

# Webinar

## ULI InfraXchange: Sustainable Actions in Transit-oriented 15-Minute Communities ??? How to Integrate ???One Energy??? Infrastructure

Date: June 08, 2023

00:00:00 --> 00:00:03: Good afternoon. You are. I welcome to this session. This

00:00:03 --> 00:00:09: is the third session of the Curtis Infrastructure initiative Infrastructure

00:00:09 --> 00:00:12: Exchange. So we're going to wait a couple of minutes,

00:00:12 --> 00:00:16: then we're going to get started. So a couple of

00:00:16 --> 00:00:20: notes. We encourage you to take the conversation online and

00:00:20 --> 00:00:23: if you would post it on social media, you can

00:00:23 --> 00:00:24: use the Hatch tag.

00:00:26 --> 00:00:29: During the meeting we would love to hear your thought

00:00:29 --> 00:00:33: and also conversation as well. So if you have any

00:00:33 --> 00:00:36: questions or whether it's to the speakers or about the

00:00:36 --> 00:00:39: topic in general, feel free to put it in the

00:00:40 --> 00:00:43: chat. So our webinar today will be recorded and it

00:00:43 --> 00:00:46: will be posted on the Knowledge Finder. And if you

00:00:46 --> 00:00:50: like to have the closed captioning, it's also available so

00:00:50 --> 00:00:54: there is an option you can select and it would

00:00:54 --> 00:00:55: enable captioning.

00:01:15 --> 00:01:19: Okay. So we're going to get started. So welcome everybody.

00:01:19 --> 00:01:23: My name is Yvonne Young. I am serving as the

00:01:23 --> 00:01:28: Curtis Infrastructure Initiative Research Fellow. And part of

00:01:28 --> 00:01:34: is to hold some conversation, particularly showcasing leading

00:01:34 --> 00:01:38: edge practices

00:01:38 --> 00:01:39: with respect to infrastructure. Today, we're going to look at

00:01:39 --> 00:01:45: energy.

00:01:45 --> 00:01:48: Particularly thinking about how the different approaches

00:01:48 --> 00:01:52: across the world.

00:01:45 --> 00:01:48: So we're gonna cover 2 case study today, one in

00:01:48 --> 00:01:52: ULI America, so from Toronto region area, another one from

00:01:52 --> 00:01:55: UI Europe, so that's from Netherland area.

00:01:58 --> 00:02:02: So what we're going to do today, we're going to

00:02:02 --> 00:02:06: go through a couple of conversation and then we're going

00:02:06 --> 00:02:10: to have a moderated discussion as well. But before we

00:02:10 --> 00:02:14: do that, we would love to turn to Craig Lewis,

00:02:14 --> 00:02:19: who is the Chair of the Curtis Infrastructure Initiative Board.

00:02:19 --> 00:02:23: So this initiative is generally supported by Jim Curtis.

00:02:24 --> 00:02:27: Who believe that every single person in a land use

00:02:27 --> 00:02:31: process has a real opportunity to make a visible difference

00:02:31 --> 00:02:34: and make it matter because you are part of the

00:02:34 --> 00:02:38: process. So what we encourage everybody to think about

00:02:38 --> 00:02:42: and

00:02:38 --> 00:02:42: ask question today is the upstream decision, Is there

00:02:42 --> 00:02:46: anything

00:02:42 --> 00:02:46: we can do differently to enable making these pro aggressive

00:02:46 --> 00:02:52: infrastructure initiative happening quicker and more effective

00:02:46 --> 00:02:52: and making more

00:02:52 --> 00:02:52: impact?

00:02:53 --> 00:02:55: Now I'm gonna turn the floor to Craig.

00:02:56 --> 00:02:59: Thank you, Yvonne. It's a pleasure to speak to you

00:02:59 --> 00:03:02: today. I have the great privilege to introduce the Curtis

00:03:02 --> 00:03:06: Infrastructure Initiative and kind of build on what Yvonne

00:03:02 --> 00:03:06: said.

00:03:06 --> 00:03:11: I currently serve as the Infrastructure Initiative Global

00:03:06 --> 00:03:11: Advisory Board

00:03:11 --> 00:03:11: Chair.

00:03:12 --> 00:03:15: And we're excited about the program. I think that there

00:03:15 --> 00:03:17: are a lot of key elements to it. But most

00:03:17 --> 00:03:21: importantly, the initiative is focused on building global

00:03:17 --> 00:03:21: partnerships, conducting

00:03:21 --> 00:03:25: technical assistance and growing knowledge for both our

00:03:21 --> 00:03:25: membership as

00:03:25 --> 00:03:28: well As for the real estate community as a whole.

00:03:28 --> 00:03:31: We do that through several different outputs of things.

00:03:28 --> 00:03:31: Currently,

00:03:31 --> 00:03:34: we're very focused on the Building 15 Minute Communities.

00:03:35 --> 00:03:38: Leadership Guide, which has just come out and we

00:03:35 --> 00:03:38: encourage

00:03:38 --> 00:03:41: you to go to the ULI Knowledge Finder website and

00:03:42 --> 00:03:46: download a copy. We also recently hosted the Infrastructure

00:03:42 --> 00:03:46: Forum

00:03:46 --> 00:03:49: at the Spring Meeting in Toronto and look forward to

00:03:49 --> 00:03:52: doing that again at our Fall Meeting in Los Angeles.

00:03:52 --> 00:03:56: We also provide funding for several technical assistance

panels and  
as well the Infra exchange that you're seeing today.  
So we're excited about this topic. I look forward to  
hearing from our speakers. And with that, it will turn  
back to Yvonne.  
Thank you, Craig. So today is our third session. What  
we're going to look at today is that at a  
community scale, how we can best utilize energy  
infrastructure to  
help us to make the shift, including dealing with carbon  
removal and waste management as well. How can we do  
it in one district, so it's not just per development  
but have entire ecosystem.  
So we want to share some of the recent policy  
and tools that is available. So this is coming out  
in November 2022. It's called the Net Zero Game Changers  
initiative from the White House administration primarily is  
about setting  
a very clear agenda to move towards reducing 50%  
decarbonization  
by 2030. So that's really exciting.  
So the diagram in here look at 37 initiative and  
really finding a way within different sections to optimize  
decarbonizing  
supply chain and a big part of that show in  
orange is about energy infrastructure.  
And other element to know is that recently there's a  
lot of research talking about the aging infrastructure when it  
come to energy in certain part particularly in California area  
and also in Texas area as well. There has been  
blackout and when there is urban heat combined with the  
blackout is has significant impact, sometimes impact and  
having safety  
to the local population so causing a lot of damages.  
So what we're hoping to do is find a creative  
solution. So there's an article on urban land talking about  
the infrastructure, basically looking at how we can use  
community  
by community as a smaller scale to help to ship  
to reliable and clean energy. So part of our mandate  
is to share with our members some of the ongoing  
opportunity. So the many of these are new funding  
opportunity  
just came out, which is very exciting.

00:06:13 --> 00:06:17: So in the US there are two major funds, one

00:06:17 --> 00:06:21: is focusing on rural, so there's \$1 billion recently released

00:06:21 --> 00:06:25: is for renewable energy and they have different sets of

00:06:25 --> 00:06:29: deadlines but all the way to next year. Another set

00:06:29 --> 00:06:34: of funding that is available is helping nonprofit primarily using

00:06:34 --> 00:06:38: that to set up potentially the local utilities as well.

00:06:38 --> 00:06:42: So that that line is around couple months away.

00:06:43 --> 00:06:47: And on the Canadian side, our Canada Infrastructure Bank

00:06:48 --> 00:06:53: has

00:06:53 --> 00:06:57: a progressive model, primarily using a partnership model

00:06:57 --> 00:07:03: using 1/3

00:07:03 --> 00:07:05: of government funding plus two third of private funding to

00:07:06 --> 00:07:11: focus on accelerating infrastructure transition. So there's \$10

00:07:11 --> 00:07:15: billion available

00:07:15 --> 00:07:18: focusing on clean power.

00:07:18 --> 00:07:21: There's also .5, five, \$500 million available, particularly on

00:07:22 --> 00:07:26: acceleration.

00:07:26 --> 00:07:31: So this is important because we know that in the

00:07:31 --> 00:07:32: past it takes quite a lot of effort and time

00:07:33 --> 00:07:36: try to understand what is needed to be done in

00:07:36 --> 00:07:40: order to get to construction. So this grant is particularly

00:07:40 --> 00:07:41: trying to help organizations or corporation to move towards

00:07:43 --> 00:07:48: construction

00:07:48 --> 00:07:53: quicker.

00:07:53 --> 00:07:59: Now I'm going to turn it to Renee, who is

00:07:59 --> 00:08:02: going to facilitate our conversation today and also introduce

00:08:03 --> 00:08:09: our

00:08:09 --> 00:08:15: speaker.

00:08:15 --> 00:08:20: Good afternoon, everybody. And for some of us, good

00:08:20 --> 00:08:25: evening.

00:08:25 --> 00:08:30: I have the honor of introducing our international panel of

00:08:30 --> 00:08:32: extremely knowledgeable experts and industry leaders from

00:08:34 --> 00:08:39: both sides of

00:08:39 --> 00:08:41: the pond, in this case the Atlantic.

00:08:41 --> 00:08:46: First of all, Morgan McGregor, Senior Vice President, Energy

00:08:46 --> 00:08:51: Planning

00:08:51 --> 00:08:56: and Development at Enwave Energy Corporation in Canada

00:08:56 --> 00:09:01: and Martin

00:09:01 --> 00:09:06: Dufort, Director of Energy and Industry at Arcadis in the

00:09:06 --> 00:09:11: Netherlands. We have posted their BIOS in the in the

00:09:11 --> 00:09:16: chat and because we really want to hear from them,

00:09:16 --> 00:09:21: I'll I'll leave it at that.

00:09:21 --> 00:09:26: We, the presentations, will focus on sustainability at scale

00:09:26 --> 00:09:31: and

00:08:40 --> 00:08:46: discuss examples of local implementation of that principle. Morgan will

00:08:46 --> 00:08:52: talk about among other deep lake water cooling system that

00:08:52 --> 00:08:57: serves over 100 buildings in downtown Toronto, and Martin will

00:08:57 --> 00:09:00: talk about a net zero facility.

00:09:01 --> 00:09:06: The Amsterdam logistics city hub that generates its own energy

00:09:06 --> 00:09:11: with charging facilities for commercial trucks and cargo ships. I'll

00:09:11 --> 00:09:13: hand it over to Morgan first.

00:09:16 --> 00:09:22: Thanks, Renee. Everyone hear me okay. Yep. So again, I'm

00:09:22 --> 00:09:29: Morgan McGregor with Enwave. Just a little bit quickly about myself.

00:09:29 --> 00:09:29: myself.

00:09:31 --> 00:09:35: I'm responsible for our energy planning and development teams at

00:09:35 --> 00:09:39: Enwave. So that's our capital deployment teams as well as

00:09:39 --> 00:09:43: our teams that look after developing new energy concepts for

00:09:43 --> 00:09:48: new areas, new developments, new redevelopments. And to Renee's point,

00:09:48 --> 00:09:51: I'm going to focus most of my presentation today on

00:09:52 --> 00:09:55: examples of projects of the types of things we're doing.

00:09:55 --> 00:09:58: I think just adds a little bit of realism.

00:09:59 --> 00:10:02: To the whole topic and before that, I'm just going

00:10:02 --> 00:10:05: to do some quick context setting on sort of anyway

00:10:05 --> 00:10:08: of who we are, what District Energy is and just

00:10:08 --> 00:10:12: the built environment in general. So if you can go

00:10:12 --> 00:10:15: to the next slide, perfect. So I think some of

00:10:15 --> 00:10:18: you may have seen this graphic before, but in the

00:10:18 --> 00:10:21: bottom side of the slide, you can see 27% of

00:10:21 --> 00:10:25: the world's carbon emissions come from the built environment and

00:10:25 --> 00:10:27: building operations.

00:10:27 --> 00:10:30: When we talk about clean energy, we often focus on

00:10:31 --> 00:10:34: power, which is a huge piece of the equation. But

00:10:34 --> 00:10:37: all of these buildings also need to be heated and

00:10:37 --> 00:10:42: cooled, which comes with zone challenges, particularly on the heating

00:10:42 --> 00:10:45: side and hot water side. A lot of these systems

00:10:45 --> 00:10:48: are fossil fuel based right now, which is where a

00:10:48 --> 00:10:52: big chunk of the carbon emissions come from. The built

00:10:52 --> 00:10:55: environment in the GTA is set to double by 2060.

