the nation to implement a rate structure based on decoupling, beginning in 2002. Decoupling is intended to break the link between earnings and the quantity of gas used by customers, removing any financial incentive a utility might have to discourage customers from conserving energy. Today more than 75% of our gas utility revenues are decoupled.

Through Energy Trust of Oregon, NW Natural supports energy-efficiency improvements such as cost-effective equipment upgrades, insulation and building improvements that last for many

Variation from Goal

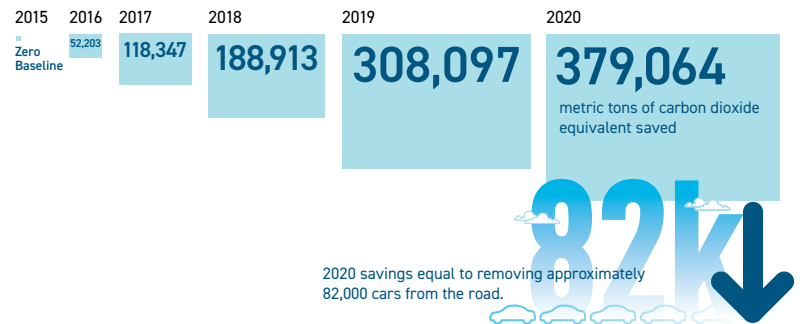


2020: Above Target Savings Rate. 379,064 metric tons of carbon dioxide equivalent saved. This marks 29.4% of savings toward goal, ahead of target pace.

2020 Source of Savings Mix



Annual Savings



years. In 2020, NW Natural and our customers provided funding that covered approximately \$29 million of expenses and generated nearly 6.8 million therms in energy savings. That's equivalent to removing greenhouse gas (GHG) emissions from nearly 7,800 cars for one year. By market, our Oregon service territory had 644,000 MMBtu of net energy savings and our Washington service territory had about 33,000 MMBtu of gross savings.

Energy efficiency contributed nearly half of the savings we achieved in 2020 toward our voluntary goal of 30% carbon savings by 2035. That's about **172,000 METRIC TONS SAVED IN 2020 RELATED TO EFFICIENCY WORK SINCE 2016.**

⁸ This is an emissions savings goal equivalent to 30% of the weather-normalized carbon emissions from our customers' gas use and company operations in 2015, or about 1.3 million metric tons annually by 2035

Energy Education

NW Natural is working with Bonneville Environmental Foundation's program called "CE—Clean Energy. Bright Futures," which partners with teachers and the greater community to bring energy education into the classroom. Preparing K-12 students to participate in a just and equitable clean energy economy is at the heart of this initiative. And NW Natural's commitment to a low-carbon future aligns with CE's mission. NW Natural is working with CE to develop curriculum around renewable hydrogen and renewable natural gas and bring those topics to teachers, who will educate their students while developing the renewable energy workforce of the future. In fall 2020, CE convened the first cohort of teachers to begin developing the curriculum. Teachers participated from Beaverton, Camas, Cottage Grove, Gresham, Hood River and Sheridan.

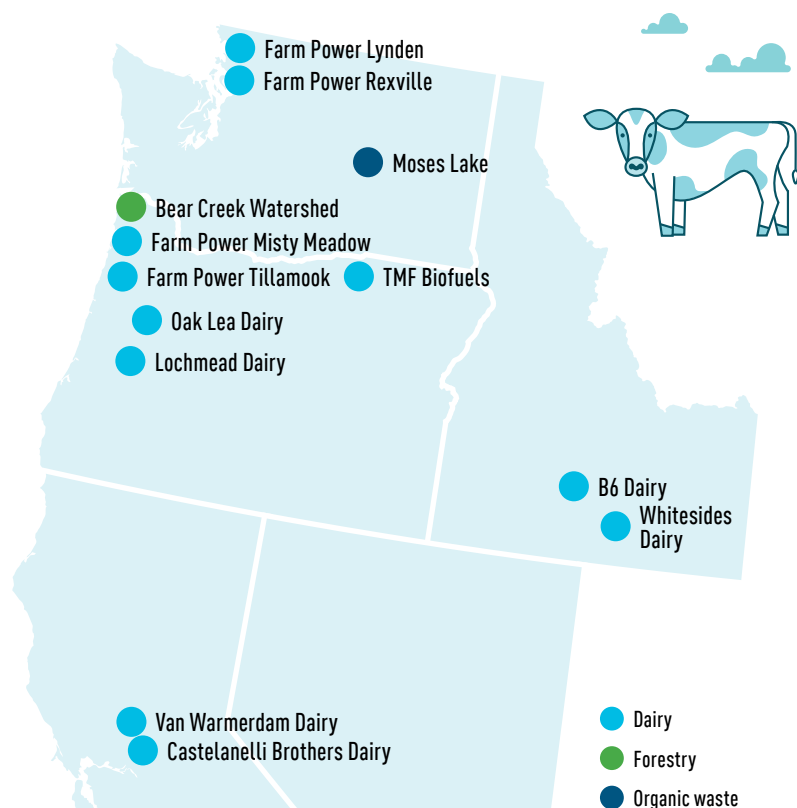
Not to be used for investment purposes—see NW Natural and NW Natural Holdings most recent Form 10-Ks as updated by the most recent 10-Q for information relevant to investment decisions.



Carbon Offsets for Customers: Now That's Smart Energy

Our customers play a vital role in fighting climate change. In 2007, NW Natural was the first stand-alone gas utility to offer customers a voluntary program that allows them to offset some or all of the carbon emissions from their natural gas use by helping to fund biogas projects on local farms that reduce or prevent the release of greenhouse gases. The **Smart Energy** program's mantra, "Use Less, Offset the Rest," reinforces that verifiable offsets are a valuable tool to effectively lowering emissions. Today nearly 9% of our customers—over 67,000—are enrolled in the Smart energy program. In 2020, they funded approximately 174,000 metric tons in emission reductions, equivalent to removing about 38,000 cars from the road. **That made Smart Energy the second largest contributor to the low-carbon goal** NW Natural set in 2016, and accounted for 146,000 metric tons of savings toward the goal in 2020. Since its inception, the Smart Energy program has funded over a million metric tons of CO₂e emissions reductions.

SMART ENERGY PROJECTS



SINCE ITS INCEPTION, THE SMART ENERGY PROGRAM HAS FUNDED OVER A MILLION METRIC TONS OF CO₂e EMISSIONS REDUCTIONS.



Gas heat pumps like the one pictured can help reduce energy usage.

Equipment Innovation

We are working with nonprofit organizations like the [Gas Technology Institute](#), [Low Carbon Resources Initiative](#), and [Northwest Energy Efficiency Alliance](#) to encourage innovation through new products like gas heat pumps, zero-net energy homes, fuel cells and other progressive technologies that use less energy. An American Gas Foundation report prepared by Enovation Partners in 2019 indicates that these new technologies have the potential to reduce energy use by 40%⁹ or more, while still serving customers' energy needs. In late 2019, we co-founded the North American Gas Heat Pump Collaborative with local distribution companies across North America, representing 31% of North American customers, to support the adoption of new technology that will reduce carbon through deployment of highly efficient space and water heat equipment. Additional efforts are underway to develop innovative solutions with resilience in mind, including self-powered gas furnaces and water heaters that can continue to work in power outages.

⁹ Opportunities for Reducing Greenhouse Gas Emissions Through Emerging Natural Gas Direct-Use Technologies. An American Gas Foundation report prepared by Enovation Partners, 2019.

