



**James Quirk:**

Hello everyone and thank you so much for joining us today. Welcome to the Western Resource Advocacy webinar, A Path to Pollution-Free Buildings

I'm James Quirk, Senior Communications Manager here at WRA and the Zoom Webinar host for our event.

I wanted to give a few reminders before we jump in. The webinar today will be one hour and while the format is mostly presentations and QA between our moderator and panelists, we will be taking questions from our audience via Zoom's Q&A function.

This will show up as a Q&A icon in the bottom center of your screen. While we might not be able to get to all questions today, we will try to follow up as needed if we can't get to your specific question.

We also have enabled close captioning. This feature should show up as an icon at the bottom of your screen as well, and you should be able to select it to turn it on and off throughout the webinar as you see fit.

Also, this webinar is being live streamed to WRA's Facebook and LinkedIn pages and recorded.

We will send everyone who is registered, whether in attendance today or not, the recording within the following week.

Before I turn this over to our moderator, I would like to first thank our sponsors for today's event.

First up, our impact sponsor First Bank. Our premier sponsors, Sol Up, Energy and Vision Ridge Partners. And finally, our signature partners, SCARPA, Southwest Energy Efficiency Project, or SWEEP, and Torch Clean Energy.

As a nonprofit, our work depends on donations and partnerships with businesses, organizations, and individuals throughout our region and beyond. Our generous sponsors and supporters allow WRA to bring you important programming and resources like today's webinar and to share solutions to the region's most pressing conservation challenges.

And with that, I'll turn this over to our moderator, Stacy Tellinghuisen. Stacy is deputy director for policy development here at WRA. In her role, Stacy advances climate policies that support clean energy across the organization's 7 state region and ensures there are equitable benefits for the region's diverse residents.

She represents WRA in state regulatory commissions and works with partners to develop legislation to catalyze the transition to a low carbon economy. Stacy, welcome.

**Stacy Tellinghuisen:**

Thank you, James, and welcome everyone. Thank you for joining us today. I am really looking forward to the discussion with our panelists today.

Before we get started, I wanted to share some background on Colorado policies to help frame our conversation today and to give a quick overview of our new report, “A Path to Pollution-Free Buildings: Meeting Xcel’s 2030 gas decarbonization goals.”

As background, I think many folks here on this webinar know, but Colorado has set ambitious economy-wide emission reduction goals of 26% by 2025, 50% by 2030, and 100% by 2050. In 2023, the Colorado legislature also established emission reduction goals between 2030 and 2050.

Colorado has made really significant progress in certain sectors, namely electricity. Most of Colorado’s electric utilities now have plans to reduce their emissions by at least 80% by 2030. And this is really critical because we can leverage progress in the electric sector to electrify other sectors like transportation and buildings.

Today we’re focusing on residential and commercial buildings, which represent approximately 1/6<sup>th</sup> of Colorado’s energy related emissions.

And emissions from these buildings primarily stem from burning natural gas for space and water heating. For example, in residences, space and water heating accounts for almost 95% of natural gas use.

I think, in general, decarbonizing energy use and buildings is really critical to meeting Colorado’s economy-wide admission goals. Which brings me to the legislation Colorado passed to address emissions from gas utilities.

In 2021, the Colorado legislature passed nation leading legislation in Senate bill 264, which established a clean heat standard for Colorado gas utilities. Under the legislation, gas utilities have a goal of reducing emissions 4% by 2025 and 22% by 2030 relative to 2015 levels.

Those goals cover both emissions from customers end use and methane leakage on the distribution system. The legislation established a suite of eligible clean heat resources. Those resources or eligible measures are listed here.

And then through 2022, the Colorado Public Utilities Commission held a really extensive role making to establish the rules for utilities to file their clean key plans.

And just earlier this week, Xcel filed its first clean heat plan on August 1. So, getting to kind of what was driving our goals for this work, Western Resource Advocates, SWEEP, and NRDC developed our recent analysis and report “A Path to Pollution-Free Buildings” to really identify the suite of strategies needed to meet Xcel’s 2030 emission goals.

We wanted to understand the level of appliance adoption and utility investment that’s really needed to achieve those goals. And the analysis finds that two clean heat resources, energy efficiency and beneficial electrification, can achieve the needed reductions.

Though it really requires robust utility programming and a true market transformation. As I mentioned earlier, achieving these emissions goals is really key to meeting Colorado's economy wide climate goals.

And because appliances like furnaces have a long lifetime, it's really critical that we start now.

Today, our panelists will discuss the details of the analysis, including what is required to meet the 2030 goals, the cost effectiveness of different clean heat resources, and how we can best deploy those measures in a way that promotes equity, improves air quality, and ensures low- and moderate-income customers really benefit from this transition.

So now, I'm happy to introduce our first set of panelists who will speak on different aspects of the report.

First, welcome Dr. Asa Hopkins, Vice President at Synapse Energy Economics. Dr. Asa Hopkins is an expert in the development and analysis of public policy and regulation regarding energy and greenhouse gas emissions, including cost benefit analyses, stakeholder engagement, state energy strategy and planning, and utility planning. Since arriving at Synapse in 2017, Dr. Hopkins has focused on utility and demand side issues and utility performance metrics.

