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 that portfolio

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

00:01:34 --> 00:01:38: with respect to infrastructure. Today, we're going to look at

00:01:38 --> 00:01:39: energy.

00:01:39 --> 00:01:45: Particularly thinking about how the different approaches 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 and

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

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

00:03:21 --> 00:03:25: technical assistance and growing knowledge for both our 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. 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 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 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
00:03:56 --> 00:04:00: as well the Infra exchange that you're seeing today.
00:04:00 --> 00:04:02: So we're excited about this topic. I look forward to
00:04:02 --> 00:04:04: hearing from our speakers. And with that, it will turn
00:04:05 --> 00:04:05: back to Yvonne.
00:04:06 --> 00:04:09: Thank you, Craig. So today is our third session. What
00:04:10 --> 00:04:12: we're going to look at today is that at a
00:04:12 --> 00:04:17: community scale, how we can best utilize energy infrastructure to
00:04:17 --> 00:04:21: help us to make the shift, including dealing with carbon
00:04:21 --> 00:04:24: removal and waste management as well. How can we do
00:04:24 --> 00:04:28: it in one district, so it's not just per development
00:04:28 --> 00:04:29: but have entire ecosystem.
00:04:31 --> 00:04:35: So we want to share some of the recent policy
00:04:35 --> 00:04:39: and tools that is available. So this is coming out
00:04:39 --> 00:04:43: in November 2022. It's called the Net Zero Game Changers
00:04:43 --> 00:04:49: initiative from the White House administration primarily is about setting
00:04:49 --> 00:04:54: a very clear agenda to move towards reducing 50% decarbonization
00:04:54 --> 00:04:57: by 2030. So that's really exciting.
00:04:57 --> 00:05:01: So the diagram in here look at 37 initiative and
00:05:01 --> 00:05:07: really finding a way within different sections to optimize decarbonizing
00:05:07 --> 00:05:10: supply chain and a big part of that show in
00:05:10 --> 00:05:13: orange is about energy infrastructure.
00:05:15 --> 00:05:19: And other element to know is that recently there's a
00:05:19 --> 00:05:23: lot of research talking about the aging infrastructure when it
00:05:23 --> 00:05:28: come to energy in certain part particularly in California area
00:05:28 --> 00:05:31: and also in Texas area as well. There has been
00:05:31 --> 00:05:35: blackout and when there is urban heat combined with the
00:05:35 --> 00:05:40: blackout is has significant impact, sometimes impact and having safety
00:05:40 --> 00:05:44: to the local population so causing a lot of damages.
00:05:44 --> 00:05:47: So what we're hoping to do is find a creative
00:05:47 --> 00:05:51: solution. So there's an article on urban land talking about
00:05:52 --> 00:05:56: the infrastructure, basically looking at how we can use community
00:05:56 --> 00:05:59: by community as a smaller scale to help to ship
00:05:59 --> 00:06:03: to reliable and clean energy. So part of our mandate
00:06:03 --> 00:06:06: is to share with our members some of the ongoing
00:06:06 --> 00:06:10: opportunity. So the many of these are new funding opportunity
00:06:10 --> 00:06:13: 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 has

00:06:48 --> 00:06:53: a progressive model, primarily using a partnership model using 1/3

00:06:53 --> 00:06:57: of government funding plus two third of private funding to

00:06:57 --> 00:07:03: focus on accelerating infrastructure transition. So there's $10 billion available

00:07:03 --> 00:07:05: focusing on clean power.

00:07:06 --> 00:07:11: There's also .5, five, $500 million available, particularly on acceleration.

00:07:11 --> 00:07:15: So this is important because we know that in the

00:07:15 --> 00:07:18: past it takes quite a lot of effort and time

00:07:18 --> 00:07:21: try to understand what is needed to be done in

00:07:22 --> 00:07:26: order to get to construction. So this grant is particularly

00:07:26 --> 00:07:31: trying to help organizations or corporation to move towards construction

00:07:31 --> 00:07:32: quicker.