00:10:57 --> 00:11:01: And so obviously those numbers speak for themselves in terms

00:11:01 --> 00:11:04: of potential impact here. And So what we do at  
00:11:04 --> 00:11:07: End Wave is we look at working with our partners  
00:11:07 --> 00:11:10: to come up with low carbon energy solutions that will  
00:11:10 --> 00:11:14: create a lasting impact for our communities and and sort  
00:11:14 --> 00:11:18: of looking at integrating energy into the infrastructure of these  
00:11:18 --> 00:11:22: communities. Next slide. So what we are specifically is a  
00:11:22 --> 00:11:26: developer, owner operator of low carbon energy Systems.  
00:11:27 --> 00:11:30: And we like to say that we aggregate the demand  
00:11:30 --> 00:11:33: so that we are able to more easily integrate low  
00:11:33 --> 00:11:36: carbon technologies versus what you'd be able to do at  
00:11:36 --> 00:11:39: an individual building scale. So a little bit of context,  
00:11:39 --> 00:11:43: I think we're probably best known for our Toronto system,  
00:11:43 --> 00:11:46: which is where I'm sitting today. But this map is  
00:11:46 --> 00:11:49: just a a picture of our current locations which also  
00:11:49 --> 00:11:53: include London, that's London ON Windsor, Markham ON in  
00:11:53 --> 00:11:55: Charlottetown,  
00:11:53 --> 00:11:55: which is in Prince Edward Island.  
00:11:56 --> 00:12:00: And the little graphic show you where we supply heating,  
00:12:00 --> 00:12:03: which is the orange drop, cooling the blue drop. And  
00:12:03 --> 00:12:07: we do some small power generation which is the electrical  
00:12:07 --> 00:12:11: symbol. For some context, we serve over 400 buildings with  
00:12:11 --> 00:12:16: our systems on close to a million, 100,000,000 square feet  
00:12:16 --> 00:12:18: of space. And just a couple facts.  
00:12:19 --> 00:12:22: Of interest, I think we are one of North America's  
00:12:22 --> 00:12:26: largest commercial operators of energy from waste. So that's  
00:12:26 --> 00:12:29: at  
00:12:29 --> 00:12:33: our P/E I facility. We use a solid waste and  
00:12:29 --> 00:12:33: biomass in that facility. We have the world's largest  
00:12:33 --> 00:12:36: commercial  
00:12:33 --> 00:12:36: deep lake cooling system, which I'll talk a little bit  
00:12:36 --> 00:12:39: more about and we also have N America's largest thermal  
00:12:39 --> 00:12:42: battery here in Toronto. Next slide.  
00:12:45 --> 00:12:48: And so to my point earlier, what is, what is  
00:12:48 --> 00:12:53: integration of energy, what is district energy, What does this  
00:12:53 --> 00:12:56: all mean? So district energy at a high level is  
00:12:56 --> 00:13:01: essentially what we're doing is we're taking the need to  
00:13:01 --> 00:13:05: create the thermal energy at individual buildings. We're able  
00:13:01 --> 00:13:05: to  
00:13:05 --> 00:13:10: create and generate that at our more centralized facilities and  
00:13:10 --> 00:13:13: then distribute that through a series of.  
00:13:13 --> 00:13:16: Piping networks to our customers, what that allows us to  
00:13:16 --> 00:13:20: do, like I said earlier, is integrate technologies that would  
00:13:20 --> 00:13:23: be difficult to do otherwise at a building scale and

00:13:23 --> 00:13:26: make them commercial. And we can leverage A variety of

00:13:26 --> 00:13:29: energy sources. So there's some examples here on the graphic

00:13:29 --> 00:13:32: of of the types of inputs to this energy generation

00:13:32 --> 00:13:35: that we're able to leverage the district energy system. We

00:13:35 --> 00:13:39: then, like I said, distribute that energy to our customers,

00:13:39 --> 00:13:41: which include commercial buildings, healthcare.

00:13:42 --> 00:13:47: Municipal buildings, residential buildings. For those familiar with Toronto, we

00:13:47 --> 00:13:52: have you know a couple names you might recognize. Scotiabank

00:13:52 --> 00:13:55: Arena is connected to our system as is the Eaton

00:13:55 --> 00:13:59: Center Mall downtown and the Toronto General Hospital as well

00:13:59 --> 00:14:03: as several other hospitals and in addition to our more

00:14:03 --> 00:14:07: centralized district energy systems and we've also works with our

00:14:08 --> 00:14:10: partners to find custom solutions.

00:14:10 --> 00:14:14: To meet the needs of specific buildings or developments based

00:14:14 --> 00:14:17: on their specific constraints. So for example, we also have

00:14:17 --> 00:14:20: N wave Geo communities service line where the in the

00:14:20 --> 00:14:24: case of a single building being developed or redeveloped in

00:14:24 --> 00:14:26: an area where it's not near an existing district or

00:14:26 --> 00:14:29: there's not significant footprint enough to.

00:14:30 --> 00:14:34: Makes sense for a district scale solution. We can provide

00:14:34 --> 00:14:38: a single building Geo exchange solution as an example. So

00:14:38 --> 00:14:42: really the focus is on working with our partners to

00:14:42 --> 00:14:46: figure out the solution that makes the most sense for

00:14:46 --> 00:14:49: them. And next slide please. And so I'm going to

00:14:49 --> 00:14:53: talk about sort of two buckets of projects here today,

00:14:53 --> 00:14:54: one is just a.

00:14:55 --> 00:14:58: I'm going to talk about our Toronto system and do

00:14:58 --> 00:15:00: a little bit of a deeper dive into the deep

00:15:00 --> 00:15:03: lake cooling system already mentioned and then talk a little

00:15:03 --> 00:15:06: bit about our community energy planning team and our new

00:15:07 --> 00:15:11: district energy system development where we're working with new developments

00:15:11 --> 00:15:15: and redevelopments to create community scale energy infrastructure. So this

00:15:15 --> 00:15:17: map is a picture of our N Wave Toronto downtown

00:15:18 --> 00:15:21: distribution system. I like this so that the yellow you

00:15:21 --> 00:15:23: see on the two sides of the screen represent.

00:15:24 --> 00:15:27: Recent expansions we've done to both the West side and

00:15:27 --> 00:15:31: the east side of our system where we've extended our  
00:15:31 --> 00:15:35: chilled water system and also implemented the low carbon  
energy  
00:15:35 --> 00:15:39: network, low carbon hot water energy network to bring  
service  
00:15:39 --> 00:15:42: out to our partners on those ends of the lines.  
00:15:42 --> 00:15:46: And I think I like the this graphic particularly because  
00:15:46 --> 00:15:49: it just represents I think fundamentally what we need to  
00:15:49 --> 00:15:50: do.  
00:15:51 --> 00:15:54: In order to really facilitate this transition to low carbon,  
00:15:54 --> 00:15:58: which is essentially to continuously innovate and adapt and  
expand,  
00:15:58 --> 00:16:01: which is again what we're trying to do here. A  
00:16:01 --> 00:16:04: couple cool facts along the bottom again before I jump  
00:16:04 --> 00:16:07: into the deep light cooling system. We have N America's  
00:16:07 --> 00:16:10: largest dual service thermal battery. So I mentioned that  
before  
00:16:10 --> 00:16:13: and that's a little picture of it being constructed, but  
00:16:13 --> 00:16:16: we're just just for a sense of scale, it's located  
00:16:16 --> 00:16:18: beneath the well in Toronto, which is a.  
00:16:19 --> 00:16:23: Approximately 3,000,000 square foot development by Rio  
Cannon Allied. It's  
00:16:23 --> 00:16:26: a giant 2,000,000 gallon storage tank located below the P7  
00:16:26 --> 00:16:30: level of that particular building. And what it does is  
00:16:30 --> 00:16:33: allow us to store either hot or chilled water depending  
00:16:33 --> 00:16:36: on the season and we can fill that tank during  
00:16:36 --> 00:16:39: off peak hours. So reduce pressure on the grid and  
00:16:39 --> 00:16:42: do it when costs are lower and then dispatch it  
00:16:42 --> 00:16:44: during the peak times that we need to have that  
00:16:44 --> 00:16:45: resource.  
00:16:47 --> 00:16:50: And another fact in the middle, we're North America's largest  
00:16:50 --> 00:16:54: recycler building waste to energy. So that one of the  
00:16:54 --> 00:16:57: other things we're able to do just with the scale  
00:16:57 --> 00:17:00: we have down here is harnessed waste heat coming up,  
00:17:00 --> 00:17:04: cooling systems, data centers etcetera and and repurpose  
that recycle  
00:17:05 --> 00:17:08: it into usable heating energy. And then last but not  
00:17:08 --> 00:17:12: least, the world's largest commercial cooling system, Deep  
Lake, which  
00:17:12 --> 00:17:15: I'll talk to on the next slide, one if you  
00:17:15 --> 00:17:16: don't mind. Perfect.  
00:17:17 --> 00:17:20: So our deep lake cooling system is probably one of  
00:17:20 --> 00:17:23: the pieces of infrastructure that end wave I think is  
00:17:23 --> 00:17:27: most famous for. We cool approximately 100 buildings in



downtown

00:17:27 --> 00:17:30: Toronto and this system saves enough electricity to power a

00:17:30 --> 00:17:33: town of equivalent of about 25,000. It's been a very

00:17:33 --> 00:17:37: successful system and we're actually in the process of constructing

00:17:37 --> 00:17:40: a fourth intake. So this tree currently into the lake

00:17:40 --> 00:17:43: to expand the capacity of the system. So that construction

00:17:43 --> 00:17:44: is well underway.

00:17:46 --> 00:17:50: And really this project came about it from, you know,

00:17:50 --> 00:17:54: the need to combine the desire to accommodate growing demand

00:17:54 --> 00:17:58: for cooling in the city, as well as support the

00:17:58 --> 00:18:02: City of Toronto's carbon targets. So they've got their GHD

00:18:02 --> 00:18:06: reduction targets of 2030 and then zero by 2040. So

00:18:06 --> 00:18:10: how do you align those two objectives the way D

00:18:10 --> 00:18:11: plate cooling works is?

00:18:13 --> 00:18:17: Water is brought in from intakes at the bottom of

00:18:17 --> 00:18:21: Lake Ontario into the Island Filtration Plant, which is located

00:18:21 --> 00:18:26: on Toronto Island, and that's where potable water is produced

00:18:26 --> 00:18:29: for the city. It then makes its way over to

00:18:29 --> 00:18:32: sort of the main shore of Toronto to a pumping

00:18:32 --> 00:18:33: station.

00:18:34 --> 00:18:37: And before that water that's been treated goes into the

00:18:37 --> 00:18:40: pot of water distribution system, we pass it through a

00:18:40 --> 00:18:42: series of heat exchangers. And that allows us to take

00:18:42 --> 00:18:45: the cooling off of that very cold water, bring the

00:18:45 --> 00:18:48: temperature of that up a couple of degrees. And then

00:18:48 --> 00:18:51: we're able to use that cooling in our cooling systems.

00:18:51 --> 00:18:54: And it offsets the use of mechanical cooling equipment. So

00:18:54 --> 00:18:57: you no longer need mechanical chillers and cooling towers located

00:18:57 --> 00:19:01: on a bunch of individual buildings. Instead we're leveraging deeply

00:19:01 --> 00:19:02: cooling system.

00:19:03 --> 00:19:07: It brings about an approximately 80% electricity reduction compared to

00:19:07 --> 00:19:12: traditional mechanical systems and also saves over 200,000,000 gallons of

00:19:12 --> 00:19:15: water annually by removing those cooling tires. And again, just

00:19:15 --> 00:19:19: a very interesting opportunity or example of what you can

00:19:19 --> 00:19:23: do when you can leverage these infrastructure synergies. And like

00:19:23 --> 00:19:26: I said, the 4th Lake right now is under construct  
00:19:26 --> 00:19:29: or the 4th intake is under construction right now that  
00:19:29 --> 00:19:32: allow us to expand and accommodate growth in the city.  
00:19:32 --> 00:19:33: Next slide.  
00:19:35 --> 00:19:38: So I'm going to switch gears quickly here just to  
00:19:38 --> 00:19:41: talk a little bit about sort of talked about sort  
00:19:42 --> 00:19:45: of our incumbent systems and how you can expand and  
00:19:45 --> 00:19:49: innovate on those. But this next section focus a little  
00:19:49 --> 00:19:53: more specifically on our what we call our community energy  
00:19:53 --> 00:19:57: planning side of the operation, which is essentially where we  
00:19:57 --> 00:20:00: work with municipalities and developers to.  
00:20:02 --> 00:20:06: Help identify and then implements low carbon energy  
solutions for  
00:20:06 --> 00:20:10: new community projects. Really what we do here is again  
00:20:10 --> 00:20:15: partner with municipalities and developers, preferably the  
early stages of  
00:20:15 --> 00:20:19: projects to get into the planning process and figure out  
00:20:19 --> 00:20:21: the objectives of our partners.  
00:20:22 --> 00:20:25: And then figure out how we can make those objectives  
00:20:25 --> 00:20:28: a reality and bring their low carbon vision to life.  
00:20:28 --> 00:20:31: What does that actually mean? What does that look like  
00:20:31 --> 00:20:34: from an infrastructure perspective and how can we do that  
00:20:34 --> 00:20:37: together? And so the next couple, a few slides I'm  
00:20:37 --> 00:20:40: going to walk through are just examples of where we're  
00:20:40 --> 00:20:44: doing that across several different projects. Again, really  
intended to  
00:20:44 --> 00:20:47: showcase sort of the the types of things you can  
00:20:47 --> 00:20:49: do and and some of the things that make them  
00:20:49 --> 00:20:52: successful in ways to think about the projects.  
00:20:54 --> 00:20:58: So first we have the Etoboco Civic Center. So for  
00:20:58 --> 00:21:02: those familiar with Toronto or not as familiar, Etoboco is  
00:21:02 --> 00:21:06: an area located on the western side of Toronto and  
00:21:06 --> 00:21:10: and we visit City of Toronto's Low Carbon Thermal Energy  
00:21:10 --> 00:21:15: Network partner. As part of that partnership we've worked  
with  
00:21:15 --> 00:21:18: the city to develop a new community energy system.  
00:21:19 --> 00:21:23: For the Etobicoke Civic Center precinct, so there's an  
existing  
00:21:23 --> 00:21:25: plot of land in the West End of Toronto, about  
00:21:26 --> 00:21:29: 14 acres undergoing redevelopment. And as part of this  
redevelopment  
00:21:30 --> 00:21:33: process, the city wanted to make sure that everything that  
00:21:33 --> 00:21:36: was done in terms of redevelopment, they're aligned with the

00:21:37 --> 00:21:40: carbon targets, but also supported growth and densification in that

00:21:40 --> 00:21:44: area. It's approximately 3,000,000 square foot mixed-use development.