We're also happy to welcome Lorena Gonzalez, Communities and Justice Campaign Manager at Conservation Colorado. In her role, Ms. Gonzalez works with grassroots and environmental partners to hold the state accountable to meeting its climate targets and aggressively reducing emissions. An essential part of this work is making sure that the state is addressing issues that impact communities that have long born outsized impacts from environmental hazards.

And finally, thanks to my colleague, Meera Fickling, Senior Policy Advisor for joining us today. As part of WRA's Clean Energy Team, Ms. Fickling advocates for policies that reduce greenhouse gas emissions, achieve state-level climate goals, and accelerate a transition toward renewables, energy efficiency, and lower carbon fuels. Her particular focus is on efficiency, gas systems, and decarbonization in Colorado buildings.

So first up, Meera Fickling will discuss findings and takeaways from the report.

Next, Asa Hopkins will talk about the cost effectiveness of the resources presented in the report.

And finally, Lorena Gonzalez will speak about the community impact of clean heat. With that, I'll turn it over to Meera.

**Meera Fickling:**

Meeting the clean heat targets is not going to be a small task.

Xcel's retail gas sales and its greenhouse gas emissions have grown by about 10% since 2015, which is the baseline year for the clean heat targets.

Meeting the targets not only requires them to reverse course but reduce emissions by almost 30% from today's levels.

But meeting the target is still possible. And it requires a market transformation for heat pumps within 7 years.

So, to achieve this, we need to, one, incentivize Colorado to replace ACs, gas furnaces, and gas water heaters at end of life with heat pumps and heat pump water heaters. As we will get to in a minute, AC replacement is really driving heat pump adoption in our scenarios.

Two, accelerate efficiency savings from weatherization insulation, behavioral efficiency, and other programs. Three, front load spending on workforce development and customer education. And four, ensure that low-income households are included in the transition.

So, this slide shows the challenge in a little more detail. And it shows that Xcel's gas sales have slowly increased since 2015 by a little over a percentage point per year.

And under business as usual, so without actions from the utility, the state, and localities to reduce use of gas, gas sales are expected to increase even further, whereas we need to instead quickly reduce gas sales to meet the 2025 and 2030 targets.

Our portfolio reduces emissions using only electrification and efficiency. And I want to talk a little bit about why we did that.

The clean heat law gives us three main pathways to reduce emissions that are allowed by law. Energy efficiency or reducing the amount of gas you have to burn for space and water heating. Electrification or switching your gas burning appliances for ones that use electricity or alternate pipeline fuels, so in other words, substituting hydrogen or renewable natural gas for a portion of the fossil gas that's piped into your home or business.

We chose not to incorporate that third option, alternate pipeline fuels, in our portfolio for a couple of reasons. One, both renewable natural gas and hydrogen are limited and how much they can contribute to those targets. So, the total potential RNG, renewable natural gas in Colorado would substitute for only about 5% of the total natural gas demand in the state.

And the appliances in our homes aren't designed to run on hydrogen. Some estimates suggest the maximum safe hydrogen blend in gas appliances is only 5% by volume, which would correlate to about a 3% reduction in emissions. So relatively limited in potential.

The second reason we decided not to incorporate these resources is cost. Hydrogen and RNG cost several times more than natural gas does today on a cost per ton of greenhouse gas emissions basis.

Hydrogen and RNG would cost ratepayers about 5 times more than rebates for cold climate pumps do today at current rebate levels. So, we found that the most cost-effective way to construct this portfolio was through electrification and efficiency.

So just to provide some information about our portfolio. And before I get into the numbers, an overall note: For the most part, we target end of life placements. That's because the vast majority of households replace the furnace A/C or water heater when it fails.

So that's when it makes the most sense for families to buy heat pumps because they'd have to replace their appliance anyway.

So, all of the numbers here refer to the percentages of replacements of failed appliances. These are not the percentages of all households.

Moving on to some of the numbers. So first we need to ramp up gas efficiency savings by about 20% while transitioning those savings from gas appliances, which are the majority of Xcel's gas efficiency programs today, to weatherization and other ways of reducing energy demand for heating.

This is really important since weatherization not only reduces emissions, but it also reduces the cost of electrifying both for customers and in terms of grid impacts. By 2029, all new homes are built all electric.

We see new buildings as low hanging fruit. They're already cheaper to build all electric and there's a state electric ready model code in place that localities need to adopt when they update their codes, and a lot of cities along the front range in Xcel service territory are already adopting either all electric or electric preferred codes for new buildings. So, for example, Denver, Northglenn, Lafayette and Erie to name a few cities that have done so.

The workhouse of our portfolio is A/C replacements. So, we assume that by 2029, a hundred percent of residential A/C units are replaced by heat pumps on burnout.

Incentives drive this transition with IRA and state tax credits, standard heat pumps are already cheaper than ACs, but to facilitate this, we also do recommend that the state pass a law or regulation requiring ACs to be two-way, so providing both heating and cooling by, 2029. And by 2029, 75% of residential gas water heaters are replaced on burnout with heat pump water.

Here you see a slide that shows how our portfolio drives emissions. So, as you can see, electrification drives almost 90% of the savings by 2030.