00:07:33 --> 00:07:36: Now I'm going to turn it to Renee, who is

00:07:36 --> 00:07:40: going to facilitate our conversation today and also introduce our

00:07:40 --> 00:07:41: speaker.

00:07:43 --> 00:07:48: Good afternoon, everybody. And for some of us, good evening.

00:07:48 --> 00:07:53: I have the honor of introducing our international panel of

00:07:53 --> 00:07:59: extremely knowledgeable experts and industry leaders from both sides of

00:07:59 --> 00:08:02: the pond, in this case the Atlantic.

00:08:03 --> 00:08:09: First of all, Morgan McGregor, Senior Vice President, Energy Planning

00:08:09 --> 00:08:15: and Development at Enwave Energy Corporation in Canada and Martin

00:08:15 --> 00:08:20: Dufort, Director of Energy and Industry at Arcadis in the

00:08:20 --> 00:08:25: Netherlands. We have posted their BIOS in the in the

00:08:25 --> 00:08:30: chat and because we really want to hear from them,

00:08:30 --> 00:08:32: I'll I'll leave it at that.

00:08:34 --> 00:08:39: We, the presentations, will focus on sustainability at scale 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

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 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 at
00:12:26 --> 00:12:29: 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 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 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 decisions

00:28:40 --> 00:28:43: and keep things moving. It's very important early engagement and

00:28:43 --> 00:28:47: ongoing collaboration I think I've stressed this a few times

00:28:47 --> 00:28:48: is critical the earlier.

00:28:49 --> 00:28:51: But you can think about energy as part of your

00:28:51 --> 00:28:55: your development which traditionally has been done in a little

00:28:55 --> 00:28:58: bit more of a disparate way the better I think

00:28:58 --> 00:29:01: it is for everybody. And then government partners with a

00:29:01 --> 00:29:04: strong vision and supporting actions and those those include you

00:29:04 --> 00:29:08: know I've mentioned a few cities here that we've worked

00:29:08 --> 00:29:10: with have been very critical as well as you know

00:29:10 --> 00:29:14: entities like TIP that Yvon's mentioned and other entities that

00:29:14 --> 00:29:16: can help support making these things reality.

00:29:17 --> 00:29:20: And really to be successful, we wanna integrate into the

00:29:20 --> 00:29:24: design development, construction process as early as possible and just

00:29:24 --> 00:29:27: become part of the team, get support and engagement from

00:29:27 --> 00:29:30: approval agencies. So again you know pipes in the road

00:29:30 --> 00:29:33: is nothing new. The the thing that's new here is

00:29:33 --> 00:29:35: you know what's in the pipes in the road in

00:29:35 --> 00:29:36: this particular case for.

00:29:37 --> 00:29:40: In the case of Ontario for example, and really just

00:29:40 --> 00:29:43: working with approval agencies who are willing to to work

00:29:43 --> 00:29:46: with us to figure out that path. Again, I use

00:29:46 --> 00:29:49: Markham as the example of getting that infrastructure in a

00:29:49 --> 00:29:53: traditional right of way, cross section leveraging infrastructure 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 and