00:21:46 --> 00:21:48: And So what we did was work with the city

00:21:48 --> 00:21:51: to come up with a solution for this district, which

00:21:51 --> 00:21:55: is using a Geo exchange system that's going to provide

00:21:55 --> 00:21:59: heating, cooling and domestic hot water for this precinct area.

00:21:59 --> 00:22:02: And because we're doing it at a community sort of

00:22:02 --> 00:22:06: planning district scale, we've located Geo exchange bore fields throughout

00:22:06 --> 00:22:09: the development that are going to be tied into a

00:22:09 --> 00:22:11: central plant that's actually located.

00:22:12 --> 00:22:16: Beneath the city's new Civic Center building that they're building

00:22:16 --> 00:22:19: as part of this redevelopment. So it's intended to be

00:22:19 --> 00:22:21: a focal point of the community. And so below grade

00:22:21 --> 00:22:24: in this building, we're going to be able to house

00:22:24 --> 00:22:25: this energy plant.

00:22:26 --> 00:22:29: The energy that's produced there is going to be distributed

00:22:29 --> 00:22:33: to the buildings throughout the community. So rather than them

00:22:33 --> 00:22:36: having their own heating and cooling generation equipment in each

00:22:36 --> 00:22:39: building, they're just going to have a transfer station. We

00:22:39 --> 00:22:42: bring the energy to them and there's over an 80%

00:22:42 --> 00:22:46: carbon savings compared to the traditional systems that would typically

00:22:46 --> 00:22:49: be installed with the system. So again, very good example

00:22:49 --> 00:22:52: of where you know we're able to align objectives as

00:22:52 --> 00:22:54: the partners get in early in the process and again

00:22:54 --> 00:22:56: leverage infrastructure.

00:22:56 --> 00:23:00: And a limited footprint to make a maximum use of

00:23:00 --> 00:23:04: space by being involved early. Next slide, Lakeview Village is

00:23:04 --> 00:23:09: another community energy planning project. I wanted to highlight this

00:23:09 --> 00:23:12: one because it's a little bit different than ECC in

00:23:12 --> 00:23:16: a few ways. So we're working right now with Lakeview

00:23:16 --> 00:23:20: Community Partners to develop a low carbon solution for Lakeview

00:23:20 --> 00:23:24: Village development in the city of Mississauga which is just

00:23:24 --> 00:23:25: West of the city of.

00:23:26 --> 00:23:30: Funnel so there's 177 acre plot of land there that

00:23:30 --> 00:23:35: used to house the Four Sisters coal-fired power plant owned  
00:23:35 --> 00:23:40: by Ontario Power Generation. That plant was demolished  
and now  
00:23:40 --> 00:23:45: the site has been remediated and there's plans to transform  
00:23:45 --> 00:23:50: it into a world class mixed mixed-use community. So it's  
00:23:50 --> 00:23:54: right on the shores of Lake Ontario. Very cool property  
00:23:55 --> 00:23:55: and.  
00:23:55 --> 00:23:58: One of the things that Lakeview wanted to do as  
00:23:58 --> 00:24:02: part of this was to really bring a sustainable living  
00:24:02 --> 00:24:05: vision to life, do this in a very intentional way.  
00:24:05 --> 00:24:09: And I'll also align with the City of Mississauga's carbon  
00:24:09 --> 00:24:13: reduction targets. So what we're doing there is working with  
00:24:13 --> 00:24:17: them to develop a district energy system that will incorporate  
00:24:17 --> 00:24:22: eventually wastewater heat recovery from an wastewater  
treatment plant that's  
00:24:22 --> 00:24:23: actually adjacent to.  
00:24:24 --> 00:24:29: This property and supply heating, cooling and domestic hot  
water  
00:24:29 --> 00:24:32: into the community. So again, doing it at a district  
00:24:32 --> 00:24:37: scale, we're able to take advantage of the wastewater  
effluent  
00:24:37 --> 00:24:41: stream on the adjacent facility and sort of unlock its  
00:24:41 --> 00:24:45: potential and bring that, you know, to bring overall carbon  
00:24:45 --> 00:24:49: savings to the City of Mississauga, in this particular case  
00:24:49 --> 00:24:51: in Etobicoke Civic Center, we were.  
00:24:53 --> 00:24:56: Locating our plant sort of in the constrained footprint in  
00:24:56 --> 00:24:58: the basement of the one of the buildings and in  
00:24:58 --> 00:25:01: this case like these vision is to showcase sustainability. And  
00:25:01 --> 00:25:05: so we're going to have a separate sustainability center  
standalone  
00:25:05 --> 00:25:08: facility for the plant and really sort of bring that  
00:25:08 --> 00:25:11: vision to life. And then energy is distributed through  
distribution  
00:25:11 --> 00:25:14: piping that's located within the rights of way under the  
00:25:14 --> 00:25:14: streets.  
00:25:15 --> 00:25:18: And we're working hand in hand with the design and  
00:25:18 --> 00:25:22: construction teams there to integrate this into the overall  
community  
00:25:22 --> 00:25:26: infrastructure planning. So just like you put your water and  
00:25:26 --> 00:25:30: your sewer piping in your typical utilities sort of getting  
00:25:30 --> 00:25:33: thermal energy into that equation as part of the community  
00:25:33 --> 00:25:34: planning activities.  
00:25:39 --> 00:25:42: And then last but not least, I wanted to talk  
00:25:42 --> 00:25:45: about this one spring water community which is up in

00:25:45 --> 00:25:49: Markham ON just because it's slightly different than some of  
00:25:49 --> 00:25:54: these higher density redevelopments we're talking about. So  
Matami Homes,  
00:25:54 --> 00:25:58: North America's largest private Lyon home builder was is  
developing  
00:25:58 --> 00:26:02: a new neighborhood in in Markham ON just over 300  
00:26:02 --> 00:26:06: homes and in this particular case it's it's primarily detached  
00:26:06 --> 00:26:06: homes but.  
00:26:08 --> 00:26:11: You know, scale aside, they had the vision of bringing  
00:26:11 --> 00:26:16: some new model for sustainable development to a  
realization. So  
00:26:16 --> 00:26:19: they partner with us and we all work closely with  
00:26:19 --> 00:26:23: the city of Markham, who has some net 0 emissions,  
00:26:23 --> 00:26:26: to figure out a solution that could marry up all  
00:26:26 --> 00:26:30: the objectives of all of the stakeholders. So we worked  
00:26:30 --> 00:26:33: with the parties to implement a Geo exchange system.  
00:26:34 --> 00:26:37: That supplies heating and cooling to the homes in the  
00:26:37 --> 00:26:40: development. And what we did in this case is locate  
00:26:40 --> 00:26:43: the Geo field in the rights of way. So they're  
00:26:43 --> 00:26:46: they're within the rights of way in the road. And  
00:26:46 --> 00:26:49: then that Geo infrastructure is then connected to a piping  
00:26:49 --> 00:26:53: ambient loop network that then brings this loop into individual  
00:26:53 --> 00:26:56: homes and you can see the little graphic there denoting  
00:26:56 --> 00:26:58: that. And so each home then has its own heat  
00:26:58 --> 00:27:01: pump and is able to use that Geo exchange field,  
00:27:01 --> 00:27:03: but we've centralized the bore fields.  
00:27:04 --> 00:27:07: And sort of taking that out of, you know the  
00:27:07 --> 00:27:10: purview of the individual homes and we're able to operate  
00:27:10 --> 00:27:14: and manage that as a utility and bring significant carbon  
00:27:14 --> 00:27:18: savings to the development by replacing the traditional  
conventional heating  
00:27:18 --> 00:27:22: and cooling systems in these homes. We've also by locating  
00:27:22 --> 00:27:25: the boreholes in the rights of way and having the  
00:27:25 --> 00:27:26: buried vault infrastructure.  
00:27:28 --> 00:27:31: Preserve the aesthetic vision of the community and and the  
00:27:31 --> 00:27:34: space at the surface so that that can be maximized  
00:27:34 --> 00:27:37: for typical residential uses. And in this case I, you  
00:27:37 --> 00:27:40: know I think part of the success was just really  
00:27:40 --> 00:27:44: working closely again with the developer upfront as well as  
00:27:44 --> 00:27:46: the city to work with us to figure out how  
00:27:46 --> 00:27:50: to implement this infrastructure and the rights of way how  
00:27:50 --> 00:27:53: to come up with the specifics around that and you  
00:27:53 --> 00:27:56: know something that is is a bit new and different

00:27:56 --> 00:27:57: has been very important.

00:27:58 --> 00:28:01: So and then think next slide, Ivan, if you don't

00:28:01 --> 00:28:05: mind, this is my last slide really just a summary

00:28:05 --> 00:28:09: of some of what I've covered off already and talked

00:28:09 --> 00:28:12: about. It's just really kind of if you distill it

00:28:12 --> 00:28:16: down, what are what you know the main keys to

00:28:16 --> 00:28:19: success that we we've seen and being able to bring

00:28:19 --> 00:28:22: some of these visions to life and I think you

00:28:22 --> 00:28:23: know first.

00:28:24 --> 00:28:27: You know setting the stage right partners right people and

00:28:27 --> 00:28:30: with the vision and mandate to deliver on the project

00:28:30 --> 00:28:33: and that means people who one have the mandate and

00:28:33 --> 00:28:36: also the passion to get it delivered and also the

00:28:36 --> 00:28:40: right level and decision making authority to make those

00:28:40 --> 00:28:43: decisions

00:28:43 --> 00:28:47: and keep things moving. It's very important early

00:28:47 --> 00:28:48: engagement and

00:28:48 --> 00:28:49: ongoing collaboration I think I've stressed this a few times

00:28:49 --> 00:28:51: is critical the earlier.

00:28:51 --> 00:28:55: But you can think about energy as part of your

00:28:55 --> 00:28:58: your development which traditionally has been done in a little

00:28:58 --> 00:29:01: bit more of a disparate way the better I think

00:29:01 --> 00:29:04: it is for everybody. And then government partners with a

00:29:04 --> 00:29:08: strong vision and supporting actions and those those include

00:29:08 --> 00:29:10: you

00:29:10 --> 00:29:14: know I've mentioned a few cities here that we've worked

00:29:14 --> 00:29:16: with have been very critical as well as you know

00:29:16 --> 00:29:20: entities like TIP that Yvon's mentioned and other entities that

00:29:20 --> 00:29:24: can help support making these things reality.

00:29:24 --> 00:29:27: And really to be successful, we wanna integrate into the

00:29:27 --> 00:29:30: design development, construction process as early as

00:29:30 --> 00:29:33: possible and just

00:29:33 --> 00:29:35: become part of the team, get support and engagement from

00:29:35 --> 00:29:36: approval agencies. So again you know pipes in the road

00:29:36 --> 00:29:40: is nothing new. The the thing that's new here is

00:29:40 --> 00:29:43: you know what's in the pipes in the road in

00:29:43 --> 00:29:46: this particular case for.

00:29:46 --> 00:29:49: In the case of Ontario for example, and really just

00:29:49 --> 00:29:53: working with approval agencies who are willing to to work

00:29:53 --> 00:29:56: with us to figure out that path. Again, I use

00:29:56 --> 00:29:59: Markham as the example of getting that infrastructure in a

00:29:59 --> 00:30:02: traditional right of way, cross section leveraging infrastructure

00:30:02 --> 00:30:05: synergies, so

00:29:53 --> 00:29:57: people being proactive and conscious about that where do we

00:29:57 --> 00:30:00: have something that we're doing where we can maximize space,

00:30:00 --> 00:30:04: whether that's a shared facility, building the deep lake cooling

00:30:04 --> 00:30:05: system, good example.

00:30:06 --> 00:30:09: Access and easement rights, so all of this stuff takes

00:30:09 --> 00:30:12: space and working with our partners and being able to

00:30:12 --> 00:30:15: get access to that space that's needed in the case

00:30:15 --> 00:30:19: of piping in the rights of way, having access agreements

00:30:19 --> 00:30:22: in the sorts of thing and then targeted funding incentive

00:30:22 --> 00:30:26: and policies. So I think this is critical upfront funding.

00:30:28 --> 00:30:31: I think Yvonne mentioned on one of the earlier slides

00:30:31 --> 00:30:34: about sort of accelerating things and and some of it

00:30:34 --> 00:30:37: is just you know getting some of that early days

00:30:37 --> 00:30:41: funding to get some of these projects off the ground

00:30:41 --> 00:30:44: from sort of a pretty picture concept level to the

00:30:44 --> 00:30:47: next level of design. You need to make it real

00:30:47 --> 00:30:50: as well as some of the supporting policies on you

00:30:50 --> 00:30:54: know the building side to to incent low carbon development.

00:30:54 --> 00:30:56: So I think that's it for me everyone.