Greener Natural Gas




Our residential and commercial customers use accounts for only about 6% of Oregon’s greenhouse gas emissions, and we are working to reduce that footprint even further. Reducing emissions across the supply chain is foundational to this effort.

NW Natural purchases natural gas from Canada and the Rocky Mountain region, two of the most stringently regulated production areas in North America, with lower methane leaks. Because upstream natural gas production and processing are where the bulk of emissions occur¹⁰ in the value chain, we’re also working with like-minded industry members and trade groups to encourage producers to adopt best practices. NW Natural is a proud member of [ONE Future](#), a coalition of more than 40 companies that set a goal of voluntarily reducing methane emissions across

the natural gas value chain to 1% or less by 2025—a goal the membership is already exceeding by a wide margin.

We are also a discerning purchaser of our gas supplies. NW Natural is one of the first utilities in the nation to develop and implement an emissions-screening tool that allows us to analyze EPA sub part W emissions data reported by U.S. producers and understand the carbon intensity of gas supplies. With this capability, we can include environmental impact as one of the key considerations in our supply purchases (alongside other key purchasing criteria such as price, credit worthiness and geographic diversity) and reward lower emitting producers with our contracts. Since implementing this scorecard in 2018, we’ve prioritized purchases from responsible producers, which has reduced the methane leakage rate associated with our purchases from the Rocky Mountain region by roughly 20%. By targeting gas purchases from more environmentally conscious producers, we have avoided more than 39,000 dekatherms of methane emissions for savings of more than 57,000 metric tons of CO₂e.

¹⁰ U.S. EPA, Inventory of U.S. Greenhouse Gases and Sinks: 1990 – 2018

<div>NWN FOUNDING MEMBER</div> <div> MJB & A an ERM Group company</div> <div>Natural Gas Supply Collaborative</div>	The Natural Gas Supply Collaborative is a group of natural gas purchasers focused on promoting safe and responsible practices for natural gas supply through more robust reporting and engagement with producers. The collaborative seeks to promote greater transparency in natural gas production, specifically around key issues such as water and land use, air quality and emissions.
<div>NWN MEMBER</div> <div></div>	<p>NW Natural is a member of Our Nation’s Energy Future (ONE Future), a coalition representing more than 15% of the U.S. natural gas value chain and committed to reducing methane emissions through adopting science-based standards and deploying best practices.</p> <p>ONE Future’s members set a target of reducing cumulative methane emissions from production, midstream and downstream operations to below 1% by 2025. One Future’s 2020 Methane Emissions Intensity Report showed that the coalition registered a methane intensity number of 0.3% in 2019, beating its one percent goal by 67%.</p>
<div>NWN FOUNDING MEMBER</div> <div></div>	As a member, NW Natural is adopting advanced practices to further reduce methane emissions, such as alternative blowdown methods in pipeline construction and maintenance. The traditional approach to depressurizing a pipeline is to vent the gas to the atmosphere. But by flaring it with a mobile flaring unit we reduce potential greenhouse gas emissions by 90%. In 2020 these voluntary practices helped avoid releasing the equivalent of nearly 3,000 metric tons of carbon dioxide, reducing emissions by more than 60% on these projects.

Camas Schools Save with Efficiency

The Camas School District collaborated with NW Natural and Energy Trust of Oregon to make energy- and cost-saving upgrades that also improve the learning environment for students and staff. Energy-efficient upgrades in seven school buildings over the past three years included a natural gas-fired condensing boiler, condensing tank water heaters, upgraded building controls for better performance, and more. Energy savings from these improvements slashed annual natural gas use by an estimated 53,400 therms and cut energy costs by an estimated \$42,300. The School District has been working with Energy Trust since 2010 to reduce energy use in schools. Including the savings from the above projects, Camas School District has decreased annual energy costs by an estimated \$73,300.

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Less We Can

Less We Can is NW Natural's public awareness campaign to support our Low Carbon Pathway. Through advertising and testimonials, our customers share how they are using less.



Spin Laundry

Morgan Gary started the Spin Laundry Lounge in Portland with a goal to revolutionize the laundromat. Now with two locations, she sees her business as an opportunity to have a positive impact on the environment as well as her community. That means finding ways to use less and conserve more, starting with high-efficiency washers and dryers that use 3.5 times less water and 15% less energy than home machines.

She's worked to further Spin's eco-friendliness with every decision she makes, like participating in NW Natural's **Smart Energy** program to offset her company's natural gas use. And she helps her customers reduce their impact—suggesting they always wash in cold water, offering earth-friendly soaps and other laundry products that are free of harsh dyes and chemicals—even encouraging them to wash their clothes less often.



Meet the Newest Renewable

Renewable natural gas derived from organic materials like food, wastewater and agricultural and forestry waste is an important part of our energy future. Renewable natural gas (RNG) reduces carbon emissions by as much as 300%, and it's available when it's needed. NW Natural's goal is to put RNG into our pipeline system to help heat homes and water. In its first inventory of technical potential, the Oregon Department of Energy found nearly 50 billion cubic feet of renewable natural gas sources—equivalent to the total amount of natural gas used by all Oregon residential customers today. We are working to educate customers about renewable natural gas. A [video](#) for NW Natural's Less We Can campaign asks customers, "What if all this waste wasn't waste at all?"



Salem Buses Roll With RNG

Powering over half its fleet with renewable natural gas since the spring of 2020, NW Natural's longtime customer and community partner Cherriots is now Oregon's cleanest public transit operation. By using renewable natural gas, the public transportation system in Salem expects to reduce harmful smog-forming tailpipe emissions by more than 90% and greenhouse gas emissions by more than 40%. The cost savings from using RNG will allow Cherriots to expand its bus service and help maintain affordable prices.

"Clean public transit is key as we move toward a more healthy, sustainable and equitable Oregon. I commend Cherriots for leading the way with cleaner, renewable natural gas buses."

— Oregon Governor
Kate Brown

LESS WE CAN



Baker Rock Resources with NW Natural's CNG truck loan program.

A CNG Hybrid Solution for the Biggest Jobs

Until recently, diesel-fueled trucks were the only way to transport the heaviest loads on public roads. Because diesel trucks are highly polluting, Baker Rock Resources was searching for an alternative that would align with the company's environmental ethos while meeting its transportation needs as a landscaping and construction materials supplier. Trucks operating on CNG historically haven't had enough horsepower to compete with diesel for the biggest jobs, and the family-owned business needed a truck capable of hauling a full load of rock through the hills near its Beaverton, Oregon operation.

NW Natural's CNG truck loan program connected Baker Rock with Hyliion, a company that developed a system that boosts the power of a Class 8 CNG truck so it can pull 100,000 pounds or more uphill with little or no decrease in performance. The E-axle runs off a self-charging electric battery, adding neither pollution nor operating costs. NW Natural arranged with Hyliion for Baker Rock to try a model of the CNG/hybrid at no cost, and Onboard Dynamics in Bend, Oregon provided a mobile CNG fueling station. After a driver piloted a fully loaded truck uphill at regular speed, Baker Rock saw that it had a powerful option for saving money while meeting sustainability goals.

Transportation and Compressed Natural Gas

Replacing dirtier transportation fuels such as diesel with clean-burning natural gas is another source of carbon savings. Heavy-duty vehicles that run on compressed natural gas (CNG) rather than diesel emit 90% less nitrogen oxide (NOx) air pollutants and particulate matter emissions¹¹, and emissions do not vary with engine load; diesel engine emissions vary significantly from idle to highway speeds. Natural gas technology also provides reliability and cost-savings unmatched by other alternative fuels. In 2020, NW Natural supplied 13 companies with 5 million therms of CNG to power their fleets.