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

00:37:26 --> 00:37:31: Infrastructure across the Netherlands not only power, not 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 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 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 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 power
00:39:42 --> 00:39:48: sources, large scale generation gas assets, coal-fired stations and a
00:39:48 --> 00:39:52: nuclear station that we have in the Netherlands.
00:39:53 --> 00:39:57: And that determines still today the grid capacity. If you
00:39:57 --> 00:40:00: add to that mix solar, then solar production of course
00:40:00 --> 00:40:04: is highly peaked. It produces during the day. If you
00:40:04 --> 00:40:08: add to that makes the charging of electric vehicles and
00:40:08 --> 00:40:12: charging of electric buses and trucks of course heavily peaked
00:40:12 --> 00:40:15: because everyone plugs in when they get home or or
00:40:15 --> 00:40:19: trucks get get back to their distribution center at at
00:40:19 --> 00:40:20: 5:00 or 6:00 PM.
00:40:21 --> 00:40:24: And so both the demand side is peaking and the
00:40:24 --> 00:40:28: supply side is peaking and that means that especially at
00:40:28 --> 00:40:32: the DNL level, distribution level in our grids, we're seeing
00:40:32 --> 00:40:37: those congestion issues occurring. So we're working on solutions here.
00:40:37 --> 00:40:42: We're working on grid enforcements, we're working on load shaving
00:40:42 --> 00:40:46: projects. How can we introduce perhaps storage in order to
00:40:46 --> 00:40:50: shift the moments of those productions and and demands.
00:40:51 --> 00:40:55: And can we reduce the peak of those consumption patterns
00:40:55 --> 00:40:59: by again storage or local supply. So these are projects
00:40:59 --> 00:41:04: that we're working on in various environments because the next
00:41:04 --> 00:41:08: picture on the next slide, that's something that we don't
00:41:08 --> 00:41:12: want to have, We don't want to have our people.
00:41:12 --> 00:41:17: In the end that are used to a certain certain
00:41:17 --> 00:41:22: luxury that should not be impacted. So we want to
00:41:22 --> 00:41:27: get away from this and that means indeed quite some
00:41:27 --> 00:41:32: local solutions here. If we move to the next slide,
00:41:33 --> 00:41:36: those local solutions are actually.
00:41:37 --> 00:41:42: 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 being
00:47:11 --> 00:47:15: explored here and that actually led to a situation if
00:47:15 --> 00:47:19: we take that to the next slides without going into
00:47:19 --> 00:47:23: much detail around the business case, but we saw that
00:47:23 --> 00:47:23: the.
00:47:25 --> 00:47:30: That the economics of that business case actually improved. The
00:47:30 --> 00:47:35: more of those solutions we integrated there locally, the better
00:47:35 --> 00:47:39: the total business case became. So it's beneficial to actually
00:47:40 --> 00:47:44: integrate all that solar. It's beneficial to have that storage
00:47:44 --> 00:47:48: on site and well, so in the end the challenge
00:47:48 --> 00:47:53: was very complicated. There were multiple stakeholders involved here.
00:47:55 --> 00:47:58: That didn't see that solution at start, but in the
00:47:58 --> 00:48:02: end there was a beneficial case for everyone to sit
00:48:02 --> 00:48:06: around the table. So a happy ending to that story.
00:48:06 --> 00:48:09: If we go to the next slide, which actually is
00:48:09 --> 00:48:13: the last slide of my presentation, I think there is
00:48:13 --> 00:48:16: a few lessons around how we how to get things
00:48:16 --> 00:48:18: done in a limited space.
00:48:19 --> 00:48:23: And in a situation with those power grid limitations that
00:48:23 --> 00:48:28: we see throughout the Netherlands and that starts with indeed
00:48:28 --> 00:48:31: a lot of talking. So that may start slow as
00:48:31 --> 00:48:35: said. But once you get together, once you see each
00:48:35 --> 00:48:40: other's perspective, then yeah, those solutions are there and may
00:48:40 --> 00:48:44: not always be the final solutions to a case, but
00:48:44 --> 00:48:47: they're worthwhile exploring as we see so.
00:48:48 --> 00:48:51: Yeah. We try to opt in as as trusted advisors
00:48:51 --> 00:48:56: there of course because we want that transparent conversation with
00:48:56 --> 00:49:00: all those, with all those stakeholders on boards. It may
00:49:00 --> 00:49:04: be typical Dutch such a consensus oriented approach. We see
00:49:04 --> 00:49:08: good examples with a commercial with industrial cases in the
00:49:08 --> 00:49:14: Netherlands also in the urban environments from

municipalities. And yeah,

00:49:14 --> 00:49:17: it's it's, it's maybe worthwhile to see.

00:49:17 --> 00:49:20: How that would work in in other countries around the

00:49:21 --> 00:49:24: globe. Those are my examples and this is where I

00:49:24 --> 00:49:26: want to leave it back to you.