00:30:57 --> 00:31:00: Thank you. So this is fantastic. So I think the

00:31:00 --> 00:31:03: key take away in here is that early and having

00:31:03 --> 00:31:07: a cohesive vision and mandate, all of your examples are

00:31:07 --> 00:31:11: at community scale covering different densities. Some of those are

00:31:11 --> 00:31:14: triggered by public sector like such as a typical. So

00:31:15 --> 00:31:18: there's a public sector, some of those are driven by

00:31:18 --> 00:31:21: private sector, but they all have a similar outcome and

00:31:21 --> 00:31:24: expectations. So that's fantastic.

00:31:24 --> 00:31:35: Now we're gonna introduce our speaker from Net Land, Martin

00:31:35 --> 00:31:36: Martin.

00:31:37 --> 00:31:41: Yes, on mute. Sorry. That was the most used sentence,

00:31:41 --> 00:31:44: I think in the last two years. Sorry for my

00:31:44 --> 00:31:47: slowness. Yeah. Thank you for having me. I will take

00:31:48 --> 00:31:51: you through the what happens in the energy transition and

00:31:51 --> 00:31:56: how we're shaping the future system in Northwestern Europe.

00:31:57 --> 00:32:01: And I'll, I'll, I'll start with a micro view and

00:32:01 --> 00:32:05: I'll go down towards micro view because in the end

00:32:06 --> 00:32:09: we want to see how that lands in the micro

00:32:09 --> 00:32:13: environment. So first of all, it's good to to have

00:32:13 --> 00:32:17: a look at what are the drivers for us in

00:32:17 --> 00:32:22: Europe and obviously that's that's climate that's where they started

00:32:23 --> 00:32:24: but until 2016.

00:32:25 --> 00:32:29: Everything around climate, climate policy was also in Europe, a

00:32:29 --> 00:32:33: very, yeah, green, maybe left wind political topic and that

00:32:33 --> 00:32:37: has changed. In 2016, those were the first tenders of

00:32:37 --> 00:32:41: offshore winds that were subsidy free and suddenly it appeared

00:32:41 --> 00:32:44: that people were able to make money with wind energy

00:32:45 --> 00:32:47: and with solar in Southern Europe.

00:32:48 --> 00:32:52: So that means that the topic of energy transition sort

00:32:52 --> 00:32:56: of be deep political politicized a little bit in Europe

00:32:56 --> 00:33:00: now recently of course. Bottom right, we have this, this

00:33:00 --> 00:33:03: situation with Russia. We have a ban on Russia gas

00:33:03 --> 00:33:08: imports, so energy security, energy independency, our next topics that

00:33:08 --> 00:33:11: are really on the political agenda.

00:33:11 --> 00:33:15: So it's not only an energy transition for sustainability and

00:33:16 --> 00:33:20: meeting the climate climate goals of Paris, There's much more

00:33:20 --> 00:33:24: at stake. It's about money and the cheapest solution of

00:33:24 --> 00:33:28: sourcing our energy, and also in the most energy independent

00:33:28 --> 00:33:29: way.

00:33:31 --> 00:33:34: And that means that for countries around the North Sea,

00:33:35 --> 00:33:37: if we go to the next slides, we see that

00:33:37 --> 00:33:42: it's really acceptable to look at higher ambitions. The countries

00:33:42 --> 00:33:45: around the North Sea that you see here in both

00:33:45 --> 00:33:50: pictures together agreed on having 150 gigawatts of offshore winds

00:33:50 --> 00:33:52: built on the North Sea in 2050.

00:33:53 --> 00:33:57: And people are working towards that. The Netherlands is actually

00:33:57 --> 00:34:01: there are targets currently is 70 GW, which is of

00:34:01 --> 00:34:05: course a more than significant share of that 150 gigawatts.

00:34:05 --> 00:34:09: But that also poses a challenge to infrastructure. Yeah, we

00:34:09 --> 00:34:12: can say that that offshore wind by itself has become

00:34:13 --> 00:34:16: subsidy free, but we also need to connect that and

00:34:16 --> 00:34:18: integrate all that energy in our.

00:34:19 --> 00:34:22: Energy systems to a large extent that's power as as

00:34:23 --> 00:34:26: it's produced in electrons. If you can use it in



00:34:26 --> 00:34:30: electrons, that's obviously the most efficient use of that renewable

00:34:30 --> 00:34:33: energy. And that means that we need quite some grid

00:34:33 --> 00:34:37: enforcement at large scale in our power grids. But we

00:34:37 --> 00:34:40: can't integrate all of that in electrons. So we also

00:34:40 --> 00:34:43: need to turn some of that into molecules and then

00:34:43 --> 00:34:47: hydrogen comes up and we're working on the hydrogen backbone.

00:34:48 --> 00:34:52: Actually the hydrogen backbone that you see here on the

00:34:52 --> 00:34:55: right side in the graph, the onshore side of that

00:34:55 --> 00:35:00: will already be ready before 20-30. The offshore will follow

00:35:00 --> 00:35:03: later. But in 2031, we will have the first offshore

00:35:03 --> 00:35:08: wind farm in the Netherlands already producing 500 megawatts of

00:35:08 --> 00:35:12: hydrogen. So this goes fast. We're accelerating.

00:35:12 --> 00:35:15: And if we go to the next slides, we take

00:35:15 --> 00:35:18: that to the onshore. This is a picture of the

00:35:18 --> 00:35:22: Netherlands as said, I'm slowly zooming in Netherlands here on

00:35:22 --> 00:35:25: its side, you see the North Sea above it and

00:35:25 --> 00:35:28: you see that it's a really busy picture. There is

00:35:28 --> 00:35:33: a lot of industry. We're heavily industrialized, we're densely populated

00:35:33 --> 00:35:37: where with more than 16 million people in the Netherlands.

00:35:37 --> 00:35:40: And that means that we have quite a challenge and

00:35:40 --> 00:35:41: already in 2019.

00:35:41 --> 00:35:45: We agreed on a climate agreement that set targets for

00:35:45 --> 00:35:48: 20-30, a road map for 2030 and we did that

00:35:48 --> 00:35:51: where in a way where we said that each sector

00:35:51 --> 00:35:54: has a fair share of this puzzle. So we want

00:35:55 --> 00:35:59: to see some emission savings from mobility from agriculture sites,

00:35:59 --> 00:36:04: from the built environment, from industry and also from the

00:36:04 --> 00:36:05: energy sector.

00:36:06 --> 00:36:09: And that fair share obviously differs a lot. So if

00:36:09 --> 00:36:13: you zoom into that, the the the built environment has

00:36:13 --> 00:36:17: a total savings of 3.4 megatons, which is exactly the

00:36:17 --> 00:36:21: same as the largest project in itself on the industry

00:36:21 --> 00:36:25: side. So the burden is spread across different sectors, but

00:36:25 --> 00:36:28: each of those run at a different pace.

00:36:30 --> 00:36:34: And that is incentivized by financial means, that is incentivized

00:36:34 --> 00:36:38: by regulation. But that also means that we need to

00:36:38 --> 00:36:42: provide it with the infrastructure that is necessary here. And

00:36:42 --> 00:36:45: if we take that to the next slides, because then

00:36:45 --> 00:36:48: it's a little bit of how we do that, this

00:36:48 --> 00:36:52: is a very complicated picture showing the structure in which

00:36:52 --> 00:36:56: we plan this infrastructure. We're not North Korea. We're not

00:36:57 --> 00:36:58: a plant economy.

00:36:58 --> 00:37:02: But we want to actually mobilize all our all of

00:37:02 --> 00:37:07: our governments at the various levels to take their part

00:37:07 --> 00:37:11: in the planning of that infrastructure required. So if you

00:37:12 --> 00:37:15: look at the very top side, we have Europe coming

00:37:15 --> 00:37:20: up with some some targets, setting targets and incentives

00:37:21 --> 00:37:26: and then our national governments in green is planning the

00:37:26 --> 00:37:31: larger.

00:37:26 --> 00:37:31: Infrastructure across the Netherlands not only power, not

00:37:31 --> 00:37:34: only hydrogen,

00:37:31 --> 00:37:34: not only natural gas and bio gas, but also carbon

00:37:34 --> 00:37:38: and heat. And provinces are taking a role here and

00:37:38 --> 00:37:43: local governments. Municipalities are also playing a role

00:37:43 --> 00:37:46: here. And

00:37:43 --> 00:37:46: at each level there are plans being prepared for urban

00:37:46 --> 00:37:52: environments from industry needs. Our industry clusters are

00:37:52 --> 00:37:53: getting together

00:37:52 --> 00:37:53: organizing their plans.

00:37:54 --> 00:37:58: And we're trying to balance out what is the needed

00:37:58 --> 00:38:03: from an infrastructure point of view, which is really needed.

00:38:03 --> 00:38:06: If we look at the next slides, we have the

00:38:06 --> 00:38:11: current situation in the Netherlands. Yvonne, can you turn the

00:38:11 --> 00:38:15: slides? Yeah, thanks. So this is a very red colored

00:38:15 --> 00:38:20: map of the Netherlands, which is the current situation on

00:38:20 --> 00:38:22: where you can still.

00:38:23 --> 00:38:27: Get a grid connection and and the Netherlands. This is

00:38:27 --> 00:38:31: actually already outdated. This is end of last year situation.

00:38:31 --> 00:38:35: Today it is extremely hard in almost the entire Netherlands

00:38:35 --> 00:38:38: to get a grid connection or an extension of an

00:38:38 --> 00:38:43: existing grid connection. Because of congestion issues. You

00:38:43 --> 00:38:47: cannot connect

00:38:43 --> 00:38:47: new solar farms in most regions of the Netherlands. That's

00:38:47 --> 00:38:50: the map to the to the left hand side. Most

00:38:50 --> 00:38:52: of the Netherlands is red.

00:38:53 --> 00:38:56: And also on the demand side, if you are an

00:38:56 --> 00:39:00: industry and you want to to electrify some of your

00:39:00 --> 00:39:04: heat processes by heat pumps or electric boilers, you can't

00:39:04 --> 00:39:09: connect that today because of great congestion. And that's

really

00:39:09 --> 00:39:13: unfortunate because that means that we have quite some target

00:39:13 --> 00:39:17: sets at national level, at European level. We have our

00:39:17 --> 00:39:21: incentives ready, but the Netherlands is mostly on lock at

00:39:21 --> 00:39:22: the moment.

00:39:23 --> 00:39:27: And what's happening here is the is explained in the

00:39:27 --> 00:39:32: following slides and that has everything to do with the

00:39:32 --> 00:39:37: timing of production or demands. So grid capacity of course

00:39:37 --> 00:39:42: is is originally designed to satisfy demands from central

00:39:42 --> 00:39:48: power

00:39:48 --> 00:39:52: sources, large scale generation gas assets, coal-fired

00:39:53 --> 00:39:57: stations and a

00:39:57 --> 00:40:00: nuclear station that we have in the Netherlands.

00:40:00 --> 00:40:04: And that determines still today the grid capacity. If you

00:40:04 --> 00:40:08: add to that mix solar, then solar production of course

00:40:08 --> 00:40:12: is highly peaked. It produces during the day. If you

00:40:12 --> 00:40:15: add to that makes the charging of electric vehicles and

00:40:15 --> 00:40:19: charging of electric buses and trucks of course heavily

00:40:19 --> 00:40:20: peaked

00:40:21 --> 00:40:24: because everyone plugs in when they get home or or

00:40:24 --> 00:40:28: trucks get get back to their distribution center at at

00:40:28 --> 00:40:32: 5:00 or 6:00 PM.

00:40:32 --> 00:40:37: And so both the demand side is peaking and the

00:40:37 --> 00:40:42: supply side is peaking and that means that especially at

00:40:42 --> 00:40:46: the DNL level, distribution level in our grids, we're seeing

00:40:46 --> 00:40:50: those congestion issues occurring. So we're working on

00:40:51 --> 00:40:55: solutions here.

00:40:55 --> 00:40:59: We're working on grid enforcements, we're working on load

00:40:59 --> 00:41:04: shaving

00:41:04 --> 00:41:08: projects. How can we introduce perhaps storage in order to

00:41:08 --> 00:41:12: shift the moments of those productions and and demands.

00:41:12 --> 00:41:17: And can we reduce the peak of those consumption patterns

00:41:17 --> 00:41:22: by again storage or local supply. So these are projects

00:41:22 --> 00:41:27: that we're working on in various environments because the

00:41:27 --> 00:41:32: next

00:41:33 --> 00:41:36: picture on the next slide, that's something that we don't

00:41:37 --> 00:41:42: want to have, We don't want to have our people.

00:41:42 --> 00:41:47: In the end that are used to a certain certain

00:41:47 --> 00:41:52: luxury that should not be impacted. So we want to

00:41:52 --> 00:41:57: get away from this and that means indeed quite some

00:41:57 --> 00:42:02: local solutions here. If we move to the next slide,

00:42:02 --> 00:42:07: those local solutions are actually.

00:42:07 --> 00:42:12: Also challenging to implement, I mentioned it before, the

Netherlands

00:41:42 --> 00:41:46: is quite dense. It's quite spaces, it's rather scars. So

00:41:46 --> 00:41:51: how do we integrate all those local renewables, those batteries,

00:41:51 --> 00:41:56: those grid enforcement projects, that's those storage projects, storage and

00:41:56 --> 00:42:00: batteries when it comes to power, but also storage of

00:42:00 --> 00:42:05: heat subsurface storage there. How do we integrate that in

00:42:05 --> 00:42:06: our small country?