Trucks on Loan

Fleet owners were invited to test drive a CNG truck in a program sponsored by NW Natural and Penske Truck Leasing. The program gives qualified fleet owners a chance to test heavy-duty CNG truck technology for up to three weeks. The "try it first" program lets participants experience the similarities between natural gas trucks and diesel trucks with respect to power, drivability, fuel range and fuel availability—plus the lower fuel costs and environmental benefits that natural gas trucks provide.

In addition to a 12-liter natural gas Class 8 CNG truck, the loan program offers a hybrid CNG-electric truck. NW Natural teamed up with Austin, Texas-based Hyliion, Inc. to make the high-power, high-mileage hybrid available to companies that transport the heaviest loads. The hybrid adds 120 horsepower to a Class 8 CNG truck, making it powerful enough to pull 100,000 pounds uphill and compete with diesel for the biggest jobs. NW Natural covers both leasing and fuel costs during the trial period. Real-world testing by commercial customers, including Tillamook County Creamery Association and the largest producer of cement and construction material products on the west coast, CalPortland, showed the new CNG solution can deliver power, sustainability and fuel efficiency.

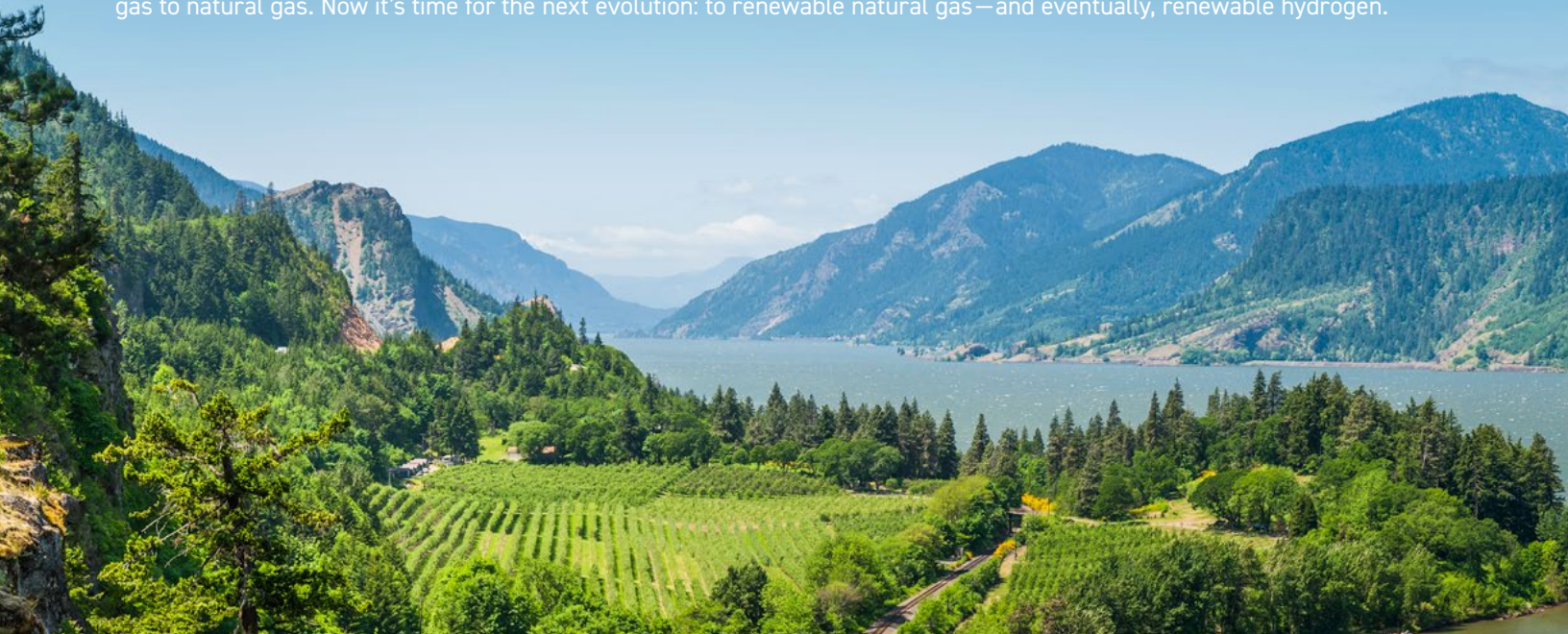


Tillamook Creamery took part in NW Natural's CNG Trucks on Loan program

Our Vision Forward: Carbon Neutral 2050

WE'RE EXCITED TO DRIVE THIS TRANSFORMATION FOR OUR CUSTOMERS.

What is the future of the gas system in a world that needs to achieve decarbonization? In our view, it starts with thinking about gas infrastructure in the same way we do the electric system. Taking steps to decarbonize the electric grid meant rethinking the energy that could be transmitted and distributed across existing poles and wires—and that's our vision for the gas system. Since NW Natural started delivering energy 163 years ago, the fuel going through our pipes has changed from manufactured gas to natural gas. Now it's time for the next evolution: to renewable natural gas—and eventually, renewable hydrogen.



As we've made progress on our 2035 savings goal, we've evolved our thinking on what's possible for our system, based on promising advancements in renewables for the pipeline system. To achieve a carbon-neutral future, we will continue to look for emissions reductions throughout the natural gas value chain, from producers, to our own operations and customers, to the transportation sector. Our long-term vision and goals are focused on collective action to:

- Continue pursuing deep energy efficiency and offset projects
- Lower the carbon intensity of the product we deliver, using a mix of technologies and renewable energy sources such as RNG and clean hydrogen
- Provide resiliency, diversity, and reliability to our region's energy supply by continuing to leverage the strengths of our energy delivery system and long-duration storage assets
- Keep energy affordable by using our existing system—one of the most modern in the U.S.—in new, innovative ways

"By combining new technologies with renewables developed for the pipeline network and lower use through energy efficiency, we see a technical path to a carbon-neutral natural gas system. It's a strategy already emerging in Europe, and it's our vision forward."