Although efficiency does play a larger role relative to electrification in early years. It does take a few years for electric appliance sales to really ramp up, but our portfolio starts to bend the curve of gas sales almost immediately. So, sales start falling rather than rising.

And as heat pump sales start to accelerate later in the decade, gas consumption starts to fall more dramatically.

Utility efficiency and electrification programs are typically driven by financial incentives, and incentives are important. It's critical that we close the gap between the cost of a gas furnace and A/C and the cost of a cold climate heat pump if we are to drive this transition.

I do want to note that they're necessary not sufficient. And if we rely on large incentives alone to drive the transition, that's not the most cost-effective way to do so.

So, we really tried also to look at other complimentary policies that largely don't require much money to help speed the transition.

So, on contract or outreach and marketing, we look to Maine as a model. Maine is a cold state. It's even colder than Colorado and it has already ramped up its market for heat pumps close to where Colorado needs to be in 2030.

In the past four years, they've achieved annual sales growth of 50% to 100% every year, which is exactly what Xcel needs to do over the next few years to be successful.

And there are some key lessons learned from their programs and other states around the country. And I could go into a lot more detail than time allows, but the bottom line is that they've structured their programs to be very easy for contractors to access and provide incentives for contractors to sell as many heat pumps as possible to customers.

Additionally, codes and standards can play a really significant role. Building codes that encourage electrification are popping up along the front range, and that's a really critical piece.

Again, a two-way A/C standard would really help provide direction to the A/C market. And these are appliances that are already cheaper than one way A/C is within.

So, on this slide you see our proposed budget. This chart alone may be a bit confusing. So, I want to take a second to walk through these numbers.

The wedges you see here are the total budgets required to implement the clean heat plan. Dark orange is the total cost of incentives for residential electrification. Light orange is the total cost of commercial electrification. These are the total cost of each year, but a lot of this will also be covered by the utilities existing approved beneficial electrification and demand side management budgets.

So, the black line shows the additional budget, net of those other DSM programs that are already in place that will be required for the clean heat plan.

And that amount comes to around \$125 million dollars in 2030. I also want to stress that that \$125 million isn't necessarily the bill impact and doesn't include any of the benefits of the plant or ratepayers, which I'll get into on the next slide.

Even though our plan is a substantial investment, it has benefits for ratepayers as well. First, we need to consider this plan in the context of the half a billion dollars a year that Xcel currently spends on expanding and maintaining its gas distribution system.

This is gas infrastructure that ratepayers are expected to pay off over several decades but will largely become obsolete by 2050 if and when we are able to transition from fossil fuels.

So, to the extent that we can target electrification incentives and investments to new construction, as well as existing homes and businesses and geographic areas that are growing quickly, we can avoid having to spend money on gas system expansion.

Our conservative estimate is that the portfolio would avoid over \$50 million in gas infrastructure spending in 2030 just based on new construction alone, that leaves out how electrification of existing buildings can also avoid spending on the gas. So, although this plan is a big investment, it also has substantial benefits for ratepayers monetarily.

Additionally, the plan avoids \$200 million per year in carbon emissions and improves home comfort, air quality, and cooling access. It reduces exposure to gas price shocks like the one we just experienced this past winter due to the war in Ukraine.

And finally, this is an upfront investment in a long-term transition. So, if we are able to make heat pumps the default option for HVAC in Colorado, we won't have to spend as much, if anything, on incentives in the decades to come, but we'll still see greenhouse gas emissions reductions as more people replace their ACs, their gas furnaces, and their gas water heaters on failure.

And that's different from fuels like renewable natural gas, which has an increasing marginal cost. The more you need, the more you need to get it from expensive sources like animal manure and food waste, as opposed to cheaper sources like landfill gas.

So this is really an investment in what we need to do to decarbonize in the long term.

**Stacy Tellinghuisen:**

And I think we'll now turn it over to Dr. Asa Hopkins who will discuss some of the cost-effectiveness analysis that Synapse have done.

**Dr. Asa Hopkins:**

Thank you, Stacey. I'm just going to talk a little bit about some analysis that those of us at Synapse did for Western Resource Advocates. A separate report describing our analyses is worth coming.

I want to make a point that you see the rest of the names below mine on the side who did the vast majority of this work, Kenji Ellen, Phillip, Kyle, and Paul. I'm pleased to be here to represent our work today.

Just for those of you who don't know who Synapse is, we've been around for almost 30 years. We're based in the Boston area. We work for public interest and government clients providing rigorous analysis in the energy sector.

The scope for our work was really looking at three different resources, that Meera was just talking about, electrification, renewable natural gas, and green hydrogen, trying to understand what those resources look like from a utility cost perspective.

How much potential might be achievable, on what kind of timeframe, from those different resources and, and how much emission reductions, those resources might be capable of boiling down to the final results you see over on the right, summary results of overall cost per ton of emission reductions using these 3 different resources.

We were focused exclusively on the residential sector for this analysis. But as, as you saw in Meera's slides, that is the lion's share of the mission reductions that are required.

So first, electrification. So, we looked at the cost side. Again, this is the utility cost from the gas utilities' perspective, from perspective of the utility running a program.

