

Before We Start....

Audience will be **muted** throughout the session.



Closed Captioning is available for this session.



Use the **chat** function to submit your questions. Use the “like” button to upvote questions.



This webinar is being recorded and will be sent to you following the session.

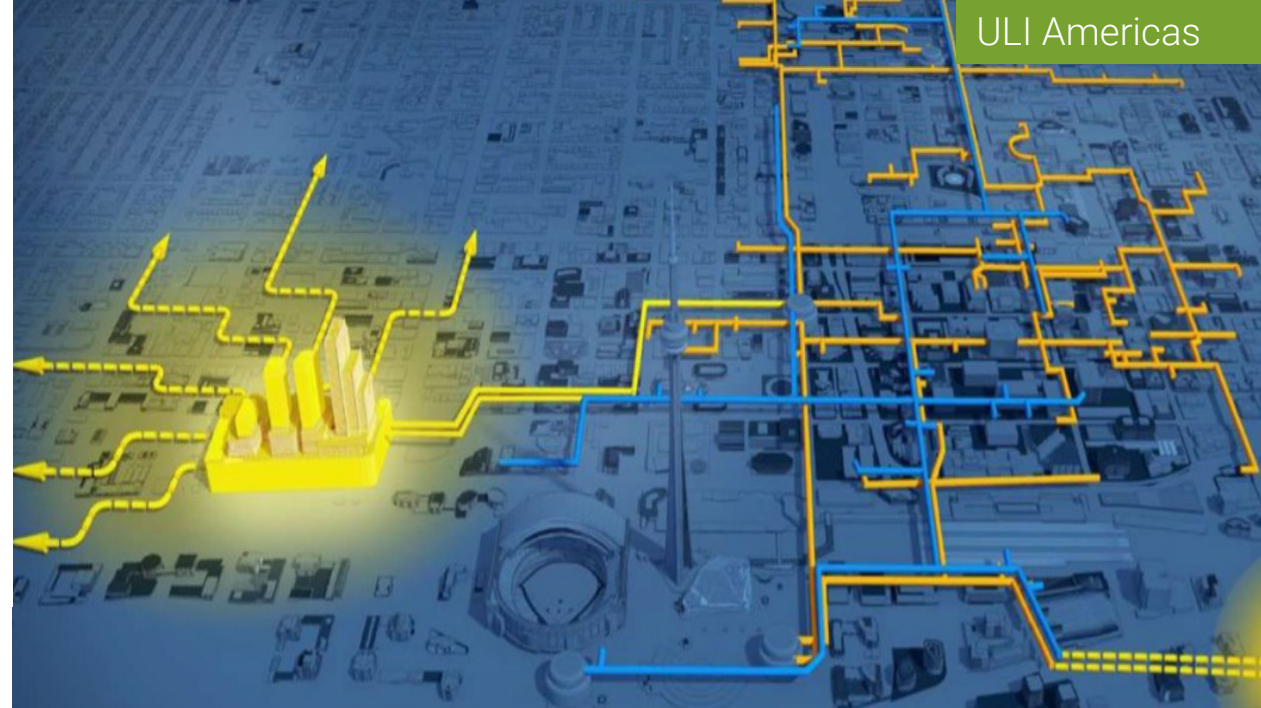


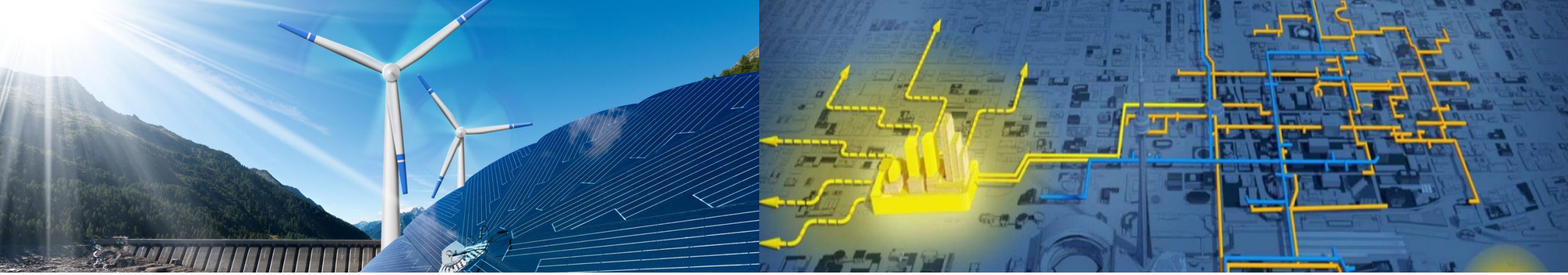
Take the conversation online
@UrbanLandInst
#WhereTheFutureIsBuilt