— David Anderson,
NW Natural president and CEO

Our Vision for the Gas System

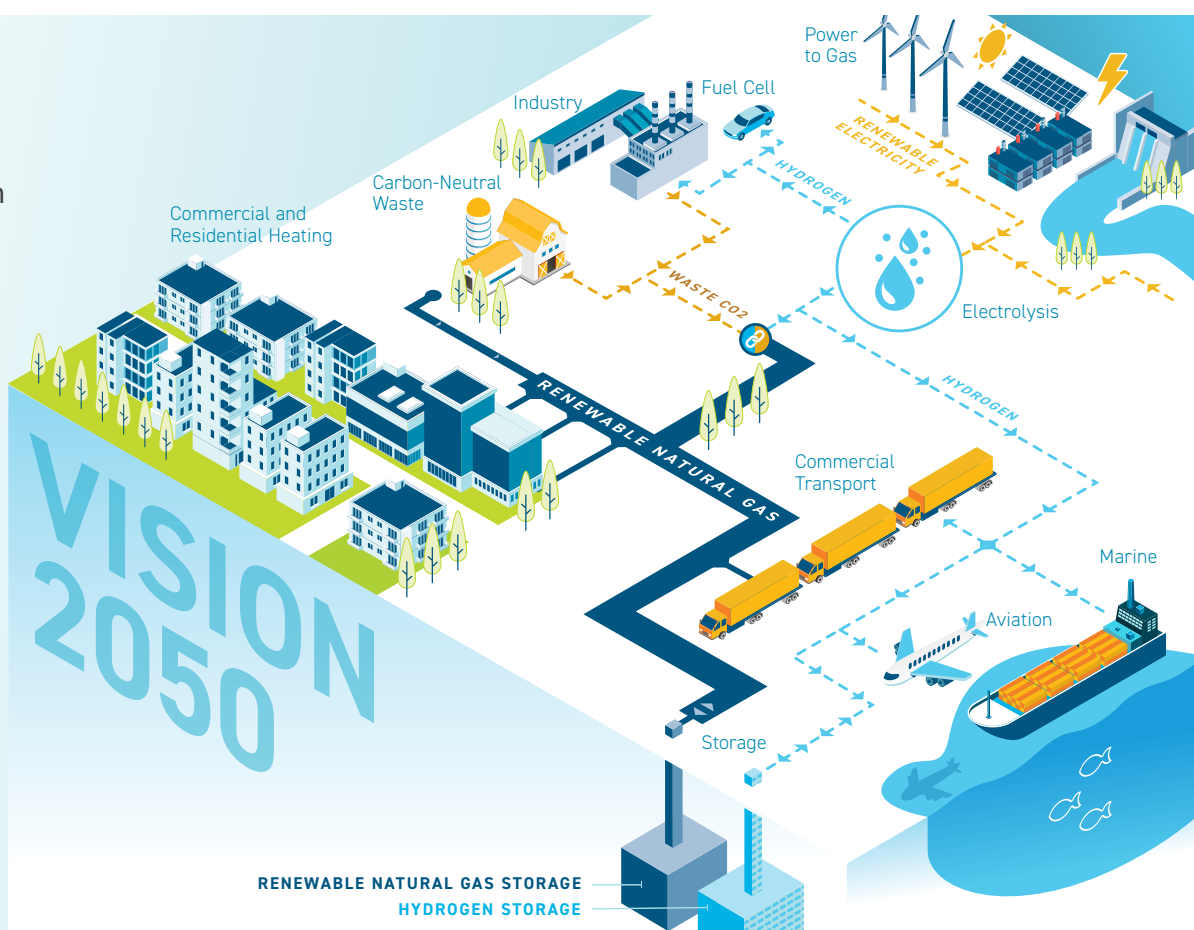
Destination Zero:

The pathway to our vision of carbon neutral

A decarbonized network:

- Deep energy efficiency
- Renewable natural gas
- Renewable hydrogen
- Blended and dedicated hydrogen systems

- Renewable Natural Gas
- Dedicated Hydrogen
- Waste CO₂
- Renewable Electricity



Renewable Natural Gas for the Pipeline

Multiple studies have shown that natural gas and the gas pipeline network will be needed for the Pacific Northwest to achieve its climate goals.

A [report by the premier environmental consultant Energy and Environmental Economics \(E3\)](#) outlines how our system—leveraging renewables developed for the pipeline—can be instrumental in achieving deep decarbonization in our region most affordably and reliably.¹²

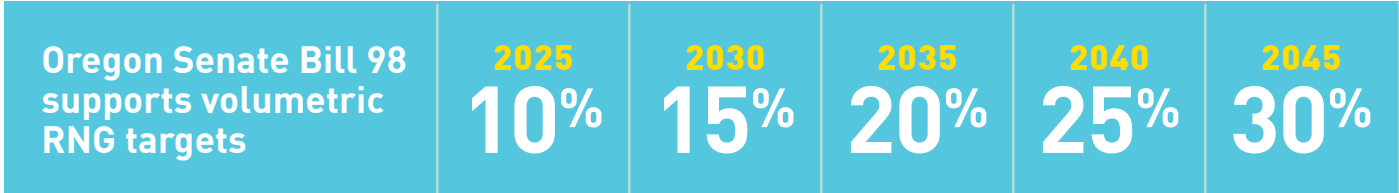
Renewable natural gas (RNG) can be cleaned up and added into the gas pipeline network to serve homes and businesses today. RNG produced from organic materials like food, agricultural and forestry waste, landfills and wastewater can be used in our existing pipeline network and consumer appliances, turning waste streams that currently contribute to

methane release into a powerful climate solution. The E3 study found that our region can achieve its deep decarbonization goals by blending just 25% RNG into the existing gas system.

Studies indicate that the potential supply of RNG is ample. A 2018 Oregon Department of Energy [study](#) on RNG supply identified nearly 50 billion cubic feet of technical potential, equivalent to the total amount of natural gas used by all Oregon residential customers today. On a national level, the technical potential for RNG is correspondingly greater. Initial estimates by [ICF Consulting](#)¹³ show that the technical potential of RNG supply is substantial when compared to current natural gas throughput. When looking at development costs and existing technologies, the ICF report estimates there is enough potential renewable natural gas to achieve a 95% reduction in emissions in the residential sector.

¹² Independent consulting firm Energy and Environmental Economics (E3) study published in December 2018 and commissioned by NW Natural.

¹³ Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment. An American Gas Foundation Study Prepared By ICF, 2019.



Oregon Supports Renewables

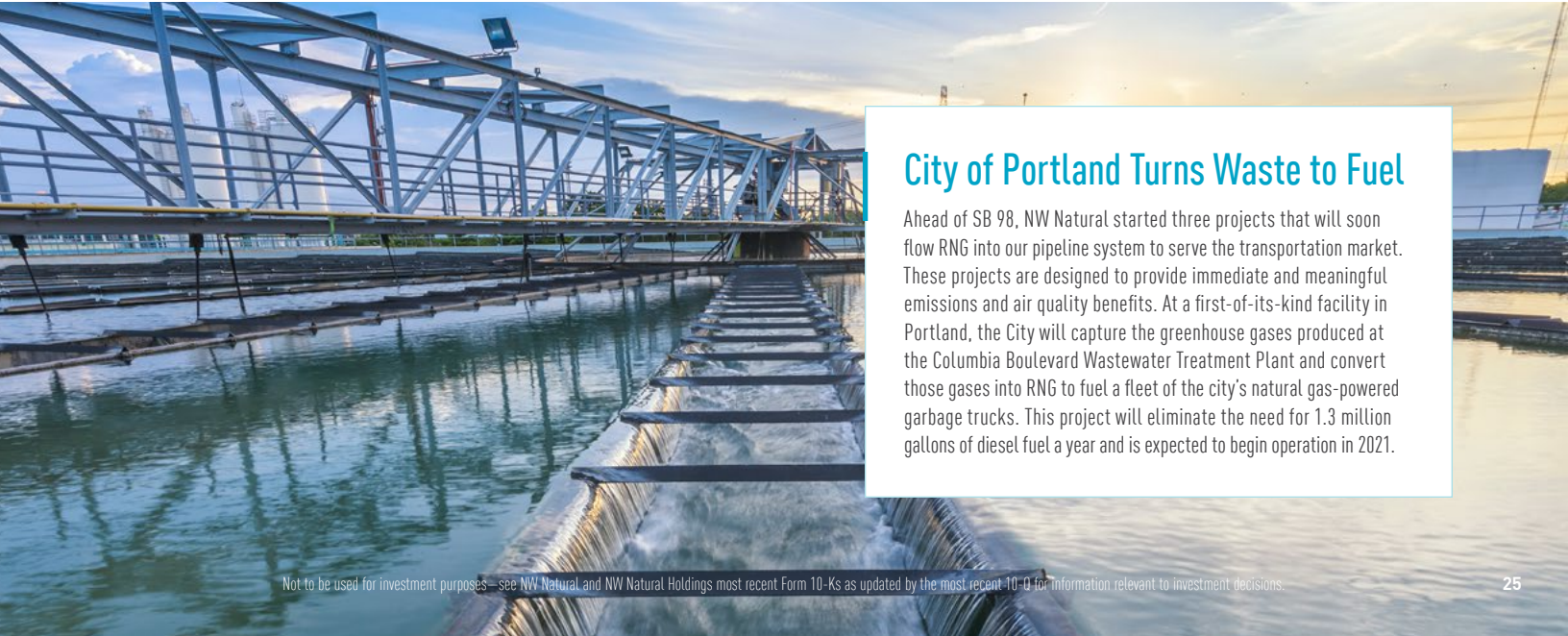
Supporting the evolution of our renewable-energy supply is groundbreaking Oregon RNG legislation, [Senate Bill 98](#). This law, passed with bipartisan support, goes further than any other current U.S. law by outlining voluntary goals for adding as much as 30% RNG into the state’s pipeline system by 2050. It allows up to 5% of a natural gas utility’s revenue requirement to be used to cover the incremental cost of RNG; currently, that equates to over \$30 million annually for NW Natural. Gas utilities can invest in interconnections with the gas system, and investments in RNG facilities can be included in their rate base if that is the lowest cost option for customers. The bill enables NW Natural to procure supply across the nation to secure the best price for our customers and provides local communities a potential revenue source to turn their waste into energy.