So, these are primarily based on incentive amounts for heat pumps and heat pump water heaters. We looked at existing levels of incentive offered in different states. So, that's the dollar side of it at the top of the ratio.

The emission reductions from electrification come from the greater efficiency of electric equipment and from the fact that the electric grid is relatively clean and getting cleaner rapidly.

The ability of electrification to reduce emissions is limited by stop turnover rates. This is exactly the same thing again that Meera was talking about, that absent some much larger incentives and costs associated with early replacement, their path of most cost-effectiveness has to do with capturing market share at the time that folks are replacing equipment, whether the AC or heating equipment.

For renewable natural gas, the cost is based on the incremental fuel costs so that the cost of renewable natural gas above and beyond the cost of the energy equivalent cost of fossil drive methane.

The emission reduction in this case depends on what the different feed stocks are. The lifecycle emissions of renewable natural gas depend very heavily on where that biologically sourced methane is coming from and what the process is to acquire it and carry it to customers.

And the potential in this case is limited by regional resource availability. There's only so much biomass that is readily transformable into methane. And so, we looked closely at how much of that there is when thinking about that portfolio construction.

And then finally, green hydrogen. Again, we're looking at the incremental fuel cost on an energy basis. We recognize that there are substantial tax incentives in the Inflation Reduction Act that, you'll see in a moment, have a strong effect on the cost of green hydrogen.

The potential is limited by blending limits, for both gas pipeline safety and customer equipment safety. In our case, we assume that green hydrogen could ramp up to about 10% by volume, which is about 5% or so below that by energy. But ramping up slowly over time to account for the need for that resource to scale over time.

For emission reductions, we basically assumed that the that green hydrogen was produced from 0 hydrogen electricity, so simplifying the assumption of green hydrogen as a zero-emission fuel.

You can see over there on the right the net result. For the Xcel scenarios for heat pumps, it's about a hundred dollars a ton levelized over time. Renewable gas energy and green hydrogen are about two and a half times as expensive on a levelized basis.



So, this shows a little bit of the time dynamics that are going on there. Heat pump emission reductions are more expensive early and less expensive later largely because the amount of emission reductions that you get per heat pump increases over time as the electric grid is getting cleaner.

For RNG, you see the effect that Meera mentioned where increasing demand over time results in needing to get access to more expensive RNG resources, and so that RNG cost per time actually increases over time.

The underlying technology cost of green hydrogen is falling. You know, it's a rapidly evolving technology. However, you could see the scale of the IRA tax incentives there, bringing what would be numbers above \$700 a time down to be in the range with RNG and heat pumps until those tax credits expire and then the cost pops up to its more physical and economic base cost.

But as you see, the heat pump option on a utility cost per time basis is the lowest cost resource across those three in each year of our analysis.

We looked at a couple of different portfolios just to compare. They achieve the same level of emission reductions by 2040 but one of them is a sort of as many heat pumps as you can imagine getting in with stock replacement and then filling in the rest with the other fuels.

Whereas the other is how much RNG and hydrogen could you possibly plausibly get access to and then how do you still achieve your emissions reductions with some amount of electrification.

So, it's sort of electrification first versus fuels first. Neither of these is intended to reflect any state specific compliance pathway. The work in the report is really tailored to that but, for this webinar, this is more of a big picture comparison.

When you put the cost per ton that we showed you into those different scenarios, you see that the electrification forward scenario, not unexpectedly, comes out to have a lower portfolio cost overall in terms of cost per ton of emissions reduction. Thank you.

**Lorena Gonzalez:**

Hi, everybody. My name is Lorena Gonzalez.

I appreciate you all having me here today. I know that the concepts we are discussing today can seem a little abstract, so I'm going to talk about what this actually translates to in our own lives in the context of public health, community benefits, and we'll have equity and environmental justice sprinkled throughout because they are both a requisite to achieving pollution free buildings.

As we've heard from advocates, so many of our homes and places where we work commonly use natural gas as fuel for heating and cooling.

But natural gas isn't harmless. Its main ingredient is methane, which is a planet warming gas that can negatively impact our health inside of our homes.

Natural gas-powered appliances such as furnaces, boilers, and water heaters can release air pollutants that are harmful due to their high concentration in close quarters, causing dangerous indoor air pollution and endangering our respiratory health. And according to the EPA, Americans spend more than 90% of their time indoors, where concentrations of some pollutants can range from 2 to 5 times as high as outdoor concentrations.

So, this is not nothing, right? Let's talk about the health impacts. Natural gas produces the byproduct of nitrogen dioxide, which is an air pollutant that can reduce lung function, cause inflammation of airways, increase asthma attacks and worsen other respiratory issues. And it's also known to harm children's respiratory tract and cognitive development.

And to layer on that, I do want to reference a study released in June where Stanford scientists in 2022 measured benzene from gas stoves in 87 California and Colorado homes.

They found both natural gas and propane stoves emitted detectable levels of benzene that in some homes raised indoor benzene concentrations above established health benchmarks.

They also found that benzene pollution can migrate throughout a home and good ventilation can typically help reduce the concentration of this pollutant, but the researchers found that exhaust fans were often ineffective at eliminating benzene exposure.

And for those who don't know, benzene is linked to leukemia and other blood cell cancers.

