OUR BUILDINGS:
THE NEXT NECESSITY IN OREGON'S CLEAN ENERGY TRANSITION

Fall 2021

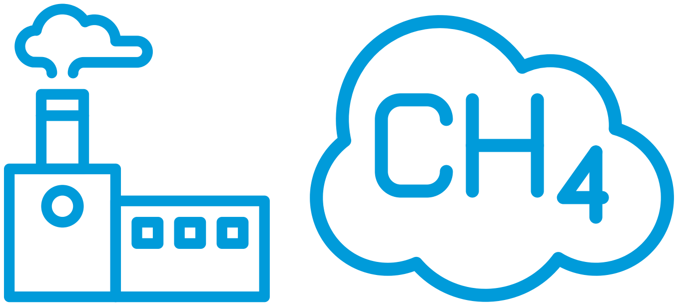
Climate-resilient, healthy buildings:

CLEAN ENERGY SOLUTIONS WE CAN AND MUST SCALE FOR OREGON'S CLIMATE AND HEALTH

As Oregon enacts *100% Clean Electricity for All* and adopts transportation electrification gains in 2021, the state is at a critical juncture to meet its goals to cut greenhouse gas emissions—and our buildings are the next major source of climate pollution that can be transitioned to being powered by a 100% clean electrical grid.

Oregon's use of coal to generate electricity has declined, but it's been largely replaced with **fossil gas** (a.k.a. "natural gas", or more accurately methane gas). Additionally, we're using more fossil gas for industrial processes and to heat and power our buildings with each passing year.[1][2] Burning fossil gas is a major source of global warming pollution in Oregon and Washington, second only to transportation.

To ensure Oregon families reap the benefits of a cleaner grid, their homes and communities must be powered by clean energy as well. Fortunately, this is achievable by decreasing our reliance on fossil gas with energy efficiency solutions and by switching to electric cooking and heating. Investing in these clean solutions now will reduce climate and air pollution and lead to a more affordable, safe, and resilient energy system for all.



Much like coal, fossil gas is one of the worst climate pollutants

Fossil gas is primarily methane, a potent greenhouse gas that traps up to 86 times more heat in our atmosphere than the same amount of carbon dioxide over a 20-year period.[3] Methane's atmospheric concentrations have doubled since pre-industrial times, making it second only to carbon dioxide as a driver of the ongoing climate crisis.

According to the Intergovernmental Panel on Climate Change (IPCC), we must reduce methane emissions by 40–45% worldwide by the year 2030 to limit global warming to 1.5° C, alongside substantial simultaneous reductions of all other climate pollutants.[4]

Using gas in our homes and buildings causes major health harms

Most people spend 90% of their time indoors where they live, learn, work, or play. Indoor gas appliances release numerous pollutants, including carbon monoxide, particulate matter, nitrogen oxide, lead, and formaldehyde. A recent study of indoor air quality in homes with gas appliances found that after cooking for just an hour with a gas stove and oven, the levels of nitrogen dioxide exceed both state and federal *outdoor* air quality standards in more than 90% of the homes tested.[5]

These pollutants are very harmful to human health, particularly for children and individuals with respiratory illnesses. In Oregon, burning fossil fuels in buildings was responsible for at least 20 people dying earlier than their expected lifespans and over $221 million in health impacts during 2017 alone.[6] Another study found that children living in a home with gas cooking appliances increases their chances of developing asthma symptoms by 42%.[7]

Fossil gas disproportionately harms Black, Indigenous, and communities of color

As an ongoing legacy of racist public policies like redlining and urban renewal, BIPOC communities are more likely to reside in areas affected first and worst by both air pollution and climate impacts.[8] On average, Black Americans are exposed to air 38% more polluted than white Americans.[9] Additionally, more than one million Black Americans live within a half-mile of gas facilities, resulting in higher rates of cancer and other health problems.[10] Communities of color are already disproportionately impacted by outdoor air pollution, and should not continue to be excessively harmed by poor indoor air quality from burning fossil gas when clean, affordable alternatives are readily available.

Emphasis on 'renewable natural gas' and 'renewable hydrogen' in buildings are red herrings

Renewable natural gas (a.k.a. RNG or biogas) is created primarily by capturing biomethane from dairy farms, landfills, and wastewater treatment plants, among other sources.