ULI InfraXchange #3 Sustainable Actions in Transit-oriented 15-Minute Communities: **How to Integrate “One” Energy Infrastructure**

JUN 8, 2023



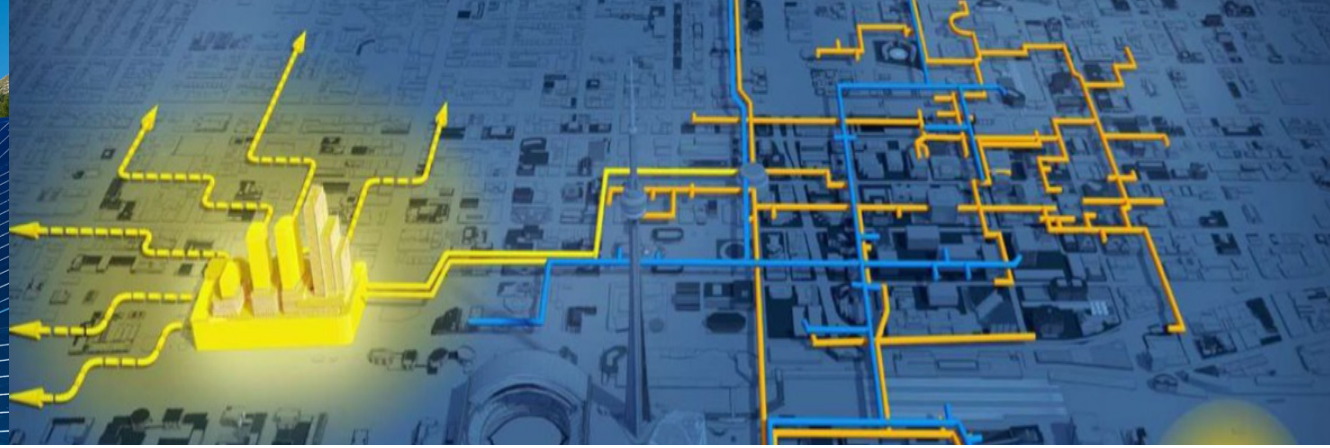


Sustainable Actions in the City



Yvonne Yeung
Principal,
Planning Sustainable Cities and Communities
Hatch Urban Solutions

ULI Toronto Advisory Board
ULI SDRC Product Council Vice Chair
ULI Curtis Infrastructure Fellow

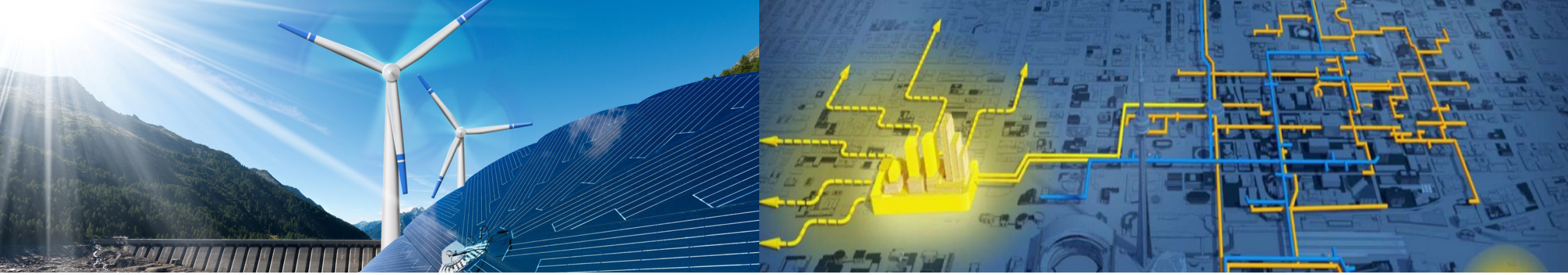


Tribute to Jim Curtis, ULI Life Trustee 1953-2019

*“Every single person in the land use process has the real ability to make a visible difference, and make it matter because they are part of the process. **If they push for the right choices, each one of them has the ability to change the world.**”*



ULI NEXT Global Visionary Video Series:
James J. Curtis III
[youtube.com](https://www.youtube.com)