Procuring RNG for our Customers

In 2020, NW Natural created a dedicated RNG team whose mission is to help us meet SB 98 targets and secure renewable supply at the best prices for our customers. The team’s first request for proposal (RFP) in July 2020 received a strong response and provided valuable market discovery information.

In December 2020, the RNG team secured our first investment under the landmark law. NW Natural is partnering with BioCarbN, a developer and operator of sustainable infrastructure projects, to convert methane from Tyson Foods facilities into RNG to heat homes and businesses. Under this partnership, NW Natural has options to invest up to an estimated \$38 million in four separate RNG development projects that will access biogas derived from water treatment at Tyson Foods’ processing plants. In December 2020, NW Natural exercised its option for the first development project in Nebraska, initiating investment in an estimated \$8 million project. Construction on the first project is expected to begin during the summer of 2021, with completion and commissioning expected in early 2022.

Once all four facilities are fully operational, these projects are expected to generate more than 1.2 million MMBtu of renewable natural gas each year—enough RNG to provide heat for about 18,000 homes NW Natural serves in Oregon.



City of Portland Turns Waste to Fuel

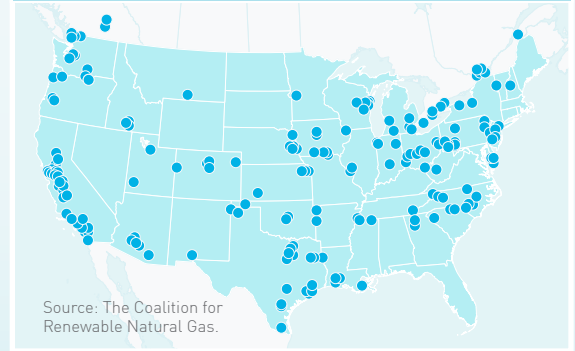
Ahead of SB 98, NW Natural started three projects that will soon flow RNG into our pipeline system to serve the transportation market. These projects are designed to provide immediate and meaningful emissions and air quality benefits. At a first-of-its-kind facility in Portland, the City will capture the greenhouse gases produced at the Columbia Boulevard Wastewater Treatment Plant and convert those gases into RNG to fuel a fleet of the city’s natural gas-powered garbage trucks. This project will eliminate the need for 1.3 million gallons of diesel fuel a year and is expected to begin operation in 2021.

Coalition for Renewable Natural Gas

NW Natural is a member of the Coalition for Renewable Natural Gas, a member-led nonprofit organization representing nearly 300 companies, municipalities, universities, and environmental and non-profit organizations that are dedicated to the advancement of RNG. The coalition advocates for public policy that supports sustainable development and use of renewable natural gas, so present and future generations will have access to renewable, clean fuel.

The coalition's Sustainable Methane Abatement & Recycling Timeline (SMART) is a new initiative to capture and control methane from more than 43,000 organic waste sites in North America by 2050, achieving significant benchmarks by 2025, 2030 and 2040. Currently there are more than 300 RNG facilities either operating or under construction in North America.

Wave of renewable natural gas projects are turning waste into energy today



Hydrogen: The Other Piece of the Puzzle

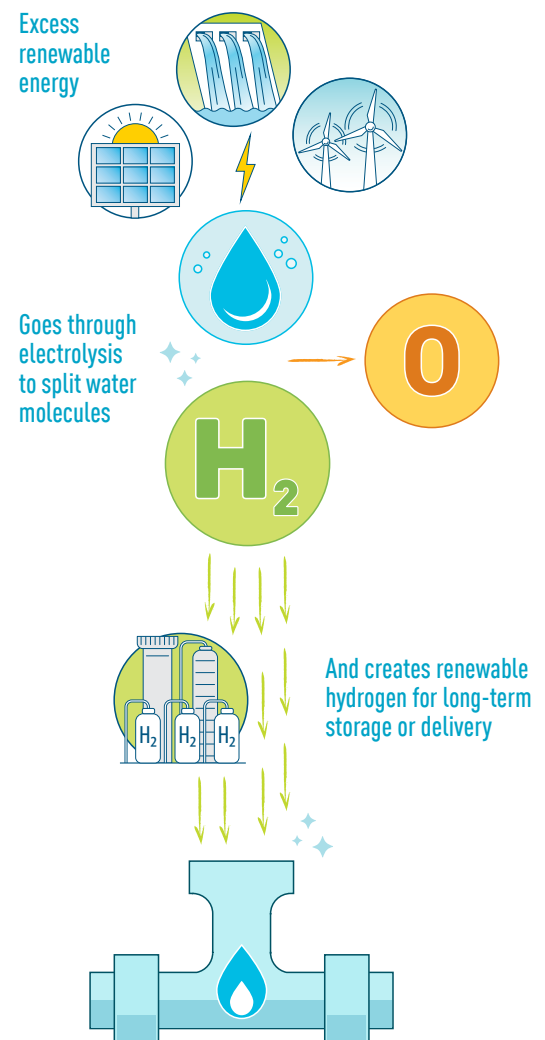
Looking into the more distant future, we're working to bring renewable hydrogen into our energy mix. Through the **power-to-gas** process, renewable hydrogen can be created using wind, solar and hydro energy sources that often produce excess power at times of low demand. Renewable hydrogen can be blended with natural gas for delivery into the existing pipeline system, or converted to synthetic methane and used as a direct replacement for natural gas. Power-to-gas can introduce considerable flexibility into the energy system, since renewable hydrogen can be stored for months and then delivered to provide energy when it's needed.

Clean, low-carbon hydrogen can also be produced by steam-methane reforming of conventional natural gas, paired with carbon capture and storage ("blue hydrogen") to make it carbon neutral. Other options include gasification of biomass feedstocks such as agriculture and forest waste. These various technologies create even greater opportunities to decarbonize hard-to-electrify sectors and processes across the economy.

