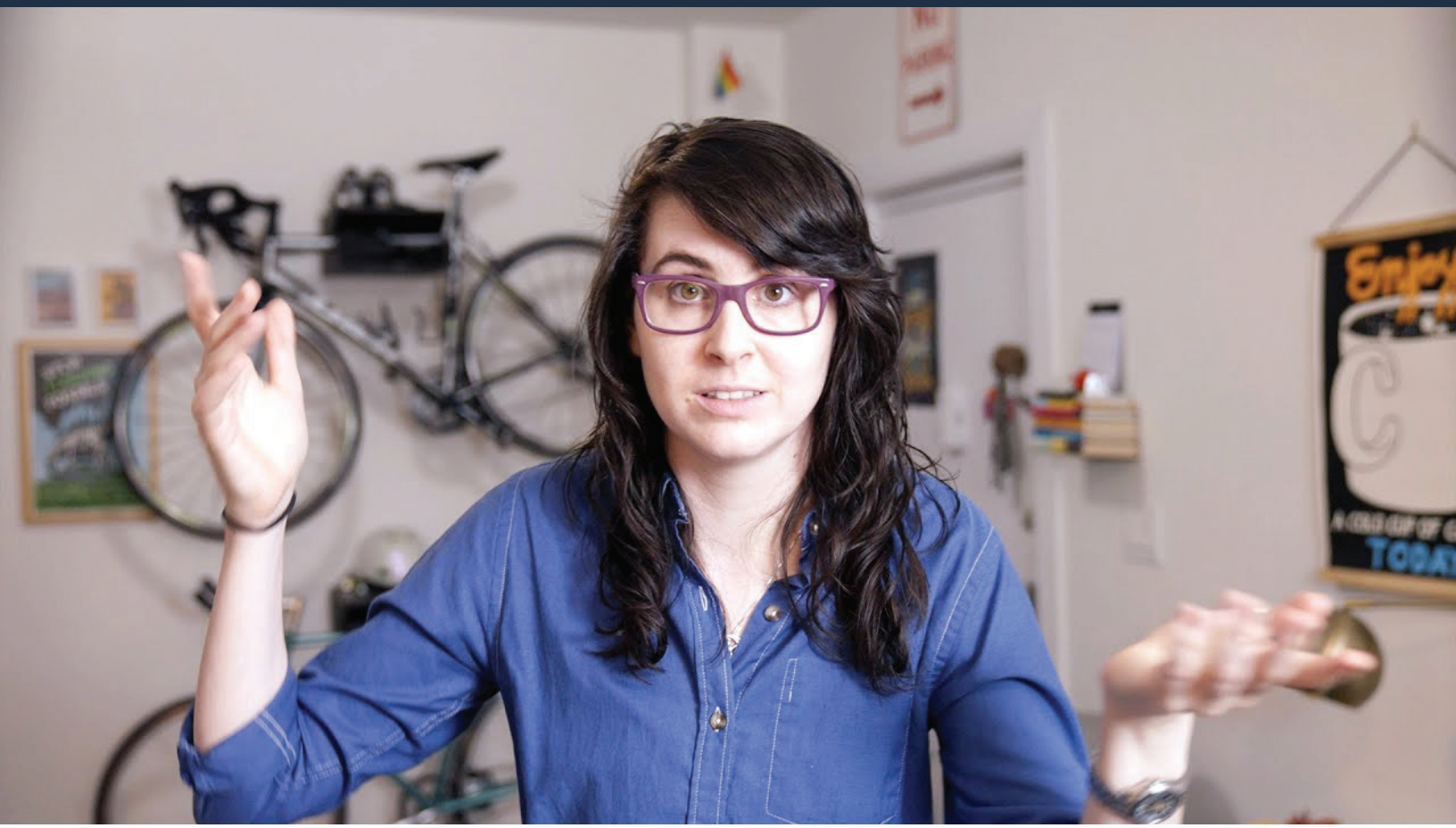

Buildings: A Climate Problem or a Climate Solution?

Buildings are responsible for nearly a third of global greenhouse gas emissions—primarily from electricity, heating and cooling, and construction. But there are also plenty of ways that existing and new buildings can be part of avoiding a climate disaster. This video explores just how bad buildings currently are and the Solutions we need to implement to make our buildings better.

0:00

If you spend any time in the comment section of a video about climate change (an activity I truly cannot recommend) you will see a lot of comments saying: THIS. THIS ONE THING. THIS fixes climate change.

And I'm sorry—no. As much as I wish it were true, no one thing can untangle the giant, intertwined, and multifaceted mess that is the climate crisis. Like, I love wind power–but even if I could snap my finger and suddenly the whole world was powered by wind turbines tomorrow–we'd still have a climate crisis on our hands. Same with solar—or insert your favorite low carbon energy source here.

Graph displaying world greenhouse gas emissions.