Introducing Curtis Infrastructure



Craig Lewis

Principal,
Practice Group Manager, Placemaking
Arcadis

ULI Curtis Infrastructure Initiative Global
Advisory Board Chair



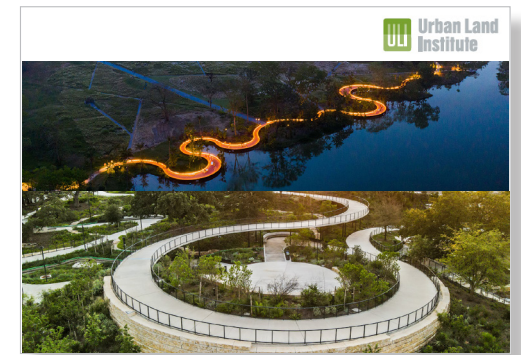
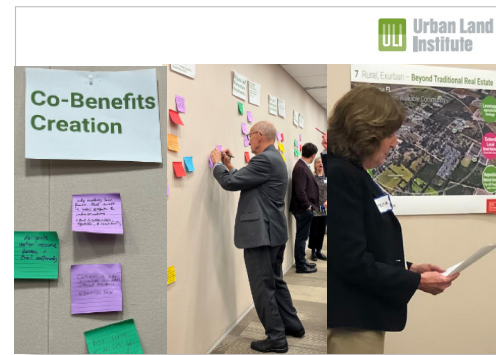
Cornerstones of ULI Curtis Infrastructure Initiative

A Global Resource for Transforming Cities into Equitable, Resilient and Thriving Communities

Build Global Partnerships

Conduct Technical Assistance

Grow Knowledge



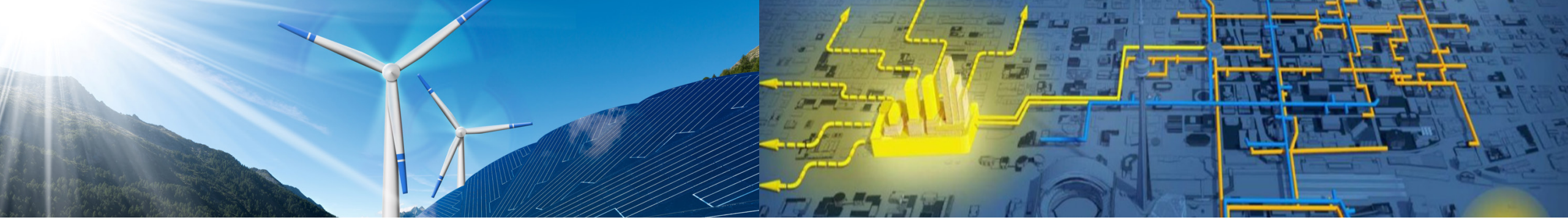
ULI Publication

**Building 15-Minute
Communities
Leadership Guide**

**ULI Infrastructure
Forum at Spring
Meeting in Toronto
Knowledge Finder**

**ULI InfraTAP
District & Product
Council Coalitions
2023**

**ULI InfraXchange
Global Spotlights
Local Spotlights
Mar - Jun 2023**



ULI InfraXchange Spring Series 2023

Building Leading-Edge Infrastructure Solutions and Co-benefit Creations in Complete, Walkable, 15-Minute Communities

Four sessions over 4 months with an article summary to follow in 2023

- MAR 30 One Environment Infrastructure deliver parks, green streets, flood protection, environmental restoration, and utilities in one project
- MAY 4 One Community Infrastructure deliver education-social-health-culture-co-work space under one roof
- JUN 9 One Energy Infrastructure deliver combine renewable energy, carbon removal and waste management in one district?
- JUN 23 One Mobility Infrastructure deliver transit, micro-mobility, broadband, and smart city system to provide one trip experience