In October 2019 NW Natural sent a technical team to research several leading decarbonization efforts in Europe. Over the past decade, countries like Germany, France and the Netherlands have funded research, developed policies, and deployed pilot projects that demonstrate new roles for natural gas infrastructure and renewable fuels in a decarbonized energy system. On the trip, the NW Natural team repeatedly heard from European government agencies, think tanks and gas companies that existing gas infrastructure can be deployed in new, innovative ways to address climate change.

Subsequently, NW Natural and other forward-thinking North American gas utilities have formed working partnerships to apply those lessons at home. In December 2020, the Downstream Natural Gas Initiative issued a

report, *The Role of Gas Networks in a Low-Carbon Future*, which synthesized the potential for this transition to a lower-carbon future and the steps needed to move ahead.





NW Natural technician testing blended hydrogen gas at NW Natural's Sherwood facility

Hydrogen Testing on Our System

In 2020, we began testing a 5% hydrogen blend at NW Natural's state-of-the-art training facility in Sherwood, Oregon. So far, these positive blend tests focused on the performance of pipes, leakage instrument, and end-use equipment. In 2021, we plan to expand our blend testing to include additional end-use equipment performance on furnaces, fireplaces, and water heaters.

HyReady

The transition to renewable hydrogen will require broad support and investments in best practices and science-based research. We're collaborating with like-minded businesses, organizations and public utility districts to advance the development of renewable hydrogen.

We're part of the Zero Carbon Hydrogen Coalition, and in 2020 we joined HyReady, a worldwide

collaboration on hydrogen, which is focused on creating guidelines and best practices for natural gas distribution companies blending hydrogen into their distribution systems. We are also partnering with other North American utilities to begin mapping out the technical tests we need to do at different blending percentages for hydrogen.

Reliable, Resilient, Renewable, Affordable: The Gas System Delivers

During winter peak-demand periods, the natural gas system in the Northwest delivers about twice as much energy as the electric system. Proposals to "electrify everything" put this reliability at risk. The Northwest electric grid currently faces serious **capacity limitations**.¹⁴ Driving more peak demand to the electric system jeopardizes energy reliability in our service territory and could result in the kind of rolling brownouts and blackouts that sometimes occur during peak electric usage.

FOR THE FORESEEABLE FUTURE, cities will need to use natural gas in the most efficient way—which is to directly heat homes and businesses. The alternative is to use even more natural gas in less efficient natural gas-fired electric generating plants, where energy is lost in electric generation process and through transmission to homes and businesses.

Below-ground natural gas infrastructure is more resilient than above-ground infrastructure and less vulnerable to hurricanes, fires and other natural disasters, according to a 2019 **study** by the consulting firm ICF. Our modern underground system also provides resiliency, as it is less vulnerable than above ground infrastructure. A **study** by Portland State University's Center for Public Service released in 2019 suggests the natural gas system could be a crucial resource in the event of a major disaster that disrupts power to the Pacific Northwest. Disaster recovery efforts could take advantage of NW Natural's modern natural gas distribution system, which includes resilient pipeline materials protected underground, a significant amount of existing regional storage capacity, and the potential for renewable gas production at multiple locations.

¹⁴ Northwest Power and Conservation Council, 2019



Renewable Hydrogen Alliance

NW Natural helped establish the **Renewable Hydrogen Alliance** in 2018 to convene interested parties in our region on emerging hydrogen and power-to-gas technologies. Since then, the association has grown to nearly 80 members including utilities, advocacy groups, manufacturers, project developers, and others dedicated to the mission of using renewables to create clean fuels.

The Alliance has successfully worked on legislation in both Oregon and Washington state. In Oregon, the Alliance sponsored legislation that directs the state's energy department to study benefits of, and barriers to, renewable hydrogen production and use in Oregon.

February 2021 Weather Event Underscores Resiliency of Natural Gas

In the gas utility industry, we talk about resilience constantly. We plan for extreme weather all year long. After the extreme cold weather we saw in February 2021, resiliency has been on a lot of minds. February 15, 2021 was the second-highest natural gas delivery day ever and, along with February 14, 2021, it set a record for the largest demand for a two-day period for our nation. Parts of the United States saw extreme cold and there were sufficient natural gas supply and delivery capacity for space heating, hot water, cooking, manufacturing, electricity generation and our export agreements with foreign allies. Thirty-eight percent of the natural gas delivered on February 15 came from storage.

The event underscored that utilities, system operators, regulators and policymakers need to recognize that a diverse supply of energy assets, including natural gas, is critical to achieving a resilient, prosperous and cleaner energy future. We believe policies need to focus on optimizing the characteristics of both the natural gas and electric systems. We are committed to driving a conversation that considers system resilience impacts as part of the energy system transformation. **We can achieve both—resilience and decarbonization—leveraging our gas infrastructure.**

Affordable Storage for Renewables

Another strength of the gas infrastructure is its ability to provide long-duration energy storage that doesn't degrade. This same storage facility could store RNG or methanated renewable

hydrogen. We believe that by leveraging this unique asset, gas utilities will be able to provide renewables at significant cost advantages when compared to electrification and battery storage.

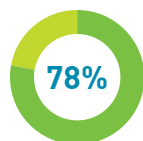
- For example, NW Natural has 20 billion cubic feet of underground storage today, which we believe could be used to store renewable molecules in the future
- That's equivalent to about 6 million megawatt hours¹⁵ of storage
- Based on today's lithium-ion technology, a battery with that capacity would cost about \$2 trillion¹⁶
- The gas system can deliver 2.5 times the energy of hydrogeneration facilities¹⁷ and gas storage provides about 1,500 times the energy delivered from current large-scale utility batteries,¹⁸ which has significant cost implications for decarbonization strategies across the energy sector
- A large power-to-gas plant can enable renewable energy storage in the gas system for about half the cost per kilowatt hour of a battery storing the same energy¹⁹

The increasing use of intermittent renewable sources like wind and solar will require this kind of flexible, large-scale energy storage to balance electricity demand and production. Renewable gas systems can complement decarbonization of the electric grid, helping to further reduce emissions and offering storage and transport capability to safeguard against interruption of service to customers.

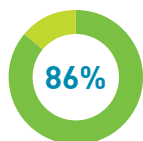
When it comes to affordability, no energy option available today can compete with conventional natural gas. But we believe renewable molecules stored and delivered in the gas system are quite cost-competitive when compared with decarbonized electricity, considering the investment in infrastructure and batteries that would be required to electrify the energy currently served by the gas system. In addition, leveraging the gas infrastructure we have in place will create a closed loop for reusing rather than building new resources.

Our Customers Want Choice, Balance, Renewables

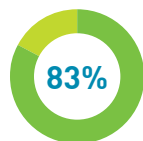
As we transition to renewables, we care about our customers' values and beliefs, so we reached out. Research by Oregon firm DHM²⁰ in late 2019 showed that people in NW Natural's Oregon and Southwest Washington service territory want the freedom to choose natural gas as an energy source for their homes and businesses. People want choice and a diversified set of solutions to lower carbon emissions affordably. That includes natural gas and RNG.



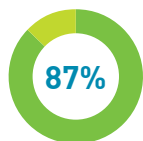
78% agree that families and businesses should have a choice of energy options to meet their needs.



86% agree that all forms of renewable energy, including renewable natural gas, are needed in a balanced, low-carbon future.



83% support local government's efforts to encourage use of renewable natural gas.