00:42:07 --> 00:42:13: In our industrial clusters in our urbanized environment. And basically

00:42:13 --> 00:42:16: we do that in a way that starts really slow,

00:42:16 --> 00:42:21: but once we are at pace, actually delivers results and

00:42:21 --> 00:42:26: it starts slow because we bring all the stakeholders around

00:42:26 --> 00:42:30: the table. It's the same way by which the climate

00:42:30 --> 00:42:35: agreement which I mentioned before was came to be.

00:42:35 --> 00:42:39: Now we we organize all those stakeholders, We are trying

00:42:40 --> 00:42:44: to speak the same language, understand one another's problems. We

00:42:44 --> 00:42:48: have all the lobby around the table and together we

00:42:48 --> 00:42:52: do that fact finding and we come to a certain,

00:42:52 --> 00:42:57: yeah, agreeable solution. How should that space be utilized most

00:42:57 --> 00:42:59: effectively towards the future?

00:43:00 --> 00:43:03: Where is the need of those local storage and local

00:43:03 --> 00:43:07: solar, etc, energy solutions and should that be here or

00:43:07 --> 00:43:11: can it also move elsewhere? So those are dialogues that

00:43:11 --> 00:43:15: we actively have at various levels at national level, but

00:43:15 --> 00:43:18: also at municipality level, if we go to the next

00:43:18 --> 00:43:22: slide, because this is also something where we see that

00:43:22 --> 00:43:25: companies themselves are getting mobilized.

00:43:26 --> 00:43:30: Companies themselves are looking around at their neighbors to say

00:43:30 --> 00:43:32: to to look at what is possible despite the grid

00:43:33 --> 00:43:36: connection. There is a Red Cross there in this picture.

00:43:36 --> 00:43:39: Can you exchange some power produced by your neighbors? Can

00:43:39 --> 00:43:43: you exchange some heat with your neighbors? Not always easy

00:43:43 --> 00:43:47: because parties don't like any look in situations that this

00:43:47 --> 00:43:47: may create.

00:43:49 --> 00:43:53: But we start from solving that organizational puzzle on how

00:43:53 --> 00:43:57: do we collaborate and who has what role in this,

00:43:57 --> 00:44:02: those processes. Fortunately this is becoming profitable and

this is

00:44:02 --> 00:44:07: becoming profitable because that green energy produced is cheaper than

00:44:08 --> 00:44:11: the Gray electricity that is both from the grid and

00:44:11 --> 00:44:15: especially last year when we saw extremely high.

00:44:16 --> 00:44:21: Power prices and gas prices across Europe, it was really

00:44:21 --> 00:44:25: clear for everyone that green energy is is having a

00:44:25 --> 00:44:30: very positive business case and actually we had such a

00:44:30 --> 00:44:35: run also at from from urban environments everyone wanted to

00:44:35 --> 00:44:38: put solar panels on their roof. So that's why.

00:44:39 --> 00:44:43: I said that those pictures that I showed before are

00:44:43 --> 00:44:47: even redder today than they were a few months ago

00:44:47 --> 00:44:51: because the pace is really immense. Okay. If we move

00:44:51 --> 00:44:55: to the next slides, I want to discuss a an

00:44:55 --> 00:45:00: example in Amsterdam. Indeed, this is an Amsterdam logistic city

00:45:00 --> 00:45:03: hub and that is a reuse of a location in

00:45:03 --> 00:45:05: the Amsterdam port area.

00:45:06 --> 00:45:11: Where there is a logistics center set up for supplying

00:45:11 --> 00:45:15: the town itself. Amsterdam as you know is a very

00:45:15 --> 00:45:21: densely populated and and and pretty city that that that

00:45:21 --> 00:45:25: it has a very old historic center and and in

00:45:25 --> 00:45:29: a few years from now diesel fuels trucks.

00:45:29 --> 00:45:34: And conventional fuels, consumer cars will be banned from the

00:45:34 --> 00:45:39: Town Center. And that means that our shops and restaurants

00:45:39 --> 00:45:44: need to be supplied by green transport modes. But all

00:45:44 --> 00:45:49: those trucks and all those distribution fans need, of course,

00:45:49 --> 00:45:53: to get charged somewhere. And that's the idea of this

00:45:53 --> 00:45:57: logistics that you have. This is a place.

00:45:59 --> 00:46:03: Where those distribution vans, those trucks will be need to

00:46:03 --> 00:46:07: be able to charge. So that means quite a power

00:46:07 --> 00:46:11: demand and quite some peaks in that power demand and

00:46:11 --> 00:46:15: of course as you can guess, the grids couldn't cope

00:46:15 --> 00:46:18: with this. So we have a challenge here. If we

00:46:18 --> 00:46:22: go to the next slides, it shows that we were

00:46:22 --> 00:46:24: able to actually solve that challenge.

00:46:25 --> 00:46:30: Of that limited grid connection, by actually looking at many

00:46:30 --> 00:46:35: solutions here, their solutions had to do with with some

00:46:35 --> 00:46:39: contracting, when do we need to charge? Are we able

00:46:39 --> 00:46:44: to provide financial incentives to actually spread the demands across

00:46:44 --> 00:46:48: the full 24 hours a day, apply some local storage,

00:46:48 --> 00:46:52: have solar PV on the roof, Have a smart energy

00:46:52 --> 00:46:54: management system?

00:46:54 --> 00:46:58: Is there a connection possible with the neighbors to swap

00:46:58 --> 00:47:03: some of the of the energy consumption with the neighbors,

00:47:03 --> 00:47:06: what is possible in terms of grid enforcement and so

00:47:07 --> 00:47:11: on. So there were various technologies and solution routes

00:47:11 --> 00:47:15: being

00:47:15 --> 00:47:19: explored here and that actually led to a situation if

00:47:19 --> 00:47:23: we take that to the next slides without going into

00:47:23 --> 00:47:23: much detail around the business case, but we saw that

00:47:25 --> 00:47:30: the.

00:47:30 --> 00:47:35: That the economics of that business case actually improved.

00:47:35 --> 00:47:39: The

00:47:40 --> 00:47:44: more of those solutions we integrated there locally, the better

00:47:44 --> 00:47:48: the total business case became. So it's beneficial to actually

00:47:48 --> 00:47:53: integrate all that solar. It's beneficial to have that storage

00:47:55 --> 00:47:58: on site and well, so in the end the challenge

00:47:58 --> 00:48:02: was very complicated. There were multiple stakeholders

00:48:02 --> 00:48:06: involved here.

00:48:06 --> 00:48:09: That didn't see that solution at start, but in the

00:48:09 --> 00:48:13: end there was a beneficial case for everyone to sit

00:48:13 --> 00:48:16: around the table. So a happy ending to that story.

00:48:16 --> 00:48:18: If we go to the next slide, which actually is

00:48:19 --> 00:48:23: the last slide of my presentation, I think there is

00:48:23 --> 00:48:28: a few lessons around how we how to get things

00:48:28 --> 00:48:31: done in a limited space.

00:48:31 --> 00:48:35: And in a situation with those power grid limitations that

00:48:35 --> 00:48:40: we see throughout the Netherlands and that starts with

00:48:40 --> 00:48:44: indeed

00:48:44 --> 00:48:47: a lot of talking. So that may start slow as

00:48:48 --> 00:48:51: said. But once you get together, once you see each

00:48:51 --> 00:48:56: other's perspective, then yeah, those solutions are there and

00:48:56 --> 00:49:00: may

00:49:00 --> 00:49:04: not always be the final solutions to a case, but

00:49:04 --> 00:49:08: they're worthwhile exploring as we see so.

00:49:08 --> 00:49:14: Yeah. We try to opt in as as trusted advisors

00:49:14 --> 00:49:18: there of course because we want that transparent

00:49:18 --> 00:49:22: conversation with

00:49:22 --> 00:49:26: all those, with all those stakeholders on boards. It may

00:49:26 --> 00:49:30: be typical Dutch such a consensus oriented approach. We

00:49:30 --> 00:49:34: see

00:49:34 --> 00:49:38: good examples with a commercial with industrial cases in the

00:49:38 --> 00:49:42: Netherlands also in the urban environments from

00:49:14 --> 00:49:17: municipalities. And yeah,  
00:49:17 --> 00:49:20: it's it's, it's maybe worthwhile to see.  
00:49:21 --> 00:49:24: How that would work in in other countries around the  
00:49:24 --> 00:49:26: globe. Those are my examples and this is where I  
00:49:32 --> 00:49:37: want to leave it back to you.  
00:49:37 --> 00:49:43: So sorry. So thank you both for these inspiring local  
00:49:43 --> 00:49:44: solutions that have the potential for implementation at a  
00:49:45 --> 00:49:49: much  
00:49:50 --> 00:49:54: larger scale.  
00:49:54 --> 00:49:58: We're very much on time. Thank you for that too,  
00:49:58 --> 00:50:04: because that leaves more room for Q&A. And to kick  
00:50:04 --> 00:50:08: that off, I have a first question for you, Morgan.  
00:50:08 --> 00:50:13: As Enwave owns both infrastructure and production and  
00:50:13 --> 00:50:14: storage, what  
00:50:16 --> 00:50:20: is your main challenge if you were to extend your  
00:50:20 --> 00:50:26: services to other neighborhoods? Can you talk a little bit  
00:50:26 --> 00:50:29: about that?  
00:50:30 --> 00:50:32: Yes, it's a very good question. I think there is  
00:50:32 --> 00:50:36: with thermal energy piece we're talking about in terms of  
00:50:36 --> 00:50:39: extension there is I think definitely.  
00:50:39 --> 00:50:43: I think I said this sort of couple of times  
00:50:43 --> 00:50:46: for my presentation, but one of our, our value proposition  
00:50:46 --> 00:50:49: is doing things at commercial that are commercial and  
00:50:49 --> 00:50:52: making  
00:50:52 --> 00:50:55: them commercially viable. And so within that there's  
00:50:55 --> 00:50:58: constraints in  
00:51:00 --> 00:51:03: terms of limits of what makes sense for expansion of  
00:51:03 --> 00:51:07: an existing system versus for example single building Geo  
00:51:07 --> 00:51:11: and  
00:51:11 --> 00:51:13: creating a new district. So I think really that's the  
00:51:13 --> 00:51:16: trick is sort of that balance and evaluating that. So  
00:51:16 --> 00:51:19: are we talking about something that's reasonably?  
00:51:19 --> 00:51:23: Efficient and economical to do in terms of an expansion  
00:51:23 --> 00:51:26: that we can accommodate through generating capacity as  
00:51:27 --> 00:51:28: well as  
00:51:28 --> 00:51:31: you know extending our distribution infrastructure. Is it  
00:51:31 --> 00:51:34: something that  
00:51:34 --> 00:51:37: we need to look at as a sort of 1  
00:51:37 --> 00:51:40: off or is it something where we should approach it  
00:51:40 --> 00:51:43: As for example, its own node with the opportunity to  
00:51:43 --> 00:51:46: to, you know as you continue to expand systems increasingly  
00:51:46 --> 00:51:49: grow things together. So I think that's really the trick  
00:51:49 --> 00:51:52: is sort of that upfront.

00:51:29 --> 00:51:33: Assessment in terms of what makes the most sense, but  
00:51:33 --> 00:51:36: still the solution that our clients are looking for.  
00:51:38 --> 00:51:42: All right, thank you. Question for you, Martin, you talked  
00:51:42 --> 00:51:47: about local solutions to meet energy needs in the Netherlands.  
00:51:47 --> 00:51:51: Do we really need all that North Sea offshore wind  
00:51:51 --> 00:51:54: power that you mentioned at the beginning of your of  
00:51:55 --> 00:51:56: your presentation?  
00:51:57 --> 00:52:01: Yes, good question. Yes, I think we very much do  
00:52:01 --> 00:52:06: for various reasons. So local solutions are often oriented around  
00:52:06 --> 00:52:10: solar and the Netherlands is at 52 degrees latitude. I  
00:52:10 --> 00:52:14: think that is right and and I always mix up  
00:52:14 --> 00:52:17: the grid there, but but that means that we have  
00:52:17 --> 00:52:22: a difference in power production of solar over factor of  
00:52:22 --> 00:52:24: 8 winter versus summer.  
00:52:24 --> 00:52:28: So we have a lot of solar in in the  
00:52:28 --> 00:52:32: summer times, but we have few of it in winter  
00:52:32 --> 00:52:36: times and that's so therefore we need to, we need  
00:52:36 --> 00:52:42: additional power, that's one, but also only with solar. We  
00:52:42 --> 00:52:47: would never make our climate goals and that mean it's  
00:52:47 --> 00:52:52: because we have many sectors that are waiting and need  
00:52:52 --> 00:52:53: to electrify.  
00:52:53 --> 00:52:57: We need to electrify transport. We need to electrify. A  
00:52:57 --> 00:53:02: large extent of our industry at 2/3 of industrial demands  
00:53:02 --> 00:53:07: is heat with temperatures below 500 degrees. That's typically something  
00:53:07 --> 00:53:11: that you want to electrify. And if you add this,  
00:53:11 --> 00:53:14: and if you also add your feedstock needs that can  
00:53:14 --> 00:53:19: be fueled with hydrogen or derivative molecules, you need an  
00:53:19 --> 00:53:21: awful load of offshore wind.  
00:53:21 --> 00:53:25: And in fact that 70 GW of offshore wind that  
00:53:25 --> 00:53:29: I was talking around that is planned for the North  
00:53:30 --> 00:53:34: Sea in the Netherlands is able to feed our future  
00:53:34 --> 00:53:38: energy needs as a country. It's able to meet our  
00:53:38 --> 00:53:43: feet, a part of our feedstock requirements as a country,  
00:53:43 --> 00:53:49: but leaving out still the energy requirements of international aviation  
00:53:49 --> 00:53:50: and shipping.  
00:53:50 --> 00:53:56: So even with those 70 gigawatts of offshore wind installed  
00:53:56 --> 00:54:00: and a country full of solar, we still need to  
00:54:00 --> 00:54:05: heavily import energy from very abundant regions like Middle East,



00:54:06 --> 00:54:10: North Africa and and and so on. So even beyond

00:54:10 --> 00:54:15: the offshore winds and and all those local solutions, we

00:54:15 --> 00:54:18: are still in need of energy imports.