RNG holds some promise as a niche source for some "hard-to-electrify" applications, such as high-heat industrial processes. However, studies show that RNG could only replace about *three to 16 percent* of Oregon's existing fossil gas demand and will cost much more than electrification.[11] Further, as with fossil gas, RNG is still primarily methane and its use poses the same public health and safety risks.

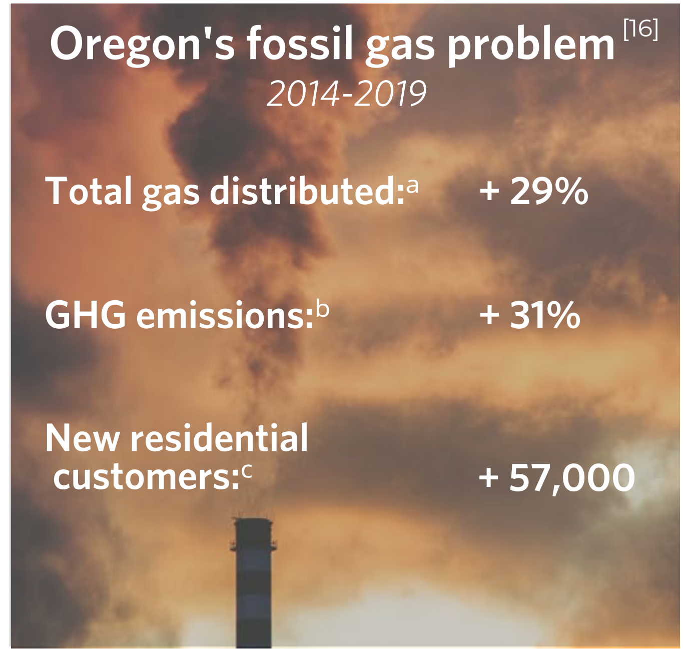
In the US, **hydrogen** as an energy source is currently produced almost exclusively from combusting fossil gas (i.e. "blue" or "gray" hydrogen).

Renewable, or "green" hydrogen costs up to six times more to produce from non-fossil fuel sources and faces significant technical production barriers at scale. While these technologies are worth pursuing for specific "hard-to-electrify" applications, it cannot compete with Oregon's 100% clean electricity—cheap and readily produced from clean, non-fossil fuel energy sources.[12]

Further, significant percentages of either renewable natural gas or renewable hydrogen would require the replacement of gas pipelines, infrastructure, and end-use appliances, such as furnaces and water heaters.[13] For these reasons, electrification is the most cost-effective, realistic and equitable solution for reducing climate pollution in buildings.

More gas is not a viable solution

The oil and gas industry claims that so-called "natural" gas is a clean-burning "bridge" resource, and that RNG and hydrogen are viable solutions to the climate crisis. However, ***methane gas (including RNG) releases harmful greenhouse gases and toxic pollutants when it is extracted, transported, and burned.***[14] Additionally, as previously discussed, mass adoption of RNG and hydrogen would necessitate massive upgrades to gas infrastructure and end-user appliances, the cost of which gas utilities will likely seek to pass along to ratepayers in order to remain profitable, even if electric alternatives would be more cost-effective for their customers and communities.