87% agree that before local governments ban natural gas for new homes and businesses, local governments should be required to determine the likely impacts on carbon emissions and costs to families and businesses.

Moving Toward Our Carbon-Neutral Vision: A Call to Action

The effort to decarbonize the electric grid has depended on public policy that supports the development of renewable power sources, and policy is equally important in decarbonizing the gas system. In Oregon, we have Senate Bill 98—the first legislation of its kind—which sets 30-year targets for gas utilities to procure renewable natural gas, and eventually renewable hydrogen, for our customers.

While we're excited about our early steps, we're also working toward additional policy support. At the federal level, we hope to see large-scale investment in hydrogen R&D and deployment—as we're seeing in Europe, Australia, Asia and Canada—and production tax credits for RNG and hydrogen development, similar to what has been successful for wind and solar. Finally, we see biomass gasification as an important component of our nation's climate and wildfire mitigation strategy.

We're also working on deeper modeling analysis and pathways to achieve net zero carbon emissions by 2050. This includes scope 1 and scope 2 emissions associated with company operations, as well as scope 3 emissions that result from the use of natural gas by our utility customers. This work builds on prior work, including our integrated resource planning, voluntary carbon savings commitments of 30% by 2035, and the [study](#) by premier consultant Energy and Environmental Economics (E3) that modeled various pathways to an 80% reduction in economy-wide greenhouse gas emissions by 2050 in the Pacific Northwest.

Efforts underway in 2021 will examine the pathway options and policy implications of reaching net zero while continuing to meet the energy needs of our Oregon and Washington customers, and doing so in an environment of continued growth in population and energy needs throughout the region. The goal of this work will be to illustrate the roles of the various levers available to us for decarbonization, including development and deployment of renewable fuels (RNG and hydrogen), conservation, energy efficiency, systems and equipment innovation, closer integration and coordination between gas and electric networks, carbon storage and sequestration, carbon offsets and more.

¹⁵ To convert natural gas volumes to MWh for comparison, this figure uses a national average heat content of 1036 btu/cf and a direct energy conversion of 0.29307 MWh/MMBtu

¹⁶ Prices based on NREL <https://www.nrel.gov/docs/fy19osti/73222.pdf>

¹⁷ Source: [EIA Weekly Natural Gas Storage Report](#) - Withdrawals are calculated and aggregated from a weekly regional report. The figure for hydroelectric generation is the total net generation from hydroelectric facilities and does not distinguish between what can and cannot be stored.

¹⁸ Source: [EIA 923 Form](#) - Hydroelectric and battery generation are pulled from generator level data identified with prime movers "HY" and "BA", respectively. Net generation is aggregated for hydroelectric generators and gross generation is aggregated for batteries.

¹⁹ Northwest Power and Conservation Council, 2019

²⁰ NW Natural Climate Change & Related Issues Survey Conducted by DHM Research, 2019

"The renewable supply exists, the technology exists, and we already have a modern delivery system in place. With our customers and our policymakers, we're committed to leading the way to solutions that work."

— David Anderson,
NW Natural president and CEO



**CORE AND SHELL
GOLD CERTIFIED**



Environmental Stewardship is a Priority Within Our Organization

Our values are reflected in our operations, at our facilities and through policies and procedures that protect our environment as we serve customers.

New Headquarters and Operations Center

In spring of 2020, we moved into our new headquarters and operations center in Portland, Oregon. Environmental stewardship, seismic resiliency, and employees' health and wellness helped guide how we designed, built and now operate this center. The building is LEED Core and Shell Gold certified, meeting the U.S. Green Building Council's rigorous standard for healthy and sustainable buildings. A range of features allow us to use less energy, conserve natural resources, minimize waste and support our strategic goals:

- **Energy Conservation Measures** – Through our high-efficiency building envelope (wall, roof and window assemblies), efficient heating, ventilation and air-conditioning system and controls, the use of 100% LED lighting and other measures, we estimate energy cost savings for the building's core and shell of approximately 28% annually, compared to a code-compliant building—more than 550,000 kilowatt hours and approximately 8,000 therms of natural gas.
- **Water Savings** – By installing efficient plumbing fixtures that use approximately 40% less water than code-compliant fixtures, we've reduced water demand with estimated savings of just under 600,000 gallons of potable water annually. Our total outdoor water savings are estimated to be over 14,000 gallons annually (75% lower potable water use for irrigation than a typical building), as a result of planting native and adaptive trees, shrubs, and groundcover, and installing a drip irrigation system.
- **Use of Green Building Materials** – Nearly 21% of the materials cost for the building core and shell construction came from recycled materials, reducing environmental impacts of extracting and processing virgin materials.
- **Convenient Downtown Location** – Our headquarters are conveniently located in downtown, within walking distance of three transit stops for six public bus lines, light rail and the streetcar. We provide secure and indoor bicycle parking, to further encourage sustainable transportation alternatives and reduce pollution from automobile use.
- **Onsite Recycling and Composting** – To limit waste, each floor is equipped with central recycling and compost stations.

Our building supports employees' health and wellness with an onsite wellness center, locker room and indoor bike parking, ample daylight in work areas and access to the outdoors and nature on our rooftop deck.

A Low-Waste Move

As soon as employees began moving to NW Natural's new corporate headquarters, the Facilities team went to work clearing out the former office space in northwest Portland. Through the moving process, more than 55 tons of materials were captured for recycling, and 407 tons of furniture and other items were donated to nonprofits for reuse. The effort kept 90% of the discarded items out of the landfill.



Clean Operations

In 2020, NW Natural used approximately 8.1 megawatt hours of electricity at our facilities and 3.9 million therms of natural gas in our own operations and facilities. And that energy was used with an emphasis on renewables. For our use of natural gas, we pay for carbon offsets through our Smart Energy program. In fact, in 2007 we became our own first Smart Energy customer and in 2020 we offset 100% of the CO₂ associated with our natural gas heating. All of our electricity is consumed from the grid. In 2020, NW Natural's largest electricity provider, Portland General Electric, derived 12% of its power for its retail load from wind and solar and 18% from hydro. We are also part of the Energy Trust of Oregon's Strategic Energy Management Program, which helps us continually improve our own operations through strategic equipment and building choices as well as employee behavior. We are examining additional renewable electricity program options, and we expect to use increasing amounts of RNG in the future as we procure RNG under [Oregon Senate Bill 98](#).

Environmental Policy and Leadership

Our board, executives, employees, and customers have been committed for decades to environmental stewardship, environmental protection and environmental performance. The Public Affairs and Environmental Policy Committee of the NW Natural Holdings and NW Natural boards of directors provides oversight of environmental matters.

Our dedicated environmental management and sustainability team focuses daily on these issues, and reports to our VP of public affairs and sustainability, who reports directly to our CEO. The sustainability team provides direct monitoring of our environmental performance, reporting regularly on environmental issues and consulting with stakeholders on environmental issues.