Because electricity production is less than thirty percent of global greenhouse gas emissions. To respond to climate change on its truly massive, global scale, requires action, and innovation and solutions all over, all at once. Like yesterday, but today is good too. Of course this video is only 10 minutes long, so I'm not gonna untangle that whole mess for you. But–what better place to start than Spiderman's best friend, buildings.

0:54

Images and animations of buildings and their environmental impact.

Okay so, this is a building. That's a building. That's a building too. uh, that's, that's a trash can. But that's a building! And that is also a building. Everything from big apartment buildings, to the massive skyscrapers downtown, to a giant supermarket, or tiny cabin–all buildings. And these places we spend so much of our time in are both a massive problem and an untapped solution.

But first: how bad are buildings for the climate? The big number is 32—32% of global greenhouse gas emissions come from buildings. And those emissions are from three main things: Electricity, Heating and Cooling, and Construction.

Now this might be pretty obvious, but buildings use a LOT of electricity. Imagine every fridge, freezer, microwave, computer, air conditioner in every apartment on every floor of a 30 story building, and every building on every block THAT'S KIND OF A LOT OF ELECTRICITY. Emissions from electricity will vary from building to building depending on its size, use, and location. Bigger buildings tend to need more electricity, which often means more emissions.

1:52

A concert venue, using high powered lights is gonna use more electricity than a home with small LED lightbulbs, just like a laundromat with a dozen washers probably uses more electricity than a store selling sweaters. And—depending on where a building is located, the electricity running everything could be coming from low carbon sources, or polluting, high carbon fossil fuel sources.

And wrapped up in all of this is the kind of buildings we have. Denser living situations end up with fewer emissions per person: all things being equal an apartment is more efficient than a standalone home. And unless you live somewhere where the temperature outside is perfectly pleasant all year round—Heating and Cooling—or HVAC—if you want to sound,,,, like you build houses—is a big part of building emissions.

Now, heating does overlap a bit with electricity. If you've got an air conditioner, that is probably running off electricity. In fact, increased global use of air conditioning contributed to 2019 setting the record for most emissions from buildings.

2:40

Images of heating and cooling systems.

And the solution here isn't to get rid of cooling systems, because as temperatures increase–beating the heat is a necessity–heat is the biggest weather-related killer. And just in case electricity wasn't carbon intensive enough, some buildings go straight to the source and just burn fossil fuels for warmth–relying on oil or gas to heat buildings, cook, or run dryers. Which has the extra bonus of making indoor air pollution worse.

Yay, we love to poison our homes and planet to keep warm. So fun. Plus—and this applies to electricity emissions too—most buildings aren't built efficiently. They're 'leaky' meaning they aren't designed to keep the heat or cool in when you need it.

Video clips of host showing us the heating and cooling systems in their apartment.

My apartment is freezing in the winter because there is only a layer of bricks and some insulation protecting me from the wind, but in the summer, these giant windows let in so much sunlight and heat, that I've sat in my empty bathtub to stay cool. And these inefficiencies lead to more emissions, running heaters or air conditioners for longer. Not to mention the compounding inequities here–newer more expensive buildings that aren't so leaky cost less to heat and cool, but older, or less well maintained, or not upgraded buildings that might have cheaper rents–can be really expensive to keep at a liveable temperatures and folks end up having to decide between running an air conditioner and their next meal.

Oh wait, and another problem with air conditioning and refrigeration, it uses refrigerants—often some flavor of flourocarbons, which are some of the most potent greenhouse gases.

3:42

Animations of construction.

And finally—buildings themselves–every step from the extraction of materials, to manufacturing, to transport, to putting it all together creates massive amounts of emissions—not to mention direct environmental and human impacts. Construction is often messy, dirty, and dangerous.

And by 2060—the world's building stock could double—which is like a new New York city worth of buildings every month for forty years–which is going to lead to a lot of emissions, unless, we can turn buildings from part of the problem, into part of the solution.

So—what is to be done? Well for buildings that already exist: weatherization is where its at. That means, adding reflective films to windows that bounce away hot sunlight, or build snazzy window overhangs that block summer sun, but let in winter sunlight. It means upgrading insulation so you keep the heat in when you need it, and out when you don't.

The great thing about weatherization—is that it pretty quickly pays for itself. If I can keep my apartment cooler in the summer, I don't need to run an air conditioner so much, which saves electricity, saves money, and reduces emissions. And weatherization becomes really powerful when it isn't just me messing around with the windows on my apartment, but an entire city mandating certain efficiency standards across all the buildings.

4:43

Next—we've gotta electrify everything. Most electric grids are increasing their share of low—carbon energy generation. So chances are—replacing a gas—powered hot water pump with an electric one—will mean fewer greenhouse gas emissions.

