[SQUEAKING]

[RUSTLING]

[CLICKING]

PROFESSOR: Next, we have someone very famous. I'm going to talk him up. He's my former boss, Jay Egg, and he's going to present on Penn South.

JAY EGG: Thank you. I've got a lapel also. Thank you, Nick. And as a matter of fact, Nick will probably recognize some of the beginning of my presentation here because he was involved in one of the first presentations we did on the Penn South Community. As a matter of fact, he's involved in the design and did some of this 3D modeling. And I've got to drop back just a little bit.

Both Cary who was on remotely, Cary, first of all, sits on the IAPMO Uniform Mechanical Code Technical Committee. In other words, we write, approve, and submit the final codes. And there is a geothermal code as of 2024. And as of 2027, there will be a thermal energy network code. Interestingly enough, Mark Metzner, C448, is basis that we use for design. So a lot of that is being adopted perhaps completely. So we have so many players in here, and I can honestly say everybody in here has had a great deal to do with what we're going to talk about now.

Now, first of all, this is part of a PON 4614 NYSERDA. That's a public opportunity notice. Now, what they do is they put these things out and they say, we've got a problem. Can you come up with a solution? And if we come up with a good solution or a problem to fit a solution, and this was for thermal energy networks, they award US funding for this. So this one started in 2021. Actually Penn South hired Egg Geo before that because they wanted to convert their campus to geothermal.

And the reason why is because they had-- let me jump back and make sure I didn't, yeah, it'll cover it in a minute. They had this 5-megawatt boiler. And in addition to that, they generate their own electricity. And so local law 91 told them if they didn't fix their carbon emissions by x year, which keeps getting extended, they would get fined millions of dollars a year.

So New York City is one of those cities that you hear about the carrot, the way to get people to do things. They've got the stick. If you have too many carbon emissions, you will get fined millions of dollars a year. So they hired us. They're pretty affluent community. 15 22-story buildings covering five blocks in downtown Manhattan, home to 2,500 families. And they have an 1,800-ton central chiller plant. You can see the cooling tower there, and a 5-megawatt central boiler.

And sorry about the overlap here. That happens sometimes in these. So just look through it. Local law 38, local law 97, I won't go into the details of it, but they needed to get compliant on these. So they hired us. And then Nick, when Nick was working with us, we put in an application for this pond, and we were awarded this pond. So we began to study how we could take this community off of these boilers and stop the emissions.

There is a New York City tool. And I keep hearing about this with regard to boreholes, and Brock, you probably know this. You can go on to a tool online, and if you were to look at the details on these graphs on the right, it shows you how many boreholes you need to drill, what the thermal capacity is under the footprint of that to do a closed loop system. So the first thing we did is studied that, and we got the entire community involved with that.

But then we really started looking at this, and this was not easy. This alone took Nick, our operations manager Justin, myself, my wife used to work with us as our marketing director, and we put on our combat boots. And we went out and we beat on doors because we wanted to find out where to get the energy to do that 5-megawatt load. Well, as it turns out, this is the US postal Service across the street, and we worked with a couple, well, with first we tried to get with the federal government, and then we found out we could use a local property management company. But we got the data on it and they have about 8 megawatts of thermal rejection through their cooling towers.

So we said, aha. And they have data centers and equipment. So they may have it all year round. And this particular center uses this orange building. This is the physical plant, the chiller plant, where it provides all the heating for all these buildings. And we said, well, if we could get this energy over here, we could maybe even do the whole thing without a single borehole. And like what Cary said earlier, that's the whole point of this.

So we said, yeah, let's go ahead and look at that. And we went forward with that. And then we put on our combat boots. And we went out and we talked to the State University of New York. We talked to the public school over here. We've even got Penn Station involved now. We're almost all the way to the Hudson River at this point. We may even be able to tap into that by the time we're done.

At any rate, we went to work on this, and one of the things you'll know, and this is the biggest concern we always hear about, to go underneath the streets of New York is a freaking nightmare. This, when Nick was there, when we presented to Con Ed because Con Ed did a lot like Eversource did here, they were directed by the PSC to do these thermal energy networks. Well, you want to take any kind of a guess how much this is going to cost? Try almost a quarter billion dollars.

So we went to Con Ed, and they said, if you can get it down to 90 million, you can have it. We walked because we weren't going to go cheap and we weren't done with our study. We just said, no. And Penn South said, we'll do whatever you want to. So we walked and we're finding ways to reduce that cost now. Meanwhile, Con Ed's doing great work. I mean, Greg Koumoullos and the whole team over there. But we wanted to do this.

And part of what a NYSERDA study does this. This is very important. Nothing moves fast with government. You've heard that, except I've got to take it back with Eversource and heat, it just whoom! Before I even knew what happened, it was done over here in Framingham. I can't wait to see that a week from Saturday after the GR conference. But for us, we were just like, no, we want to get through this. Plus, Sue Dougherty over at NYSERDA is our project manager. And for every problem, they ask 100 questions.

They said, well, how are you going to deal with that? because they don't fund this so that somebody can get something for free. Why do you think they fund it? So we can clear a path for others to do it. And that's exactly what we're doing. So the amount of paperwork we do to tread the way for others to follow is monstrous. Our hats off to our engineers and so forth.

So we move forward. This is actually from earlier this month. They turned in task 5. We had to model it without the post office, because what if the post office decides to move? They're just renting the building after all. And what if we don't have that 8 megawatts? So we really had to look at it. It's kind of like the backup boiler scenario. So our guys really started looking at it and they said, OK, here's where we can put the closed loop, but we'd have to do the advanced boring solution like they did in Framingham.

And so that's expensive. But we have other technologies, and that involves aquifer coupled. And by the way, this particular part of Manhattan has a very robust glacial till aquifer. So we checked that. We got involved with it. We looked at what's called advective flow. If you've listened to a lot of what we're talking about, doing these advective flow studies shows how fast when we're extracting heat or rejecting heat, it can be restored.

Plus we have to show thermal influence to the neighboring properties, because in New York. They want to know what you're doing to everybody's property. So each of these models, as Nick will tell you, or any scientists, can take 8 to 16, even 40 hours. But we get through this and we look at the bottom line is we get a thermal influence over 25 years. And I think that's the way we're going to go. We're going to go with four doublets, and we're going to be able to handle the peak.

We're still going to need some boilers and so forth. But this is the Penn South underground utilities. This is how it's going to be piped. And this is what it looks like. You've heard a lot about, from Cary about these are the singular loops. And then there's a transportation loop. As a matter of fact, right here in Framingham, they have those two loops. They'll be able to shed or add load one to another. All of these individual loops here will be able to share energy with one another. And this is just a picture of what we call the transportation loop.

What is it transporting? It's transporting energy. It's like the grid. When you take a big load, maybe in Texas they need extra electricity, and you can get it from maybe Arizona or something like that. In a much smaller way, that's the way it works. And that is my presentation. Thank you, everybody.

[APPLAUSE]