00:54:19 --> 00:54:23: All right. Thank you for clarifying that. We have a

00:54:23 --> 00:54:28: question for for you Morgan from David Wilkes. Thank you.

00:54:28 --> 00:54:33: David. The approach of Geo Geothermal Exchange can work

00:54:33 --> 00:54:38: well

00:54:38 --> 00:54:42: for both heating and cooling district energy requirements.

00:54:42 --> 00:54:47: Can it

00:54:48 --> 00:54:53: be confirmed that this is heat heat pump model where

00:54:53 --> 00:54:58: systems are optimized? Sorry, I'm trying to read the check.

00:54:58 --> 00:55:01: Where systems are optimized for both heating and cooling.

00:55:01 --> 00:55:05: Or

00:55:05 --> 00:55:08: is there a better way to categorize the systems? Can

00:55:08 --> 00:55:12: you speak about that a bit? Yeah.

00:55:12 --> 00:55:18: Yeah, No, definitely and yes that's good question. And to

00:55:18 --> 00:55:22: clarify it, I I was largely Speaking of what I'll

00:55:22 --> 00:55:26: call them Geo exchange system. So essentially that where

00:55:26 --> 00:55:29: we're.

00:55:29 --> 00:55:33: Versus what I would term differently, geothermal where

00:55:33 --> 00:55:36: you're extracting

00:55:36 --> 00:55:38: direct use energy from further down. So the Geo exchange

00:55:38 --> 00:55:42: I'm referring to is exactly that. So where you would

00:55:42 --> 00:55:45: use sort of the constant temperature of the ground as

00:55:45 --> 00:55:48: both a heat source and sink and then couple that

00:55:48 --> 00:55:51: with heat pumps that can provide and address both your

00:55:51 --> 00:55:54: heating and cooling needs, so.

00:55:54 --> 00:55:57: That's what that would look like in terms of a

00:55:57 --> 00:56:01: system. And and then yes, you'd work on balancing the

00:56:01 --> 00:56:06: fields and optimizing for your sort of optimal balance when

00:56:06 --> 00:56:07: you're in a a geography where there's heating and cooling

00:56:07 --> 00:56:13: to kind of to bet to balance those needs. And

00:56:13 --> 00:56:18: then sort of you would supplement that centrally as needed

00:56:18 --> 00:56:23: based on your sort of load balancing so.

00:56:23 --> 00:56:28: Thank you. I have a a bit more global question

00:56:28 --> 00:56:32: for both of you.

00:56:32 --> 00:56:38: And which is how do these solutions that you are

00:56:38 --> 00:56:44: mentioning in your presentation relate to the overarching

00:56:44 --> 00:56:50: desire to

00:56:50 --> 00:56:56: create 15 minute communities? The suggestion there is that

00:56:56 --> 00:57:02: a

00:57:02 --> 00:57:08: comprehensive approach to systems is going to result in

00:57:08 --> 00:57:14: better

00:57:14 --> 00:57:20: outcomes for communities. Can you both talk about that a

00:56:32 --> 00:56:32: bit?

00:56:37 --> 00:56:37: Yeah.

00:56:40 --> 00:56:43: I think, I mean from my perspective I think it

00:56:43 --> 00:56:47: aligns very well in terms of sort of those objectives

00:56:47 --> 00:56:50: and how it looks. So I think it's gonna theme

00:56:51 --> 00:56:55: in my presentation, but sort of up run holistic planning

00:56:55 --> 00:56:55: I think is.

00:56:56 --> 00:56:59: Really a key in sort of maximizing benefits of whatever

00:56:59 --> 00:57:03: approach you're taking and looking at the picture holistically about

00:57:03 --> 00:57:05: it versus slicing and dicing off pieces of it. So

00:57:05 --> 00:57:08: I think Martin had a good example where you know

00:57:08 --> 00:57:10: we ended up having to integrate a whole bunch of

00:57:10 --> 00:57:13: stuff to make something happen and you can only do

00:57:13 --> 00:57:15: that if you do it as one concerted picture. I

00:57:15 --> 00:57:18: think when it comes to energy and you're talking about

00:57:18 --> 00:57:21: localizing things whether it be thermal and or electrical which

00:57:22 --> 00:57:24: are often hand in hand now just given the transition.

00:57:25 --> 00:57:28: Away from fossil fuels on the heating side, for example,

00:57:28 --> 00:57:32: it's really well aligned and important because essentially what you're

00:57:32 --> 00:57:36: doing is you're sort of looking at consolidating that infrastructure

00:57:36 --> 00:57:39: and being able to deliver it at scale. So you

00:57:39 --> 00:57:43: want that connected network. Densification helps with that, which all

00:57:43 --> 00:57:45: sort of ties directly to that principle of.

00:57:46 --> 00:57:50: You know, accessibility, 15 minute community and you know building

00:57:51 --> 00:57:54: things in a an intentional way to support that which

00:57:54 --> 00:57:58: facilitates being able to integrate this type of infrastructure we're

00:57:58 --> 00:58:02: talking about directly into those plans. So thank.

00:58:03 --> 00:58:03: You.

00:58:04 --> 00:58:07: Yeah, I can. I can only second that. I think

00:58:07 --> 00:58:11: the example that I shared was already an example of

00:58:11 --> 00:58:11: how to.

00:58:13 --> 00:58:18: Greenify local transport solutions, so that that really is building

00:58:18 --> 00:58:23: that that that community from a local transport perspective and

00:58:23 --> 00:58:28: what is needed there. Overall the energy transition is something

00:58:28 --> 00:58:33: that requires some well local heat local storage solutions to

00:58:33 --> 00:58:38: actually integrate solar PV on rooftops and so on there.

00:58:38 --> 00:58:41: So the local dimension to those problems.

00:58:41 --> 00:58:45: Is very important and that's at the same time also

00:58:45 --> 00:58:49: a very challenging issue because that means that well, well,

00:58:49 --> 00:58:52: if if if you're a large energy company, you would

00:58:52 --> 00:58:55: like to think in scalable products. And so you need

00:58:56 --> 00:58:59: to actually map the break the world down into blueprints

00:58:59 --> 00:59:02: and have a look at how can you work and

00:59:02 --> 00:59:07: implement those blueprints in certain in certain environments.

00:59:07 --> 00:59:10: So if

00:59:11 --> 00:59:14: you look at that from a heat and cooling perspective.

00:59:15 --> 00:59:19: In the Netherlands we have quite some variety on ages

00:59:19 --> 00:59:24: and therefore also energy efficiency of buildings. For

00:59:24 --> 00:59:28: example, what

00:59:28 --> 00:59:32: works in neighborhood one is is absolutely not working in

00:59:32 --> 00:59:35: neighborhood B. But then how many different types of

00:59:36 --> 00:59:38: neighborhoods

00:59:38 --> 00:59:42: can can you actually have and how many type of

00:59:42 --> 00:59:46: different solutions can you map and can you skill?

00:59:46 --> 00:59:50: As a company, so I think in the end all

00:59:50 --> 00:59:53: of this has to do with local community building and

00:59:53 --> 00:59:56: and adapting the solutions to the local circumstances for that

00:59:56 --> 00:59:57: assets. You need all those local stakeholders to get around

00:59:57 --> 00:59:58: the table, but the challenges you in your business model

00:59:58 --> 01:00:01: if you're a large company and want to do something

01:00:01 --> 01:00:03: here.

01:00:04 --> 01:00:08: Yeah, yeah. Thank you. And you and I both live

01:00:09 --> 01:00:13: in in cities that were built.

01:00:13 --> 01:00:18: 800 years ago. So when you say how many neighborhoods

01:00:19 --> 01:00:24: do we define, I can only imagine trying to introduce

01:00:24 --> 01:00:28: these type of solutions in historic centers of cities like

01:00:28 --> 01:00:32: or Utrecht new challenge. I have another question that again

01:00:32 --> 01:00:36: is a little bit more at the at the global

01:00:36 --> 01:00:41: scale.

01:00:41 --> 01:00:46: And again for both of you, as we as we

01:00:46 --> 01:00:51: aim for better outcomes for communities, our goal is to

01:00:51 --> 01:00:54: be inclusive and improve the quality of life of underserved

01:00:54 --> 01:00:57: communities. How can this be achieved through investment

01:00:57 --> 01:01:02: in energy

01:00:57 --> 01:01:02: infrastructure and transition and maybe you have examples

01:00:57 --> 01:01:02: of that?

01:00:57 --> 01:01:02: Yeah, yeah. If I can, if I can go first,

01:00:57 --> 01:01:02: sorry, Morgan, then then what, what what we saw basically

01:01:02 --> 01:01:06: across Europe last year is, is that power prices became  
01:01:06 --> 01:01:11: so high that energy poverty really became a big thing  
01:01:11 --> 01:01:11: and.  
01:01:12 --> 01:01:15: I I would say until two years ago that the,  
01:01:15 --> 01:01:20: the general answer former politician would be, yeah, we have  
01:01:20 --> 01:01:24: to think of just transition, but we'll we'll manage that  
01:01:24 --> 01:01:28: right. And and there was no dedicated attention put to  
01:01:28 --> 01:01:31: this problem. I think what we solved last year is  
01:01:31 --> 01:01:35: that this is already an issue today. So that means  
01:01:35 --> 01:01:40: something on the social role that our energy companies  
01:01:40 --> 01:01:41: actually  
01:01:40 --> 01:01:41: actually play.  
01:01:41 --> 01:01:47: And governments have worked on maximum retail prices,  
01:01:47 --> 01:01:53: have worked  
01:01:47 --> 01:01:53: on obliging companies to also offer a fixed term contracts  
01:01:53 --> 01:01:57: and so on. So, so there is there are things  
01:01:57 --> 01:02:02: being being done. They're also cheap cheap financing  
01:02:02 --> 01:02:07: options for  
01:02:02 --> 01:02:07: for for people there is subsidies for solar PV on  
01:02:07 --> 01:02:11: their roofs and so on. Is it sufficient?  
01:02:12 --> 01:02:12: Probably.  
01:02:12 --> 01:02:18: Not probably, not probably. We need really to add another  
01:02:18 --> 01:02:23: rounds of yeah of of of policy on this team  
01:02:23 --> 01:02:27: at the moment we're still at the at at the  
01:02:27 --> 01:02:32: front side I think of the transition for many but  
01:02:32 --> 01:02:37: but we'll need to to add more measures to this  
01:02:37 --> 01:02:38: point.  
01:02:40 --> 01:02:44: Thank you for that, my time. And just to add  
01:02:44 --> 01:02:48: on, one of the biggest challenges is people who do  
01:02:48 --> 01:02:52: not own their homes and therefore cannot benefit from the  
01:02:52 --> 01:02:57: subsidies for making improvements to your to your home.  
01:02:57 --> 01:03:01: And  
01:02:57 --> 01:03:01: Morgan, I don't know if that is an issue at  
01:03:01 --> 01:03:05: all in Canada, but in cities in the Netherlands, there's  
01:03:05 --> 01:03:10: still a significant number of people who are renting.  
01:03:11 --> 01:03:15: So they they are definitely part of that group that  
01:03:15 --> 01:03:19: Martin is talking about where we see energy poverty issues.  
01:03:21 --> 01:03:23: Yeah, I I think so. And I mean I think  
01:03:23 --> 01:03:26: people are probably familiar with just some of the rhetoric  
01:03:26 --> 01:03:29: around both both rental prices and and cost of property  
01:03:29 --> 01:03:31: for example, specifically in the GTA. So I think it  
01:03:32 --> 01:03:34: is a big issue. I would and I would sort  
01:03:34 --> 01:03:36: of echo what Martin was saying and I think.