In addition to that, it's really important to highlight how this impacts folks across different intersections.

We know this burden falls heaviest on low-income populations and communities of color who may inhabit smaller and older homes or apartment buildings with structural and maintenance issues that may require extra work done before installing new energy equipment.

Not only that, but these communities are less likely to have range hoods or other ventilation in place and also tend to have higher existing rates of respiratory disease like asthma.

Fortunately, though, the good news is that by making homes more efficient and electric, we can prevent the negative impacts of natural gas.

So, by swapping gas appliances for electric ones when they reach the end of their life and by implementing building energy efficiency measures like air sealing and insulation. All of that can help facilitate healthy and safe indoor air quality, which is what we all want, right?

To not have to think twice about the air that we and our families are breathing inside of our homes.

And if efficiency upgrades are paired with electrification, it would have great benefits to reducing heating bills, which is really essential for the Coloradans dealing with energy insecurity and forced to make tough tradeoffs when having to pay high electric bills.

From a climate perspective, it is worth naming that at this moment in time we saw July make history as the hottest month ever recorded, leaving those without cooling at high risk of heat illness.

And in fact, 30% of Denver residents do not have air conditioning. Well, the heat pumps can help address that by helping these households access A/C during increasingly hot summers.

We know that a heat pump can function as a furnace and an air conditioner in one device.

And so now the challenge before us is how do we get these in more homes in an equitable manner and fast? And how are we making sure there is public education on heat pumps and other clean energy measures because I can assure you that many in my community don't know what that is and that's of no fault to them. It's an education and an outreach problem.

Another point on climate is that Colorado is behind under a near term economy wide greenhouse gas pollution. And so, we really must prioritize measures that work with us, not against us. And electrification and energy efficiency at scale can help us stay on course and avoid climate disaster.

So next I'd like to spend some time talking about the environmental justice and equity implications of transitioning to clean heat, which must be kept front and center in this conversation.

One of the pillars of environmental justice is distributive justice, ensuring there's an equitable distribution of benefits. When it comes to clean energy measures, the truth is that they've disproportionately benefited higher income households.

And that has created distrust among underserved and disproportionately impacted communities. And it's really unfortunate because these folks stand to benefit the most from these interventions as they often face poor outdoor air quality, often having no reprieve from pollution outdoors or indoors.

And they also face a slew of economic barriers. Some of those barriers that we need to account for in the transition to clean heat are the upfront costs of new electric appliances or required home renovations, which do pose a barrier for low-income families who may not have the disposable income.

And another barrier we need to solve is ensuring that renters are able to benefit from electrification and energy efficiency measures. We need policies targeted to renters because there is a split incentive problem. While a renter may receive an incentive, landlords do not.

And renters also understandably fear that any upgrades may mean an increase in rent or even eviction in order to rent the property to more affluent renters. It's something that we definitely need to keep top of mind.

So as is mentioned in the report, that's why it's so crucial that Xcel and the PUC are strategic and robust incentives as well as on bill financing for low and moderate households to lower the cost of electrification and enable those investments in energy efficient appliances.

And this can result in improving indoor air quality, lower energy bills. And it will also offer greater resilience against rising gas prices.

In close, I do want to thank my colleagues again for crafting such an important report. And I cannot emphasize enough the need for the clean heat plan of our state's largest utility to

prioritize those targeted and strategic investments of the clean energy measures discussed today, specifically to low-income households and disproportionately impacted communities.

**Stacy Tellinghuisen:**

Thank you to all of our presenters. And we have about 25 minutes left. We're entering the question to answer portion of our conversation and as part of that I'd like to welcome two more panelists to our group.

First, please welcome Justin Brant, Utility Program Manager Southwest Energy Efficiency Project.

Mr. Brant's SWEEP work centers around the gas transition and decarbonization of gas utilities, advocating at public utilities commissions around the Southwest for stronger energy efficiency, demand management, redesign, and beneficial electrification.

Welcome Justin. And I'd also like to introduce Kiki Velez, equitable gas transition advocate at Natural Resources Defense Council.

Ms. Velez focuses on equitable transition to clean electricity and buildings with a particular focus on achieving a managed gas system transition.

Justin and Kiki were primary authors of the report, "A Path to Pollution-Free Buildings," and we're happy that they are here to share their perspectives today.

I want to invite all of the panelists to turn your cameras on now and also just want to remind the audience again, feel free to please ask questions in the Q&A function at the bottom of the Zoom screen.

We've gotten a few questions here and we will hopefully have time to answer several of them at the end, but I have a few preplanned questions to start.

So, to start, I will turn to Asa. Asa, you work in states around the country, some of which have similarly ambitious emission reduction goals. Is the kind of market transformation that we're discussing here even feasible and are there lessons Colorado can learn from other jurisdictions?

**Dr. Asa Hopkins:**

Thanks, Stacy. I guess the first answer is achievable, yes. Easy? No. The level of ambition required to decarbonize entire sectors of the economy in relatively short order is a big task.

That said, there are places, if you look across and pick what people doing best for different components and able to put it all together and we're all able to learn from each other, then I think we are in a much better shape, than states trying to reinvent the wheels time after time.

