[SQUEAKING]

[RUSTLING]

[CLICKING]

CHRIS RABE: Everyone can hear me? How's everyone doing? Good? Great. So my name is Chris Rabe. I'm the Education Program Director here at MIT's Environmental Solutions Initiative. It's really important for me to talk about that, quickly, that I come at this from an educational lens. And a lot of my projects are about trying to integrate climate justice or environmental justice into educational contexts, both at MIT, or in other institutions of higher education, and even in K through 12. So this is a really high level discussion on how Geothermal Energy Networks, or GENs, can meet environmental justice priorities.

So just a quick overview-- I'm going to go over an EJ framework, define environmental justice. I'll probably say EJ a lot right now. I'm going to review EJ concerns with existing gas networks, talk about how GENs can meet EJ priorities, and then really briefly, talk about some next steps. How can we better integrate EJ into this kind of work?

So let's define environmental justice really quickly. What is environmental justice? I think it's important to remember that environmental justice is a movement that started in the early 1980s, as people of color and other vulnerable groups, like Indigenous people, protested the inequitable placement of environmental harms in their community. And this was happening in the United States and all around the world.

Here you can see a really famous protest in Warren County, North Carolina, where African-American communities tried to block the delivery of toxic PCB waste into their landfills around them. So that famous protest is cited in a lot of environmental justice studies, and it led to these two landmark reports that used, GIS technology to show and prove that, yes, environmental harms were inequitably placed in communities of color and low-income communities.

That led to the Environmental Protection Agency and a definition of environmental justice. This is a basic definition that all people have the right to a healthy and safe environment, regardless of their social identity. There's been a lot of theory, new work on defining environmental justice, so I recommend checking out David Pellow, who has this term called "critical environmental justice," or looking up Kimberlé Crenshaw's notion of intersectionality, if you want to go do a deeper dive on new definitions of environmental justice.

So those two landmark reports helped form a field of environmental justice. And maybe some of you are familiar with things like climate justice or maybe energy justice, which is most directly connected to today and tomorrow's class. So you can see this movement has splintered into different areas and fields. It has expanded in breadth, and depth, and methodology. And so the environmental justice work that was being done in the mid 1980s is totally different from the work that's being done now.

I like to point out that environmental justice helped redefine the environment. So I think if you look at American environmentalism, the environment was pristine and natural wilderness. And a lot of focus was on nature preservation. But the founder of environmental justice, Robert Bullard, always talks about how the environment is where we live, work, and play, or study, or worship, and the environment is all around us, which I think is so connected to the built environment, in this two-day conference. And also, environmental justice helps theorize or conceptualize, think about, what is justice or what is equity?

So I kind of want to talk about network geothermal through this prism, through different forms of justice. So I think a lot of people think about social justice, they're thinking usually about distributive justice. How are we allocating resources? But they often don't think about participative justice. Who has a seat at the table? Whose voices are being listened to? And I think this is a critical component as we move forward with addressing the climate crisis.

Or there's also procedural justice. When you start a project, what are the different checkpoints of the project to check in to see, are we involving everybody? How are laws and policies going forward? There's recognition. Who's getting recognition for this work? Who's involved, et cetera? I think recognition is very connected to participative and procedural. There's historic or restorative justice, acknowledging the problems of the past, and then when we're engaging in projects, focusing in on groups who haven't historically been included.

And then there's epistemic justice, which I like to just say, knowledge justice. Are we making sure we're listening to the voices and experiences and stories of those who have been historically marginalized in discussions? So let's talk about some EJ concerns in the energy transition, or in relation to GENs, through that prism of justice that I just mentioned. I won't mention all of those in these concerns. But you can see how they're intertwined.

So I think it's really important to just point out that buildings account for 30% of US emissions. And half of that comes from on-site combustion. I think Christopher Reinhard talked about that, Jason Jay already. This is like an injustice for all. Also, I think discussed by Christopher Reinhard was how right now, we have an individual home market model, where if I want to redo my energy system at home, it's under my discretion or responsibility to learn about that and go through the process.