01:03:38 --> 01:03:41: From our perspective it comes back to this, this concept  
 01:03:41 --> 01:03:44: I had mentioned a couple of times and as we  
 01:03:44 --> 01:03:47: see increasing you know a number of projects focused on  
 01:03:47 --> 01:03:51: residential. It really that commercial piece and what that you  
 01:03:51 --> 01:03:53: know really means for us is how, how do you  
 01:03:53 --> 01:03:57: make this affordable and equivalent. You're trying to do all  
 01:03:57 --> 01:04:00: these great things, you're trying to address, you know these  
 01:04:00 --> 01:04:04: low carbon targets, these grid constraints, but if you can't  
 01:04:04 --> 01:04:06: do it in an economically sustainable way.  
 01:04:08 --> 01:04:11: You know, it's just, it's that that in itself is  
 01:04:11 --> 01:04:13: a challenge and I think that's a key, a key  
 01:04:13 --> 01:04:16: piece of the puzzle in terms of making these projects  
 01:04:17 --> 01:04:17: successful, so.  
 01:04:19 --> 01:04:22: Thank you, Craig. I see your hand, but I also  
 01:04:22 --> 01:04:26: see a question in the chat. If okay with you,  
 01:04:26 --> 01:04:29: I'm, I'm going to go to that one and then  
 01:04:29 --> 01:04:33: I'll, I'll come back to you. So David is asking  
 01:04:33 --> 01:04:37: can both please speak to the Montreal Protocol?  
 01:04:37 --> 01:04:42: For refrigerant compliance and how that plays into the design  
 01:04:42 --> 01:04:44: process? And thank you for the question.  
 01:04:49 --> 01:04:51: Do you want me to go first this time? Yes.  
 01:04:52 --> 01:04:55: Yes, because I'm not sure if your time is aware  
 01:04:55 --> 01:04:58: of the Montreal Protocol, but maybe, yeah, but where do  
 01:04:58 --> 01:04:59: you go for it? Yeah.  
 01:05:00 --> 01:05:02: Well, I mean, so it's a good question. So I  
 01:05:02 --> 01:05:05: actually I appreciate this question in the context of.  
 01:05:06 --> 01:05:08: You know, we're here to talk about energy and people  
 01:05:09 --> 01:05:11: talk about energy and you create energy with carbon and  
 01:05:11 --> 01:05:13: that's great and that's a big, huge piece of the  
 01:05:13 --> 01:05:16: puzzle and that's why we talk about it. But there's  
 01:05:16 --> 01:05:19: many other facets to energy production. You know, there's,  
 01:05:19 --> 01:05:21: you  
 01:05:19 --> 01:05:21: know, we talked about the social piece. Now there's also  
 01:05:21 --> 01:05:25: environmental impact when you talk about infrastructure,  
 01:05:25 --> 01:05:28: wind, onshore, offshore,  
 01:05:25 --> 01:05:28: hydro dams, all these sorts of great things. So everything  
 01:05:28 --> 01:05:30: comes with a bit of a, you know, a trade  
 01:05:30 --> 01:05:32: off and it's really this life cycle perspective.  
 01:05:34 --> 01:05:36: Piece of all of it solid waste, I mentioned our  
 01:05:36 --> 01:05:39: PTI facility as well. And so and and another piece  
 01:05:39 --> 01:05:42: is you know the components that go into an energy  
 01:05:42 --> 01:05:45: system. So in the case of you're not, you're talking

01:05:45 --> 01:05:49: about you know significant cooling systems would include refrigerant. So

01:05:49 --> 01:05:52: I think from that perspective it is something on the

01:05:52 --> 01:05:54: radar for us. We just don't talk about it as

01:05:54 --> 01:05:57: much. Same with the water savings I mentioned with the

01:05:57 --> 01:05:58: cooling towers.

01:05:59 --> 01:06:02: These types of things are are sort of on our

01:06:02 --> 01:06:04: standard sort of tracking list when we go through our

01:06:05 --> 01:06:08: design processes and figuring out what solutions are something like

01:06:08 --> 01:06:11: the deep lake cooling system as an example. So we

01:06:11 --> 01:06:13: have a unique feature we can take advantage of in

01:06:13 --> 01:06:17: Toronto that that not everyone does you know removes entirely

01:06:17 --> 01:06:19: that need for mechanical cooling which.

01:06:20 --> 01:06:23: Takes that out of the equation and then subsequently I

01:06:23 --> 01:06:27: mean when you're talking about you know other refrigerant uses

01:06:27 --> 01:06:30: in in the mechanical equipment that's still remaining sort of

01:06:30 --> 01:06:34: what that looks like. How it's being addressed in you

01:06:34 --> 01:06:37: know in accordance with the protocols and requirements and what

01:06:37 --> 01:06:41: sort of refrigerants manufacturers are using is sort of part

01:06:41 --> 01:06:44: of the the overall design consideration process so.

01:06:46 --> 01:06:47: Thank you.

01:06:48 --> 01:06:51: If I can can, can add to that fully, fully

01:06:51 --> 01:06:54: agree, but this is not the only theme of course

01:06:54 --> 01:06:59: for producers. It's also has everything to do with circularity,

01:06:59 --> 01:07:02: raw materials and so on. And I think that what

01:07:02 --> 01:07:07: we're seeing across Europe is that governments in their subsidies.

01:07:07 --> 01:07:11: Are more and more also looking at those factors. So

01:07:11 --> 01:07:16: the offshore wind tenders that I mentioned before, those offshore

01:07:17 --> 01:07:21: wind tenders in the Netherlands until that zero subsidy bid

01:07:21 --> 01:07:25: in 2016 that I discussed, we're very much driven for

01:07:26 --> 01:07:30: who can offer or realize an offshore wind farm for

01:07:30 --> 01:07:34: the lowest price since 2016. That is a beauty context

01:07:34 --> 01:07:35: because there is no.

01:07:36 --> 01:07:40: Well, if everyone goes for zero, then then then how

01:07:40 --> 01:07:44: to differentiate? And there's a few factors there. One has

01:07:44 --> 01:07:48: to do with system integration. How do you, deer tender,

01:07:48 --> 01:07:53: facilitate the integration of the energy produced? Well, that's still

01:07:53 --> 01:07:57: energy. Two is ecology. How is your building and your  
01:07:57 --> 01:07:59: solution your wind farm?  
01:08:00 --> 01:08:06: Actually not degrading local ecology, but actually improving  
the local  
01:08:06 --> 01:08:11: marine ecology. And three which is new now circularity. So  
01:08:11 --> 01:08:16: how is your solution? How circular are the materials that  
01:08:16 --> 01:08:20: you're using? So a full cradle to grave approach is  
01:08:20 --> 01:08:24: what those next tenderers need to come up with.  
01:08:26 --> 01:08:31: So topics like indeed refrigerant compliance like rare material  
use  
01:08:31 --> 01:08:35: and reuse of material that is being asked by tenders.  
01:08:35 --> 01:08:39: So this is a main topic of innovation for the  
01:08:39 --> 01:08:42: producers of this of these equipment.  
01:08:43 --> 01:08:45: Thank you, Craig. Thank.  
01:08:47 --> 01:08:47: You.  
01:08:48 --> 01:08:54: Fantastic presentations, it's actually the third presentation  
about and wave  
01:08:54 --> 01:08:57: in the work that you've been doing up there that  
01:08:57 --> 01:09:00: I've seen in the last three weeks. So and I  
01:09:00 --> 01:09:05: learned something new each time. My question I'm speaking  
on  
01:09:05 --> 01:09:09: from the United States, most of our energy is distributed  
01:09:09 --> 01:09:14: through regulated companies. Can you talk a little bit about  
01:09:14 --> 01:09:16: your relationship I guess?  
01:09:16 --> 01:09:20: Both, I guess maybe the Amsterdam logistics city hub as  
01:09:20 --> 01:09:24: well as N Waves general operations, how that interacts with  
01:09:24 --> 01:09:28: the sort of standard regulated utilities or if you have  
01:09:28 --> 01:09:30: regulated utilities and how that works?  
01:09:34 --> 01:09:36: Sure. Martin, do you want to go first or me?  
01:09:38 --> 01:09:40: Well, I thought the question was on N Wave, but  
01:09:40 --> 01:09:43: I can also comment from European perspective, but but  
please  
01:09:43 --> 01:09:44: go first.  
01:09:44 --> 01:09:45: OK, great.  
01:09:46 --> 01:09:49: So I think if I can break it down into  
01:09:49 --> 01:09:54: two pieces here. Specifically in Canada, I'm referring to and  
01:09:54 --> 01:09:59: I'll speak more specifically to Ontario, there's a thermal piece  
01:09:59 --> 01:10:04: and then the power piece and thermal energy in Canada  
01:10:04 --> 01:10:08: is regulated and or not regulated depending on the province  
01:10:08 --> 01:10:10: that you're in.  
01:10:11 --> 01:10:13: And in the province of Ontario thermal energy, so in  
01:10:14 --> 01:10:17: terms of actually district energy producing and supplying hot  
water,

01:10:17 --> 01:10:20: steam chilled water is would be considered not a regulated utility. So it doesn't operate under sort of those standard principles which again is kind of back to the the

01:10:20 --> 01:10:22:

01:10:22 --> 01:10:25: the key point of commercial viability because if it's really

01:10:25 --> 01:10:28: not a.

01:10:28 --> 01:10:28:

01:10:29 --> 01:10:33: You know value proposition to the end user, there's no requirement or need to do that. Power on the other

01:10:33 --> 01:10:36: hand is regulated here as is natural gas distribution. For

01:10:36 --> 01:10:39: example we do have I think I mentioned some power

01:10:39 --> 01:10:42: assets and depending on where they're located we have

01:10:42 --> 01:10:46: some

01:10:46 --> 01:10:49: sort of internal power generation and one of our facilities

01:10:49 --> 01:10:53: does exports in which case we'd we'd operate under sort

01:10:53 --> 01:10:56: of you know standard power purchase agreements.

01:10:57 --> 01:11:00: And so I think where that comes into play when

01:11:00 --> 01:11:02: it comes to thermal energy, you know we have sort

01:11:02 --> 01:11:05: of flexibility in terms of where and how we're implementing

01:11:05 --> 01:11:09: things. The trick really becomes working with the local jurisdiction

01:11:09 --> 01:11:12: being getting rights to get our infrastructure in the rights

01:11:12 --> 01:11:13: of way and establish facilities.

01:11:15 --> 01:11:18: On and our dealings with the regulated utilities then would

01:11:18 --> 01:11:21: come in from a sort of commodity supply perspective. So

01:11:21 --> 01:11:24: we work very closely with the incumbent regulated utilities for

01:11:24 --> 01:11:27: example on the power side to figure out you know

01:11:27 --> 01:11:30: services to our facilities, how are we going to deal

01:11:30 --> 01:11:33: with things are the grid constraints like the stuff that

01:11:33 --> 01:11:35: Martin was talking about is a big piece of the

01:11:35 --> 01:11:38: puzzle especially when we're have assets in in highly dense

01:11:39 --> 01:11:42: urban areas that also have a grid constraint challenges.

01:11:42 --> 01:11:46: The other place it really comes into play on the

01:11:46 --> 01:11:50: power side is as we're seeing the increased electrification of

01:11:50 --> 01:11:53: these systems, I think on the thermal side is working

01:11:53 --> 01:11:57: closely with the regulated utilities and then on the power

01:11:57 --> 01:12:00: generation side as well in terms of how we can

01:12:00 --> 01:12:04: work with them to figure out solutions that make sense.

01:12:04 --> 01:12:07: So, for example, electricity at the local scale, so within

01:12:07 --> 01:12:10: Ontario, there's regulations in terms of.

01:12:11 --> 01:12:15: You know who has jurisdiction, the local distribution companies to

01:12:15 --> 01:12:18: distribute power across property lines and rights of way. And

01:12:18 --> 01:12:21: so the trick there is really working with them and

01:12:21 --> 01:12:24: stakeholders upfront to figure out you know, what makes



sense

01:12:24 --> 01:12:27: and are the things that need to change. And then

01:12:27 --> 01:12:30: where that's not the case, how can we work within

01:12:30 --> 01:12:33: the existing constraints to come up with solutions that can

01:12:33 --> 01:12:35: address some of these challenges so.

01:12:38 --> 01:12:43: So, so then the, the European perspective here on the

01:12:43 --> 01:12:49: power side, power production trades and supply is something that

01:12:50 --> 01:12:54: is to the market, it's really a market thing. That

01:12:54 --> 01:13:01: market is highly regulated at European level because the European

01:13:01 --> 01:13:06: Commission sees this as a way to level prices across

01:13:06 --> 01:13:07: Europe.

01:13:07 --> 01:13:12: And and price differences are are seen as bad because

01:13:12 --> 01:13:17: that means that some users are paying too much. And

01:13:17 --> 01:13:22: and for equality purposes, one big electricity market is the

01:13:22 --> 01:13:28: cornerstone of European energy policy. That is also the way

01:13:28 --> 01:13:33: by which we believe we are best integrating renewable power.

01:13:34 --> 01:13:39: The larger the market, the lower price differences across markets,

01:13:39 --> 01:13:43: the easier it becomes to integrate wind and solar. So

01:13:43 --> 01:13:47: that's the one side. The other side of that market

01:13:47 --> 01:13:51: of course is the infrastructure side and that is purely

01:13:51 --> 01:13:57: regulated. So infrastructure companies, grid companies are regulated businesses. If

01:13:57 --> 01:14:00: you look to the gas side, it's.

01:14:01 --> 01:14:06: It's somehow the same, not quite, there are some differences

01:14:06 --> 01:14:12: but overall infrastructure is the regulated business and trade production

01:14:12 --> 01:14:16: which goes by large concessions of course and multi year

01:14:16 --> 01:14:21: concessions. That's all. That's all left to the market. Now

01:14:21 --> 01:14:25: the debate is on hydrogen, should hydrogen.

01:14:26 --> 01:14:29: I shared the the hydrogen backbone that we have in

01:14:29 --> 01:14:33: the Netherlands and and are also connecting to our neighboring

01:14:33 --> 01:14:37: countries that is not regulated business yet, but our TSO

01:14:37 --> 01:14:41: are monopolist is actually having the sole right to explore that. So that will become regulated business as well. Just

01:14:41 --> 01:14:45: like natural gas today heat district heating, we have district

01:14:45 --> 01:14:49: heating across multiple cities in the Netherlands.