Maine is, as Meera mentioned a couple of times in her summary, a really promising place to look. They've been able to develop the workforce. To really change the default about how people think, right? I mean, that's what market transformation is, right? What am I shopping for? Am I shopping for heating? Am I shopping for a heat pump? Am I shopping for a replacement gas furnace, right?

Like the way that people think about it is, you know, is a measure of what it means to transform the market.

A place where there is market excitement. And that that when you call someone up, they're like, yeah, sure. I'm happy to come install that for you, right? But the workforce piece, getting the contractors on board.

You know, that's a critical piece that goes along with any incentive budgets or the rest of it is knowing that when you call up the contractor, you're going to get someone who's experienced who's done a bunch of relevant work, and you can talk to their other customers, right?

You can know that they're excited to come and make that installation for you. Each state is going to try things a little differently and we're always doing a good job of keeping an eye out across the country.

And we're always doing good job of keeping eye out across the country to say, oh yeah, that's the great thing that somebody tried Vermont or in Minnesota or in California or in Texas

We should be able to think about how to bring that to bear in each state and help everyone up their game.

**Stacy Tellinghuisen:**

Kiki, I wanted to ask you the next question or at least give you the opportunity to start with the next question.

The report, as Meera described, focuses on efficiency and electrification. Can you share why you focus on efficiency and electrification and where you see the role of renewable natural gas and hydrogen.

**Kiki Velez:**

Thanks for the question. So, you know, it'd be great if there were just this magical drop in fuel that could replace all of the natural gas that Colorado currently uses, but that just doesn't exist. Bio methane and hydrogen can't be scaled to cost effectively meet Colorado's climate targets.

So that's why we focus on the solutions that can be scaled, like electrification, energy efficiency, that are proven and cost effective as Asa described in his presentation.

Just to dig into this a little bit more, bio methane is really limited in availability. Its carbon impact can vary widely by feedstock.

The Colorado Energy Office estimates that the RNG that could be produced from four major sources in Colorado being agriculture, food waste, landfills, and wastewater could only displace less than 5% of Colorado's total annual gas demand in the state. So, it's not going to be a major component of any clean heat plan.

And likewise, green hydrogen is a very early-stage technology. So, it's really expensive as we've already talked about in this webinar.

And it can also only be safely blended into existing pipelines at up to 20% by volume. Which is actually only 6 to 7% by energy content. So just displacing only as much as 6 to 7% of current gas use.

Before triggering costly pipeline overhauls. And that's because hydrogen causes embrittlement in many current common pipeline materials.

It also reduces pressure in pipelines, which can affect the way that pipelines are operated, and it leaks more easily than gas in pipelines because it's a smaller molecule.

And when it leaks, it causes significant warming as well. So, these fuels might be needed to address carbon emissions in some of the harder to decarbonize sectors, for example, maritime shipping.

But in buildings, they're just not cost effective or scalable. And we know that energy efficiency and electrification are and they're proven technologies and that's why we focus on those in this report.

**Justin Brant:**

just to add, I think another, you know, I see energy efficiency and electrification is sort of no regret strategies.

Investing in some of these alternative fuels means we need to continue investing in the maintaining expanding the gas system as we have, which comes at significant cost.

And if Colorado is to meet its long-term emission reduction targets, we need to reduce gas usage, almost to 0, essentially. So by continuing investments at the pace, we've been at, we really risk huge future costs, that will need to be paid for.

But by investing now in energy efficiency and electrification, we can hopefully avoid a significant amount of those costs.

**Stacy Tellinghuisen:**

Thanks Justin and we've gotten a couple of questions about the clean heat plan that Xcel just filed. I want to turn to Meera. While recognizing that you've had less than 48 hours to review the plan that was filed, I don't know if you have any high-level takeaways that you can share from it and how it compares with the portfolio of measures that WRA, SWEEP, and NRDC have laid out in the new report.

**Meera Fickling:**

Thank you. I'll just say that, you know, we're, of course, still continuing to dig into the Clean Heat Plan filing. It's a huge filing, and we look forward to wrapping our heads around it in the coming weeks, but I guess I do have a few high-level takeaways from what I've seen so far.

So one is that the plan just reinforces that electrification is a cost-effective part of every portfolio of measures to reduce emissions and buildings, and I think this speaks to the future of heating in Colorado.

That no matter what portfolio you look at ours, Xcel's, we are going to be deploying thousands of heat pumps across the front range.

There are some key differences between our suggested portfolio in our report and Xcel's portfolio and one big difference is cost. Our proposed plan is less expensive for repairs than I think all of the Excel portfolios and we're still digging into the details to figure out where we differ.

But I'll just say that we really made an effort in our analysis to maximize the greenhouse gas reductions for every dollar that we're asking ratepayers to spend. And that's what leads us to look into how best to leverage federal and state incentives for electrification.

It also leads us to look into complementary policies, what other states are doing so that we don't reinvent the wheel, as Asa suggested, because there's already a lot of money out there for electrification when you look at you know the IRA incentives and the state tax credits that Colorado is offering.

But there are significant barriers to electrification in Colorado. With, you know, heat pumps starting at around 2% market penetration according to the roadmap.