00:49:32 --> 00:49:37: So sorry. So thank you both for these inspiring local

00:49:37 --> 00:49:43: solutions that have the potential for implementation at a much

00:49:43 --> 00:49:44: larger scale.

00:49:45 --> 00:49:49: We're very much on time. Thank you for that too,

00:49:50 --> 00:49:54: because that leaves more room for Q&A. And to kick

00:49:54 --> 00:49:58: that off, I have a first question for you, Morgan.

00:49:58 --> 00:50:04: As Enwave owns both infrastructure and production and storage, what

00:50:04 --> 00:50:08: is your main challenge if you were to extend your

00:50:08 --> 00:50:13: services to other neighborhoods? Can you talk a little bit

00:50:13 --> 00:50:14: about that?

00:50:16 --> 00:50:20: Yes, it's a very good question. I think there is

00:50:20 --> 00:50:26: with thermal energy piece we're talking about in terms of

00:50:26 --> 00:50:29: extension there is I think definitely.

00:50:30 --> 00:50:32: I think I said this sort of couple of times

00:50:32 --> 00:50:36: for my presentation, but one of our, our value proposition

00:50:36 --> 00:50:39: is doing things at commercial that are commercial and making

00:50:39 --> 00:50:43: them commercially viable. And so within that there's constraints in

00:50:43 --> 00:50:46: terms of limits of what makes sense for expansion of

00:50:46 --> 00:50:49: an existing system versus for example single building Geo and

00:50:49 --> 00:50:52: creating a new district. So I think really that's the

00:50:52 --> 00:50:55: trick is sort of that balance and evaluating that. So

00:50:55 --> 00:50:58: are we talking about something that's reasonably?

00:51:00 --> 00:51:03: Efficient and economical to do in terms of an expansion

00:51:03 --> 00:51:07: that we can accommodate through generating capacity as well as

00:51:07 --> 00:51:11: you know extending our distribution infrastructure. Is it something that

00:51:11 --> 00:51:13: we need to look at as a sort of 1

00:51:13 --> 00:51:16: off or is it something where we should approach it

00:51:16 --> 00:51:19: As for example, its own node with the opportunity to

00:51:19 --> 00:51:23: to, you know as you continue to expand systems increasingly