Of course—in an ideal world—no electricity is generated with fossil fuels, but we can and should start electrifying everything now. The one /big/ caveat being— this needs to happen alongside improved grid resiliency, because where I grew up in central Maine, if a tree hit a powerline, we'd lose electricity for several days. If that happened in winter, and your heating ran on electricity—that quickly becomes a really dangerous situation. Not having heat in winter—I think we can agree—is bad. So as everything becomes electrified—grid utilities need to be doing things like burying powerlines, decentrilizing energy generation, building smart grids, and expanding broadband access.

Okay, remember when I said air conditioners and refrigeration were huge emitters, well the good news is fixing refrigerants is one of the best ways to reduce global emissions. Fixing refrigerants means finding ways to keep us and everything cool without fluorocarbons, AND properly disposing of all the fluorocarbons out in use.

5:40

Technical difficulties graphic.

*Text on screen reads, "*stares sadly into the distance wishing the Paris Agreement was enforceable*".*

And here is where there is some exciting good news. Transitioning away from fluorocarbons and other polluting refrigerants, combined with energy efficiency improvements could avoid 460 gigatonnes of greenhouse gas emissions over the next 40 years. That's like truly.... That's huge. And that could really happen.

The Montreal Protocol—a big international agreement to keep the ozone hole from expanding—if you want more information I made a whole video about this on Hot Mess—also provides serious climate benefits. See, many of the same molecules that wreak havoc on the ozone layer are also potent greenhouse gases. But—because they mess up the ozone layer—the Montreal Protocol can regulate them. Which is a big deal, because the Montreal Protocol has teeth, meaning—if you're signed on—you have to do the thing, otherwise there are actual consequences. Pretty regularly all the countries that are signed onto the Montreal Protocol meet and outline new, stricter regulations.

In 2020, one of those: the Kigali Amendment started coming into force. The Kigali Amendment, calls for the complete elimination of hydrofluorocarbons. That amendment alone could avoid 53 gigatons of CO2 equivalent emissions.

6:42

Side note: amongst Biden's piles of climate—related executive orders and statements—one of those was asking Congress to sign on to the Kigali Amendment.

Now this isn't really an international policy video but, all this is to say, improving refrigerants is already happening—there is broad international consensus that this is a good thing to do. And its essential because keeping ourselves cool gets more and more important as temperatures creep upward.

Of course, HVAC and electricity are only two of the major emission sources for buildings, so what about construction? Can that be part of the solution too?

Totally—for sure. We need to be building any new buildings way better. Right now, most buildings are made out of some combination of concrete, steel, and glass—the mining, creation, and use of those materials often means greenhouse gas emissions, environmental destruction, and human rights violations galore.

To fix buildings, frankly, we need to build them out of different things. Now, that could be recycled steel, or laminated wood, or maybe somewhere off in the distant future concrete that pulls the—carbondioxide byproduct right back into the material—locking away the CO2 in a new building. There are already lots of cool, innovative alternate building materials that can be just as strong as concrete and steel.

7:42

Graphic of the Environmental Product Declarations.

If you want to have a really fun time—the International Organization for Standardization defines these Environmental Product Declarations that quantify the embodied emissions of different building materials. In some cases—builders can just swap out one more traditional material for an equivalent material—often made of plants—that can dramatically reduce and even turn buildings into net—carbon sinks.

And finally, when we build the buildings—lets build them smarter. These are extremely not—new ideas, but building homes that are well suited for their climate—using centuries old techniques of passive heating and cooling—will drastically reduce the energy needed to power buildings. This is just a sampling of all the cool—new and old developments in how to turn the spaces we live, work, and play in into part of the solution. But none of these ideas work on their own.

At the risk of overemphasizing this—there isn't a single solution to building emissions, we need to use everything we have—and a few things that haven't been developed yet—to fundamentally shift what buildings are and do. Now that list of how to fix buildings is awesome—but—there's always a but—most of those things you, or I, or most people can't do ourselves.

8:41

This list relies on innovation, and getting utilities and manufacturers to perhaps work against their immediate bottom line. And that is maybe the biggest hurdle in the response to climate change. But we do have a pretty cool system that can help.

Policy. But not just—ya know—any policy. A toothless ordinance that calls for reducing building emissions by 30% by 2050 isn't gonna cut it. Policies to reduce building emissions need to be specific—both in the goals and how you get there—but also designed specifically for the location. Well designed climate—building policies also pay attention to how these improvements are implemented. Mainly you don't want a bunch of policies that result in these giant fancy, 'climate—friendly' buildings that nobody who lived there before can afford. Green-gentrification can, and must be avoided.

Shelter is a fundamental human right—and I'd argue—it should be everyone's right to live, work, and play in buildings and spaces that are pollution and greenhouse gas emissions free. We need better buildings, but we need those buildings to serve everyone. And we won't get there with any single policy or solution—we need every tool in the toolbox, all at once, right now. Thanks so much for watching and if you have any questions, or want to discuss your favorite type of hemp insulation—I'll be hanging out downstairs in the comments.

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