And you know, you can pay people enough money to get them to want to overcome those barriers, but it can be most cost-effective to target the barriers themselves.

And I'll just reiterate that codes and standards play a significant role in making this transition cost effective. So, one of the things that we're going to be evaluating when we look at the Clean Heat Plan is how Xcel captured the impact of local electric and electric preferred building codes under construction.

We also do recommend a 2-way A/C standard. And I realize that's not something that Xcel has direct control over, but we hope that Xcel will join us and advocate for policies like that at the state level that can make this transition cost effective for repairs.

The other, you know, key sort of difference that stuck out to me was the resources in the portfolio. So, about a third of Xcel's preferred portfolio is certified natural gas and offsets.

So, what is certified natural gas and offsets? It's gas that's been certified usually by a third party to reduce methane leaks upstream during production and transportation and pipelines.

And what's important about that is that it's still natural gas. When you burn it in your appliances, it produces the exact same CO<sub>2</sub>, the exact same NO<sub>x</sub>, because it's natural gas.

And that's why certified gas isn't included in the clean heat standard. It's not compliant for reducing emissions under that law. Because it doesn't reduce emissions from burning gas in your appliances because it's gas.

So that's a concern for us. We are concerned that it's included in the portfolios and a broader concern as Justin alluded to about getting so much of your emissions reductions, essentially from investments and other gas is that it prolongs spending on gas distribution system infrastructure. And there's, there's no way that we can get to 0 emissions, which is, you know, net 0 is our target for 2050, without at some point reducing our consumption of gas and building. Which means that are spending on the gas distribution system today is going to be stranded.

And that's the advantage of relying on electrification instead. So, it not only invests in the long term decarbonization that we need in buildings and sort of stop gaps, but it also avoids that spending on the gas system and it saves ratepayers that money.

And that needs to be taken into account in evaluating the cost of these portfolios. So yeah, I certainly look forward to continuing to dig into this in the coming weeks but just some initial impressions.

**Stacy Tellinghuisen:**

Justin, as you know, this investment in clean heat comes with a big price tag. How do you foresee this affecting rates for the utilities gas customers?

**Justin Brant:**

I think it's hard to know exactly. Our modeling shows the price tag is big to implement and to meet the 2030 emission reduction targets.

However, we estimate that just the reduction in gas cost, essentially customers needing to pay for gas through energy efficiency or electrification, comes in at about 300 to 500 million dollars.

In addition, as a number of us have already talked about, Xcel invests about half a billion dollars/500 million dollars a year in its gas system. And a significant amount of these costs, not all of it is to expand the system to serve new customers. So, it's hard to quantify how much of those future costs one can reduce.

But by investing in electrification and energy efficiency today, we expect that over time we'll be able to reduce those investments.



think our conservative assumption in the report is about 50 million dollars a year and that's the cost of essentially hooking up new homes to the gas system. So, at a minimum, I think that's very conservative. We'd be able to reduce those costs.

But there's also significant costs to make certain new subdivisions, but also make existing types bigger.

So, while there is a large cost in the short term, I definitely expect that over the life of a heat pump or a heat pump water heater these measures, and certainly buildings and installation, that the benefits to guest customers would outweigh those costs. And that's without considering all the other benefits.

If you add the emission reduction benefits with the social cost of carbon we're talking about significant benefits, as well as the increased comfort, health, and safety that Lorena was talking about.

Earlier of those are important benefits, though difficult to quantify. So, while, again, there are significant costs, we think those benefits will outweigh them over the long term.

**Stacy Tellinghuisen:**

Thanks Justin and we've gotten a number of questions in the chat about how to support this transition for renters and how to promote equity in this transition. So, I wanted to ask Lorena a question about what complementary policies that you see as critical to enabling equitable transition. You talked about some of these in your presentation, but I wonder if there's legislation or local government policies that you think are also important to enact over the next decade.

**Lorena Gonzalez:**

Thank you for the question, Stacy. We do know that the upfront costs of heat pumps are high, right?

And they may be untenable for some low-income families. And we also know that many of the low- and moderate-income households are not eligible for the federal or state tax credits.

And so, one role of the state legislature could be to provide additional funding for appliances and weatherization in low-income households.

And as mentioned in my presentation enabling that on bill financing of these measures is critical, and that can be achieved through the PUC, or it could be directed through legislation.

I do want to name something on the cooling side of things. I mentioned that 30% of Denver residents, for example, do not have A/C.

This will become a significant health and safety concern. Especially as temps continue to rise from climate change. But the legislature could require landlords to maintain a safe maximum habitable temperature, essentially requiring them to install cooling while providing robust support for heat pumps to ensure that cooling isn't contributing to the climate crisis.

And then the last point I'll make, on the local government side, is that both local governments and the legislature can help address rental housing.

Some local cities have energy efficiency codes that rental houses must meet. This protects families who rent from high energy bills, and appliance standards could similarly ensure that landlords install efficient, ideally electric, appliances in rental homes when the existing gas appliances fail.

**Meera Fickling:**

The only thing I'd add is a lot of the barriers to electrification that exist, you know, apply even more for low-income customers. So, for example, access to upfront financing for these appliances. It's even more of an issue if you don't have a lot of capital to spend than if you're relatively high income.