01:14:49 --> 01:14:53: I think one of the larger countries in district heating

01:14:54 --> 01:14:58: is of course also Denmark at Copenhagen has a huge

01:14:58 --> 01:15:02: district heating grid. Historically, those are nonregulated

01:15:02 --> 01:15:08:

businesses. So those  
01:15:08 --> 01:15:13: are private companies that own production and the distribution. And  
01:15:13 --> 01:15:17: that's very often one in the same company owning this.  
01:15:17 --> 01:15:19: Not always, not in all cases.  
01:15:20 --> 01:15:25: But that means that there is regulation actually for determining  
01:15:25 --> 01:15:29: the the, the, the retail price for that heat. And  
01:15:29 --> 01:15:34: for that we have the principle that the heat supplied  
01:15:34 --> 01:15:39: by district heating should not be more expensive than energy  
01:15:39 --> 01:15:44: provided by by natural gas. So there is extensive calculations  
01:15:44 --> 01:15:48: of that maximum price that is determined than in the  
01:15:48 --> 01:15:49: entire government.  
01:15:50 --> 01:15:54: So it's regulated and the fierce constraints, the debate now  
01:15:54 --> 01:15:57: in the Netherlands if we want to extend all those  
01:15:58 --> 01:16:01: distribution grids is can we leave that to the market  
01:16:01 --> 01:16:06: because investing in new distribution grids, Morgan, you talked about  
01:16:06 --> 01:16:09: it before is not so easy and because the the  
01:16:09 --> 01:16:13: payback times, the investment time scale of the infrastructure is  
01:16:13 --> 01:16:15: really different.  
01:16:15 --> 01:16:19: From the production and storage sites at the infrastructure you  
01:16:19 --> 01:16:22: you bury in the ground for I don't know 40  
01:16:22 --> 01:16:25: plus years so So what public company or sorry what  
01:16:26 --> 01:16:29: what private company can cope with those risks. We have  
01:16:29 --> 01:16:33: dedicated Dutch word for that, the full open eco that  
01:16:33 --> 01:16:36: is what is the pace at which individual parties will  
01:16:36 --> 01:16:40: actually connect because they now have their gas boiler.  
01:16:40 --> 01:16:44: In in their attic. So how how fast can we  
01:16:44 --> 01:16:47: expect new users in the grid, it's a major risk  
01:16:47 --> 01:16:52: and can private companies actually take that risk and and  
01:16:52 --> 01:16:56: invest in that 40 year payback infrastructure. It's it's quite  
01:16:56 --> 01:17:01: that's quite a challenge. So their their thoughts of actually  
01:17:01 --> 01:17:07: socializing distribution grids and having municipalities as the sole owner  
01:17:07 --> 01:17:08: of those grids.  
01:17:09 --> 01:17:12: Which again comes with different challenges of course, but yeah,  
01:17:12 --> 01:17:13: that's the discussion.  
01:17:15 --> 01:17:19: Thank you both for sharing some of these nuances in  
01:17:19 --> 01:17:24: the discussion debate on the regulation and what you can  
01:17:24 --> 01:17:28: leave to the market. Before we wrap up, I wanna

01:17:28 --> 01:17:32: ask Craig if you have any key takeaways for this  
 01:17:33 --> 01:17:37: group based on what we've heard today and what Morgan  
 01:17:37 --> 01:17:38: and.  
 01:17:38 --> 01:17:40: Martin have presented to us.  
 01:17:40 --> 01:17:44: I do thank you, Renee. And in a fascinating conversation,  
 01:17:44 --> 01:17:48: I think we're we're all experiencing this in many different  
 01:17:48 --> 01:17:52: ways. Europe is experiencing this. I think in you know  
 01:17:52 --> 01:17:56: because of the the war in the Ukraine really kind  
 01:17:56 --> 01:17:59: of brought things to a head. the US we, you  
 01:17:59 --> 01:18:03: know we've gone through periodic rolling blackouts in Texas  
 and  
 01:18:03 --> 01:18:04: California.  
 01:18:05 --> 01:18:08: And then just the delicacy of of our grids as  
 01:18:08 --> 01:18:10: a whole has led to a lot of a need  
 01:18:10 --> 01:18:14: for new solutions and a new thought to it. I'm  
 01:18:14 --> 01:18:17: a I mentioned earlier, this is the third time I've  
 01:18:17 --> 01:18:21: heard a presentation by the good folks at and and  
 01:18:21 --> 01:18:24: Wave and I bring something new back from each one  
 01:18:24 --> 01:18:27: of those. I mean I I it seems like a  
 01:18:27 --> 01:18:32: a highly creative organization that's looking for marketbased  
 solutions.  
 01:18:33 --> 01:18:36: To the challenges they have, you know they've they've done  
 01:18:36 --> 01:18:40: a fantastic job at really tapping into their local geology.  
 01:18:40 --> 01:18:43: We don't all have the benefit of having a very  
 01:18:43 --> 01:18:46: cold Lake Ontario on their southern border and and the  
 01:18:46 --> 01:18:49: ability to be able to go out four kilometers or  
 01:18:49 --> 01:18:52: however long you're going out now to be able to  
 01:18:52 --> 01:18:55: tap into that cool, cool water. I'm in the USS  
 01:18:55 --> 01:18:58: not really an option down here, but I think there's  
 01:18:58 --> 01:19:00: other ways to be able to do that.  
 01:19:00 --> 01:19:04: You know it's sort of bears the issue of reflect  
 01:19:04 --> 01:19:08: their context and I think that that the stories we've  
 01:19:08 --> 01:19:12: heard today from our neighbors up north were really  
 phenomenal  
 01:19:13 --> 01:19:16: about that and from our time I think you know  
 01:19:16 --> 01:19:19: learn a new term today, great congestion.  
 01:19:20 --> 01:19:23: And I I didn't realize that was as much of  
 01:19:23 --> 01:19:26: an issue as it is, it is, it's certainly less  
 01:19:26 --> 01:19:29: of an issue in in less developed countries or more  
 01:19:29 --> 01:19:33: sparsely developed countries or geographies. But that is  
 definitely an  
 01:19:33 --> 01:19:36: issue. But that's led to this need for more local  
 01:19:36 --> 01:19:40: based solutions. And I think one of the things that

01:19:40 --> 01:19:43: we've learned is that we can't all just sort of  
01:19:43 --> 01:19:45: live on our own and live off of the the  
01:19:45 --> 01:19:46: solar panel or the.  
01:19:47 --> 01:19:50: The wind generator in our backyard, we we need to  
01:19:50 --> 01:19:53: help to kind of share and collaborate a little bit  
01:19:53 --> 01:19:56: and that's led to some creative solutions as part of  
01:19:56 --> 01:19:58: that. So I think you know I think there are  
01:19:58 --> 01:20:01: three things I I took away from this as a  
01:20:01 --> 01:20:04: whole. I think first is that the the creative collaboration  
01:20:04 --> 01:20:08: is is leading to some really profitable marketbased solutions.  
These  
01:20:08 --> 01:20:11: are they're born out of necessity which is really my  
01:20:11 --> 01:20:14: second point you know, but it's really the mother of  
01:20:14 --> 01:20:15: invention.  
01:20:16 --> 01:20:19: And that's what we've seen time and time again. We  
01:20:19 --> 01:20:22: often times we'll try things when we don't need them,  
01:20:22 --> 01:20:26: but we think that they're a great idea. But it's  
01:20:26 --> 01:20:29: only when we really truly need them that we can  
01:20:29 --> 01:20:32: generate the the ideas and the solutions that we need  
01:20:32 --> 01:20:35: to make happen. And I think what we're seeing is  
01:20:35 --> 01:20:38: that low carbon is well independent of very much a  
01:20:39 --> 01:20:42: part of energy independence and so the ability, because our  
01:20:42 --> 01:20:44: grids are very fragile.  
01:20:45 --> 01:20:48: As we've seen and so the ability to be able  
01:20:48 --> 01:20:51: to deliver these solutions and scale them to provide that  
01:20:51 --> 01:20:56: element of independence at the neighborhood level, the  
district level,  
01:20:56 --> 01:21:00: even the national level I think are really key. So  
01:21:00 --> 01:21:04: I phenomenal presentations by both our panelists. Thank you  
so  
01:21:04 --> 01:21:07: much for joining us. Again, love the the exchange in  
01:21:08 --> 01:21:12: these conversations, infrastructure is more than just roads  
and bridges.  
01:21:13 --> 01:21:16: And I love that we continue to have these great  
01:21:16 --> 01:21:18: conversations. So with that, I'll turn it over to Yvonne.  
01:21:19 --> 01:21:23: Thank you, Craig. And want to thank today's speaker as  
01:21:23 --> 01:21:28: well from Martin Morgan and Renee for this thoughtful  
conversation.  
01:21:28 --> 01:21:32: So I'm gonna do a quick share screen and just  
01:21:32 --> 01:21:36: go through some about recent report that is not released.  
01:21:36 --> 01:21:40: So this is the report I've been talking about. So  
01:21:40 --> 01:21:42: this is driven by members voices.  
01:21:43 --> 01:21:47: Covering infrastructure forum taking place in different cities

over the  
01:21:47 --> 01:21:50: last couple of years and what our members are tell  
01:21:50 --> 01:21:53: us is that there is opportunity to really take the  
01:21:53 --> 01:21:56: shift bringing us back to a walkable neighborhood model. So  
01:21:56 --> 01:22:01: particularly this is interesting when you think about  
infrastructure is  
01:22:01 --> 01:22:02: that in the report we look at?  
01:22:04 --> 01:22:07: Other than on top of policy changes, how policy is  
01:22:07 --> 01:22:11: helping us to apply walkable catchment decisions, on top of  
01:22:11 --> 01:22:15: that is think about in a tangible way for each  
01:22:15 --> 01:22:18: of the real estate type how we can optimize and  
01:22:18 --> 01:22:22: amplify the impacts of renewable energy for example. So  
there  
01:22:23 --> 01:22:26: are three examples in here that we want to highlight  
01:22:26 --> 01:22:30: when you download a report and go through it. The  
01:22:30 --> 01:22:32: first one is about at City.  
01:22:32 --> 01:22:36: So this is interesting is some of those they are  
01:22:36 --> 01:22:40: called Uptown primarily is cluster of high density from office  
01:22:41 --> 01:22:45: towers to residential towers. Many of them has aging  
infrastructure  
01:22:46 --> 01:22:49: and because of the density, the overall area is also  
01:22:49 --> 01:22:53: a very high air temperature as well. So in the  
01:22:53 --> 01:22:57: past when there is heat wave happening that could be  
01:22:57 --> 01:23:00: black out, those are the places that has a lot  
01:23:00 --> 01:23:01: of issue.  
01:23:02 --> 01:23:06: When there's power outage. So our report talk about there's  
01:23:06 --> 01:23:12: a need of strategically and also intentionally using  
infrastructure to  
01:23:12 --> 01:23:17: help to mitigate those conditions. Another one that is  
interesting  
01:23:17 --> 01:23:18: is expert.  
01:23:18 --> 01:23:22: So this is talking about the future of those areas  
01:23:22 --> 01:23:26: is actually on nature based solution and also on creative  
01:23:26 --> 01:23:29: energy solution as well. So those two are interesting in  
01:23:29 --> 01:23:34: terms of thinking about a different way to apply infrastructure  
01:23:34 --> 01:23:38: to really optimize community outcome. And then lastly is that  
01:23:38 --> 01:23:42: we spoke a lot about California because California has by  
01:23:42 --> 01:23:46: this passed the state law to enable doing mixed uses  
01:23:46 --> 01:23:48: along suburban corridor. So this is.  
01:23:48 --> 01:23:52: Significant and also create a lot of great campuses for  
01:23:52 --> 01:23:57: people to think about at a district scale. For example,  
01:23:57 --> 01:24:01: early on thinking about is there any opportunity to put  
01:24:01 --> 01:24:05: in district energy having an energy district so that can

01:24:05 --> 01:24:10: really transform including the mall as well. So lastly is,  
01:24:10 --> 01:24:14: so this is our last session on June 23rd. We're  
01:24:14 --> 01:24:16: going to look at 2 examples.  
01:24:17 --> 01:24:20: One in Hong Kong as at R and another one  
01:24:20 --> 01:24:24: in Toronto region. Two of those is very densely populated  
01:24:24 --> 01:24:28: area is going through a transition but also a significant  
01:24:28 --> 01:24:32: amount of population are able to adapt to a car  
01:24:32 --> 01:24:35: free living. So we're going to explore what are some  
01:24:36 --> 01:24:39: of the key things that need to happen to provide  
01:24:39 --> 01:24:41: for a one trip experience.  
01:24:42 --> 01:24:46: End to end covering first and last mile and also  
01:24:46 --> 01:24:50: importantly how that can integrate seamlessly in  
development so that  
01:24:50 --> 01:24:54: when we're doing development we don't need to spend the  
01:24:54 --> 01:24:59: energy and resources on parking infrastructure as an  
example. So  
01:24:59 --> 01:25:03: thanks everybody. So this today's webinar will be recorded  
and  
01:25:04 --> 01:25:06: you would receive an e-mail to the link.  
01:25:07 --> 01:25:11: To Knowledge Finder and you can see more information from  
01:25:11 --> 01:25:13: there. Thanks very much.  
01:25:14 --> 01:25:15: Thank you, Yvonne.  
01:25:16 --> 01:25:17: Thank you. Bye.  
01:25:18 --> 01:25:19: Thank you all. Alright.

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