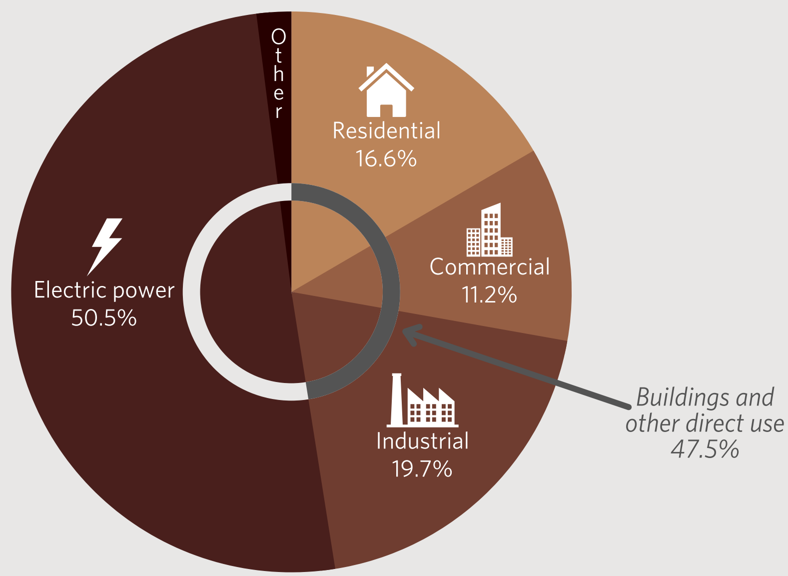


Electric appliances can replace virtually all direct uses of gas

From cooktops to furnaces, clothes dryers, and water heaters, today's electric appliances are more reliable, energy-efficient, and affordable than ever before. Homeowners and businesses can replace gas appliances when needed with modern electric ones to enjoy saving money over time, better indoor air quality, and equivalent (or even better) performance.[15] Additionally, electric appliances are future-proof: investing in electric appliances will help make the clean energy transition worry-free for millions of Oregon's residents and business leaders.

Oregon's fossil gas consumption by end-use [17]

2019



Climate-resilient, healthy buildings can create jobs and save Oregonians money

In addition to clean buildings' climate and public health benefits, a variety of studies have found that switching from gas to all-electric heating and cooking technologies can save utility customers money. One study found that the upfront costs of electric heating systems are $1,500 lower than conventional gas alternatives.[18] Another found that all-electric buildings in California are comparable to or slightly less expensive than gas-plus-electric buildings over a 20-year life cycle.[19] A third study found that in the Pacific Northwest, the average new all-electric home ***saves $4,500 in up-front costs*** and 28 tons of CO_2 emissions over a 15-year period, compared to a new home with gas appliances.[20]

Transitioning to all-electric new buildings will also prevent a costly and unnecessary expansion of gas infrastructure, which in turn poses a risk of stranded assets. New buildings often have a life expectancy of over 50+ years, and gas pipeline systems have similarly long lifespans.[21] As the climate crisis worsens and consumers become increasingly aware of the impacts from gas and the benefits of electrification, ratepayers who can afford to switch to all-electric homes will voluntarily defect from their gas utilities.

Indeed, a study issued by the California Energy Commission noted the importance of planning now for the transition away from gas, and highlighted requiring new buildings to be all-electric as a primary strategy to effectuate this transition.[22]

States and cities across the country are ramping up incentives for building owners to switch from gas to electric heating and cooking options. As this gas phase-out occurs, low-income households and renters will be least likely to be able to switch. Without planning ahead with ambitious policy action to ensure everyone can go all-electric as quickly as possible, this will create stranded costs and increase bills for remaining gas utility customers.

In addition to cost savings for consumers, a rapid transition to clean and efficient buildings will create jobs in HVAC work—both in electric appliance installs, service and maintenance—as well as construction jobs associated with building modifications. A study by UCLA found that updating to efficient electric appliances in California's buildings over the next 25 years would create ***100,000 full-time jobs*** in construction, manufacturing and the energy sector each year.[23]

Fossil-free buildings are safer and can increase community resilience

There are countless examples of gas infrastructure posing significant public health and safety threats, including leaks and gas pipeline explosions. In March 2021, a gas pipeline exploded in Lincoln County, KY, killing at least one person.[24]

A few years ago, an excavator dug on the wrong side of the street in Portland, causing a gas explosion that seriously injured a firefighter and destroyed several buildings.[25] And the prevalence of earthquakes in Pacific Northwest increases the risk of this issue. Highly pressurized gas pipelines are at high risk of exploding during earthquakes and wildfires, causing immediate danger.

By contrast, all-electric buildings are more resilient following natural disasters such as wildfires and earthquakes, as electricity can be restored more quickly than repairs can be made to ruptured gas lines.[26] Energy efficient buildings can also help protect families from wildfire smoke and other outdoor air pollutants and save money on home heating and cooling costs.[27]

Conclusion

To ensure a livable climate and safe and healthy communities, Oregon must be a leader in rapidly transitioning gas out of buildings. But gas companies are doubling down on efforts to maintain their business model and continue to push gas in buildings—both fossil gas and RNG—so it's up to Oregon's leaders to think creatively and proactively to help Oregonians make this transition.

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