One of the things that we recommended in our report was that the PUC give additional attention to what's called tariffed on bill financing, which is kind of a mouthful. But basically, what that means is that utility customers would be able to have the utility pay to finance an efficiency or beneficial electrification measure and then pay off that over time through their bills. And I know the PUC has indicated interest in a program like that, particularly for low income customers.

We think it should apply to all residential customers, but it is especially essential to have a low cost, easy way of financing these things that people can get prequalified for through their record of utility bill payments or get qualified for really quickly.

Because these are oftentimes these are emergency replacements. Your furnace goes out, your A/C goes out in the middle of the summer, you want to get a replacement immediately, so this is absolutely essential to move this market forward.

**Justin Brant:**

I think to add there's also a lot of opportunities with how the states are going to be using federal funding. So, in the coming months, Colorado will be developing its plan for incentives under the Inflation Reduction Act, including significant incentives that are targeted at electrification.

I think those by definition will need to go to low- and moderate-income customers only, but I think in SWEEP's view, it should be really targeted at low-income customers to try to help the customers most in need move towards electrification.

And they're significant dollars - up to \$14,000 per home available through those federal incentives.

There's a number of other federal programs that I think could also be targeted but I think there is opportunity to bring the significant federal resources that are available to help fund income qualified electrification as well.

**Stacy Tellinghuisen:**

Thank you all. I'm just keeping an eye on the time we're close to the hour. I wanted to ask if each of the panelists can weigh in on one last question. We actually got a ton of questions through the Q&A function, and we'll do our best to reach out to folks and answer your questions after the fact.

But the last question I would love thoughts from all the panelists on is, you know, what is the future in your view of Colorado and our region look like when the building sector is completely decarbonized?

**Meera Fickling:**

I'll speak to an aspect of that. Hopefully the future looks like really smart, really targeted investments into exactly what we need going forward to meet our carbon reduction goals in 2050.

And kind of along those lines I saw a bunch of questions about gas system investments like are you worried about the amount it's going to take to maintain and pay off expansions to our gas distribution system as customers electrify and another related question about whether that would cause any like safety or liability concerns to take a closer look at our investments and figure out like which ones we actually really need.

And I think it is critically important that all of this transition is managed.

So, as we're incentivizing customers to electrify, to opt for heat pumps and heat pump water heaters, we're also looking really critically at our spending on the gas distribution system.

There is a proceeding that's ongoing right now on what's called a gas infrastructure plan.

So, Xcel filed a gas infrastructure plan earlier this year. And a lot of what that does is looks at planned big gas infrastructure projects and looks at what can we do instead? Can we electrify customers? Can we introduce energy efficiency measures?

Can we introduce demand response and what investments can we avoid because looking forward to 2050 what we want is an energy system that is ultimately affordable for customers both on the electric side and for any customers remaining on the gas side who could be predominantly low income and that requires us to be really smart.

**Kiki Velez:**

I was going to say something very similar, but you said it perfectly. Just really strategically winding down investment in the gas system as we transition to electrification, which delivers many co benefits, including health benefits, affordability, safety benefits.

And making sure that, just to put a finer point on it as Meera says, there's a risk that if we don't really target incentives, electrification incentives at low-income households, those could be the households that are left stranded sort of with these huge gas system costs.

In the gas infrastructure plans, Xcel is proposing some investments that that ratepayers would pay off till 2100. That's not okay, right? Like that's not compatible with a long-term affordable gas system or energy system.

So, we really need to wind down investment in the gas system while helping low-income households get off the system first so that everyone can benefit from healthier, safer, affordable homes, which energy efficiency and electrification can bring.

**Justin Brant:**

I guess the only thing I have to add is I think the future looks very similar to today. You know we have technologies where folks can have electric comfortable homes. And no matter what the temperature, you can turn on the heat, and it's there.

So, while there's a lot of work to be done, I don't see the future being much different honestly.

**Lorena Gonzalez:**

For me, it's that low-income communities of color are champions of electrification and efficiency because we did all that we could to make sure that they're benefiting from those measures, that we've done education and outreach right, and that they're no longer having to make tough choices between paying their bills and putting food on the table like my family did.

And that those living on the front lines of pollution can at least find reprieve inside of their homes. Also, that we have achieved our climate targets in state law.

**Stacy Tellinghuisen:**

Thank you again to all the panelists. Thanks to members of the audience for their interest today. This has been an exciting conversation and look forward to working with many of you over the coming years to make it a reality.

**James Quirk:**

I first I wanted to thank all of our panelists so much. It was a great conversation, and we got so many wonderful questions in the chat.

I want to reiterate, for those that we didn't get a chance to get to, you can email us at [outreach@westernresources.org](mailto:outreach@westernresources.org) and we'll do our best to get questions answered from one of our experts.

I also wanted to thank Stacy for moderating. Thanks to all of you for attending. Watch out for the webinar recording in your email in the next couple of days.

It will also be available on our website under the webinar section. And one final plug, if you're interested in supporting WRA's clean energy work, please visit [www.westernresourceadvocates.org/donate-now](http://www.westernresourceadvocates.org/donate-now)

I hope to see you again at a future webinar. Have a great day, everyone. Cheers.