And it's pretty challenging. I'm still working through that. No one tells you that when you put in heat pumps, there's no heat for the bathrooms, or there's no heat for your basement. This is just a little silly example. But I think that a lot of people in Massachusetts, around the country, lack literacy about this. And this can exacerbate inequity.

As people make the transition to renewable energy, the gas customer base will go down. And this has showed that this will put a burden on low-income communities because their rates will go up. So you can see, one study showed that this will double the economic burden on low-income families by 2050. As the gas customer base goes down, this can also make gas utilities vulnerable. And finally, there are gas leaks, which have already been discussed. So this is a health and safety concern.

So how can geothermal energy networks meet those EJ problems that I just discussed? So I think this slide is almost like a justice for all slide, which I think there's always some tension in the EJ movement, is we need to acknowledge that the injustices have been inequitable among different groups. But then there's also injustices that we all face. So network geothermal can decrease carbon emissions by a lot. And then also, it can lead to a lot of savings at a community level and also have an increased energy efficiency, where there's less peak demand on the grid or significant savings.

Also, just mentioning, again, gas leaks are really problematic for our health and the environment. And we can move to a safe and healthy, reliable heating and cooling system, which is a better model for gas utilities. And we can better address urban heat islands, where I know here, even in Massachusetts, there's a ton of communities that lack adequate access to cooling.

So, thinking a little bit more about the distribution and sharing of energy resources, I think one thing that's really interesting and I'm just learning more about is how a geothermal loop can share heating and cooling across different kinds of buildings. So there's one ongoing project in Chelsea, New York, where a data center is on a loop with a public housing community. And data centers will release extra heat. And that can be used by another community. So here you see a building infrastructure with different kinds of resources being able to more equitably share that.

Or one of the first, or the first, network geothermal or geothermal project in Boston is in Dorchester in the Franklin Field community. And so network geothermal allows us to prioritize EJ communities when we can provide heating and cooling to every building on the network, regardless of the residents' income level or homeownership status, which I think addresses this idea that only wealthier families or families with literacy can redo their appliances in their home.

Finally, I think this one is the most interesting to me. How do we engage the community and make sure all stakeholders and all groups are involved in the process when we're engaging in network geothermal work? So this again, goes from an individual to the community level. We need community engagement. This is the project in Framingham, the Framingham Loop, where a number of different communities from different contexts had to be involved in the project. And then we need to engage in stakeholder assessment and engagement.

There are renewable energy projects all around the country that get halted because one particular community blocks the project because they hadn't been involved in the process until later on. So there's actually a course here at MIT called the Renewable Energy Facility Siting Clinic Course-- that's quite a mouthful-- where they actually teach students how to do that stakeholder engagement. And I'm trying to learn as much about that as I can. So I guess maybe you could see a little bit how these forms of justice interconnected in those solutions and thinking of this as a framework for future geothermal work.

So just really quickly, what do we do in the future? We need more legislation. I've got tons of time. We need more legislation. I think environmental justice has historical roots in law and policy. So we need to do that. I think we need improved participation across sectors. I think the work that heat does is so incredible, where the energy utilities are involved, government is involved, education is involved, community organizations are involved, and then individual residents are involved. This is incredible work. It takes so much thought and process to do that.

And we need education and awareness. So most people are still confusing the different kinds of geothermal. They're confusing deep geothermal with shallow geothermal. A lot of people don't know that this is a viable energy resource moving into the future. And so we need that at the K through 12 level and at the level of higher education and then also in informal spaces. This is a term used in the literature, where we're just working with individual people and community residents.

And then we need action at all different kinds of levels. So that's political action and communication. And so I just kind of have this reflection question here is, how can we make sure that an EJ framework, or a framework of different forms of justice, is included in future geothermal energy network projects? How can we make sure that all forms of justice are considered? So thank you for your attention.

[APPLAUSE]