00:51:23 --> 00:51:26: grow things together. So I think that's really the trick

00:51:27 --> 00:51:28: 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 well
00:54:33 --> 00:54:38: for both heating and cooling district energy requirements. Can it
00:54:38 --> 00:54:42: be confirmed that this is heat heat pump model where
00:54:42 --> 00:54:47: systems are optimized? Sorry, I'm trying to read the check.
00:54:48 --> 00:54:53: Where systems are optimized for both heating and cooling. Or
00:54:53 --> 00:54:58: is there a better way to categorize the systems? Can
00:54:58 --> 00:55:01: you speak about that a bit? Yeah.
00:55:02 --> 00:55:05: Yeah, No, definitely and yes that's good question. And to
00:55:05 --> 00:55:08: clarify it, I I was largely Speaking of what I'll
00:55:08 --> 00:55:12: call them Geo exchange system. So essentially that where we're.
00:55:14 --> 00:55:18: Versus what I would term differently, geothermal where you're extracting
00:55:19 --> 00:55:22: direct use energy from further down. So the Geo exchange
00:55:22 --> 00:55:26: I'm referring to is exactly that. So where you would
00:55:26 --> 00:55:29: use sort of the constant temperature of the ground as
00:55:29 --> 00:55:33: both a heat source and sink and then couple that
00:55:33 --> 00:55:36: with heat pumps that can provide and address both your
00:55:36 --> 00:55:38: heating and cooling needs, so.
00:55:39 --> 00:55:42: That's what that would look like in terms of a
00:55:42 --> 00:55:45: system. And and then yes, you'd work on balancing the
00:55:45 --> 00:55:48: fields and optimizing for your sort of optimal balance when
00:55:48 --> 00:55:51: you're in a a geography where there's heating and cooling
00:55:51 --> 00:55:54: to kind of to bet to balance those needs. And
00:55:54 --> 00:55:57: then sort of you would supplement that centrally as needed
00:55:57 --> 00:55:59: based on your sort of load balancing so.
00:56:01 --> 00:56:06: Thank you. I have a a bit more global question
00:56:06 --> 00:56:07: for both of you.
00:56:09 --> 00:56:13: And which is how do these solutions that you are
00:56:13 --> 00:56:18: mentioning in your presentation relate to the overarching desire to
00:56:18 --> 00:56:23: create 15 minute communities? The suggestion there is that a
00:56:23 --> 00:56:28: comprehensive approach to systems is going to result in better
00:56:28 --> 00:56:32: 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. So if
00:59:07 --> 00:59:10: you look at that from a heat and cooling perspective.
00:59:11 --> 00:59:14: In the Netherlands we have quite some variety on ages
00:59:15 --> 00:59:19: and therefore also energy efficiency of buildings. For example, what
00:59:19 --> 00:59:24: works in neighborhood one is is absolutely not working in
00:59:24 --> 00:59:28: neighborhood B. But then how many different types of neighborhoods
00:59:28 --> 00:59:32: can can you actually have and how many type of
00:59:32 --> 00:59:35: different solutions can you map and can you skill?
00:59:36 --> 00:59:38: As a company, so I think in the end all
00:59:38 --> 00:59:42: of this has to do with local community building and
00:59:42 --> 00:59:46: and adapting the solutions to the local circumstances for that
00:59:46 --> 00:59:50: assets. You need all those local stakeholders to get around
00:59:50 --> 00:59:53: the table, but the challenges you in your business model
00:59:53 --> 00:59:56: if you're a large company and want to do something
00:59:57 --> 00:59:57: here.
00:59:58 --> 01:00:01: Yeah, yeah. Thank you. And you and I both live
01:00:01 --> 01:00:03: in in cities that were built.
01:00:04 --> 01:00:08: 800 years ago. So when you say how many neighborhoods
01:00:09 --> 01:00:13: do we define, I can only imagine trying to introduce
01:00:13 --> 01:00:18: these type of solutions in historic centers of cities like
01:00:19 --> 01:00:24: or Utrecht new challenge. I have another question that again
01:00:24 --> 01:00:28: is a little bit more at the at the global
01:00:28 --> 01:00:28: scale.
01:00:29 --> 01:00:32: And again for both of you, as we as we
01:00:32 --> 01:00:36: aim for better outcomes for communities, our goal is to
01:00:36 --> 01:00:41: be inclusive and improve the quality of life of underserved
01:00:41 --> 01:00:46: communities. How can this be achieved through investment in energy
01:00:46 --> 01:00:51: infrastructure and transition and maybe you have examples of that?
01:00:54 --> 01:00:57: 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 actually
01:01:40 --> 01:01:41: actually play.
01:01:41 --> 01:01:47: And governments have worked on maximum retail prices, 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 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. 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, 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, 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
01:10:20 --> 01:10:22: utility. So it doesn't operate under sort of those standard
01:10:22 --> 01:10:25: principles which again is kind of back to the the
01:10:25 --> 01:10:28: the key point of commercial viability because if it's really
01:10:28 --> 01:10:28: not a.
01:10:29 --> 01:10:33: You know value proposition to the end user, there's no
01:10:33 --> 01:10:36: requirement or need to do that. Power on the other
01:10:36 --> 01:10:39: hand is regulated here as is natural gas distribution. For
01:10:39 --> 01:10:42: example we do have I think I mentioned some power
01:10:42 --> 01:10:46: assets and depending on where they're located we have 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

01:14:41 --> 01:14:45: that. So that will become regulated business as well. Just

01:14:45 --> 01:14:49: like natural gas today heat district heating, we have district

01:14:49 --> 01:14:53: heating across multiple cities in the Netherlands.

01:14:54 --> 01:14:58: I think one of the larger countries in district heating

01:14:58 --> 01:15:02: is of course also Denmark at Copenhagen has a huge

01:15:02 --> 01:15:08: district heating grid. Historically, those are nonregulated

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.