The board's Public Affairs and Environmental Policy Committee is guided by the company's environmental policy, which sets forth our commitment to:

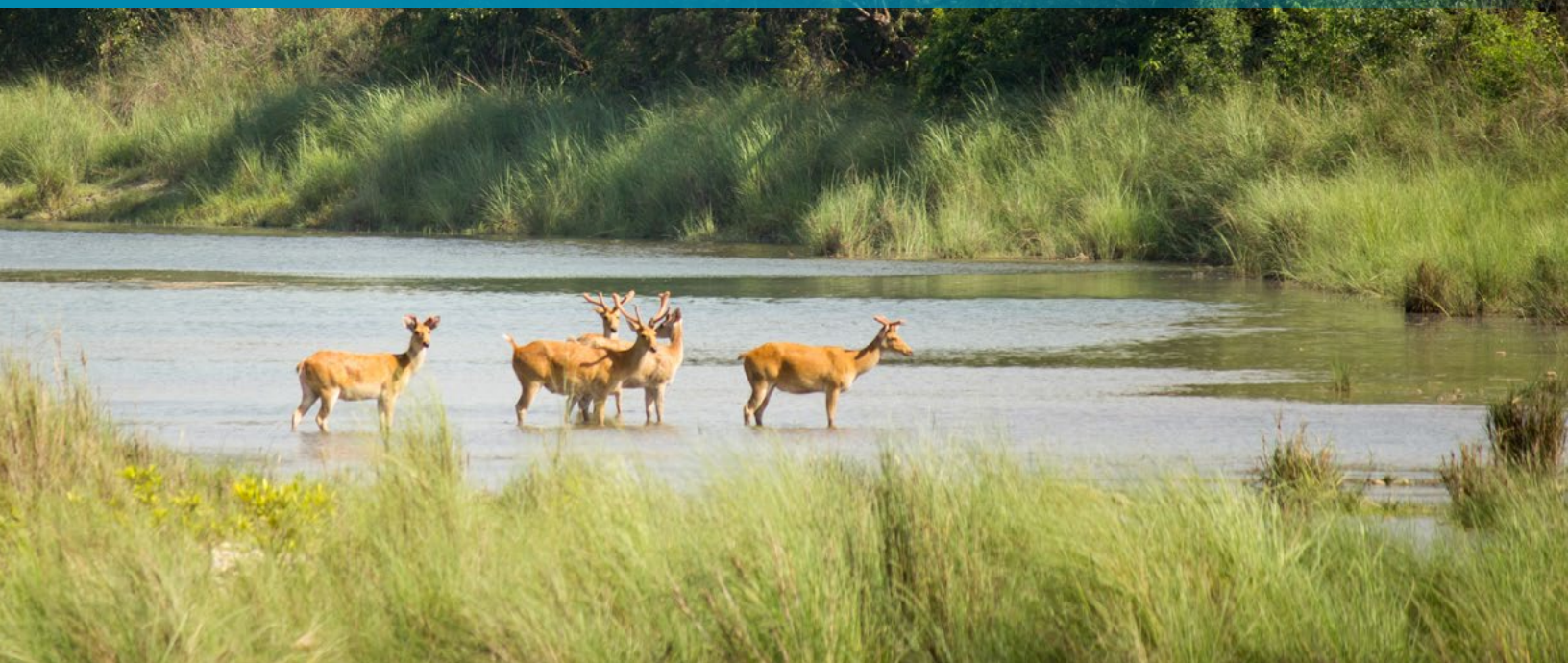
- Environmental stewardship
- Reducing emissions, releases, and waste
- Using our natural resources and energy more efficiently
- Protecting and enhancing the quality of the natural environment
- Operating our business in an increasingly sustainable manner

The policy is reviewed and approved annually.

FOR OUR USE OF NATURAL GAS, WE PAY FOR CARBON OFFSETS THROUGH OUR SMART ENERGY PROGRAM. IN FACT, IN 2007 WE BECAME OUR OWN FIRST SMART ENERGY CUSTOMER AND IN 2020 WE OFFSET 100% OF THE CO₂ ASSOCIATED WITH OUR NATURAL GAS HEATING.

With one of the most modern natural gas distribution systems in the country, in a well-established service territory, NW Natural performs a limited amount of new construction or other work that might disrupt local communities and the environment, including waterways.

WHEN WORK IS REQUIRED, OUR ENVIRONMENTAL MANAGEMENT TEAM STRIVES TO COMPLY WITH ALL ENVIRONMENTAL REGULATIONS AND LEAVE THE AREA THE SAME AS, OR BETTER THAN, IT WAS WHEN WE BEGAN.



Biodiversity, Land, Water, and Non-GHG Emissions Environmental Management

To help us use our precious resources wisely and efficiently, we have strong environmental programs that we diligently follow, and we strive for continual improvement.

With one of the most modern natural gas distribution systems in the country, in a well-established service territory, NW Natural performs a limited amount of new construction or other work that might disrupt local communities and the environment, including waterways. When work is required, our environmental management team strives to comply with all environmental regulations and leave the area the same as, or better than, it was when we began. We have a rigorous procedure manual that provides guidance on environmental matters, including EPA, Oregon Department of Environmental Quality (DEQ) and Washington Department of Ecology (DOE) regulations, and local jurisdictions' requirements. In certain instances, we take the strictest regulation within our jurisdictions and apply it to our entire service territory, which assists us in holding ourselves to a higher standard and facilitates consistent procedures across our operations.

Our internal Environmental Management System (EMS) addresses how our resource centers and field work sites are designed and operated.

The procedure manual outlines how to design sites to prevent runoff and soil erosion, mitigate spills, obtain necessary Clean Water Act permits, and follow federal, state and local rules and regulations. These rules and regulations are primarily related to water quality, air quality, chemical handling, spill response, waste, cultural resources and threatened and endangered species.

In addition, the EMS is used as a guide to rigorously vet products, substances, activities and services to help us minimize our impact on the environment and use the safest and most environmentally responsible materials appropriate in our operations. We keep environmental records and provide environmental training for each project, and

we offer awareness programs and trainings for new employees and refresher trainings for established employees. The EMS allows us to assign roles and responsibilities, as well as monitor activities for compliance with our permits. Our internal audit department performs periodic audits of our environmental programs and trainings, and external agencies such as EPA, DEQ and DOE also periodically audit our permitted facilities.

We strive to reduce and recycle any byproducts of our process. We perform waste audits periodically at all our resource centers. We have implemented recycling programs in our operations and currently recycle 100% of the following items: batteries, waste oil from our fleet transportation, oil filters, antifreeze, scrap metal, and some types of plastic. We follow EPA's rules and regulations for hazardous waste and report to the state government the amount of hazardous waste that is incinerated or sent to the landfill annually. In addition to materials recycled in 2020, NW Natural disposed of materials from ordinary operations as well as remedial site wastes. Of the ordinary operational waste that was disposed, 85% was non-hazardous waste (100% landfilled) and 15% was hazardous waste (80% incinerated and 20% landfilled).

While our natural gas distribution operations are not water intensive, we strive to adhere to all Clean Water Act requirements, and we use limited water for hydrostatic testing and pipeline construction. We also repurpose water, use leading stormwater-management techniques and conduct regular audits at construction sites.

We work to promote healthy air quality in several areas. We have invested in five CNG stations for our own fleet, which includes over 150 vehicles. A station at our Sherwood Service Center is designed to provide backup service for our CNG customers. We strongly believe that natural gas as a transportation fuel provides significant economic and environmental benefits to our customers and to the overall community. We also have an idling-reduction initiative aimed at reducing particulate emissions. Non-greenhouse gas emissions such as sulphur oxides (SOx), nitrogen oxides (NOx) and non-methane volatile organic compounds (VOCs) are not significant to our operations.



FOR MORE INFORMATION SEE ALSO:

- [Less We Can](#)
- [Renewable Natural Gas](#)
- [Vision 2050: Destination Zero](#)
- [Public Affairs and Environmental Policy Committee](#)
- [Environmental Policy](#)