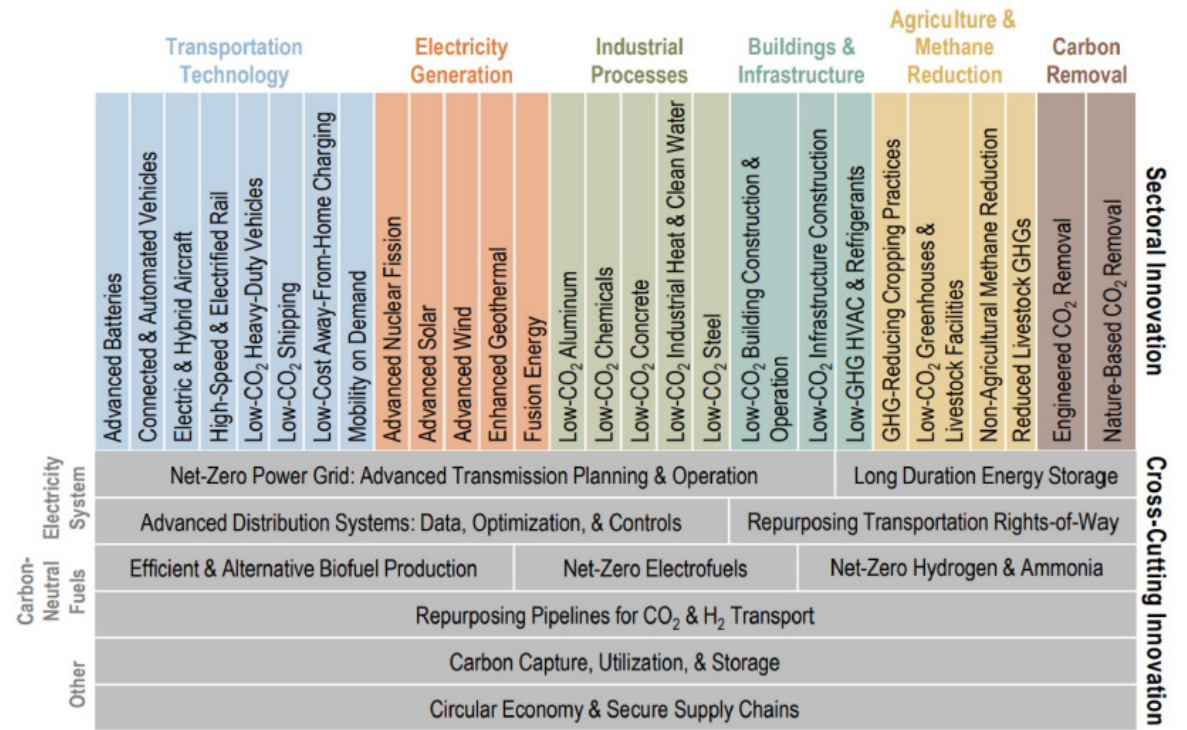
Today's Challenge: Sustainable Actions in the City

How to Create 'One' Energy Infrastructure to address...

50% Decarbonization by 2030

Informed by the **2021 Paris Agreement**

- Decarbonize the supply chain
- Create well-paying jobs
- Develop clean energy technologies
- Net-Zero Game Changers Initiative



For Reference: % of 2020 U.S. GHG Emissions by Sector (EPA 2022)





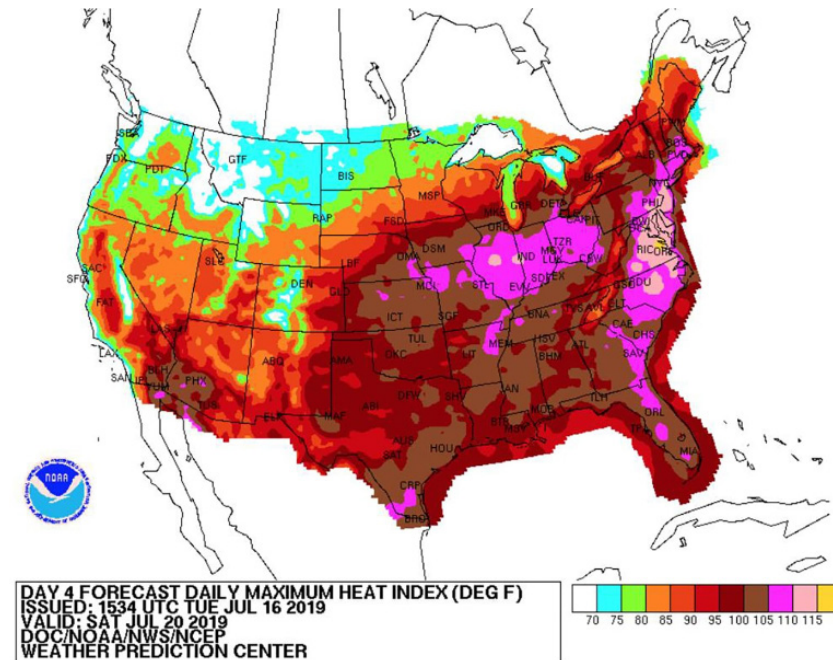
Today's Challenge: Sustainable Actions in the City

How to Create 'One' Energy Infrastructure to address...

Access to Reliable and Clean Energy

75% of US transmission lines and power transformers are over 25 years old

- The average lifespan of transmission lines is 50 years
- The average lifespan for transformers is 25 to 40 years
- Aging Infrastructure causing power outages
- Heatwave blackouts
- Cost \$100 billion for 1 event, impacting 6 million people





Opportunities: Sustainable Actions in the City

How to Create 'One' Energy Infrastructure to Leverage...

Rural

\$1B USDA
Energy Grants

**Renewable
Energy Systems &
Energy Efficiency
Improvement**

various deadlines to
September 2024

[usda.gov](https://www.usda.gov)

Non Profits

\$25M DOE Mitigate
Risks of Urban Heat

**Energy Improvements
at Nonprofits - Renew
America's Nonprofits**

deadline Aug 3, 2023

[grants.gov](https://www.grants.gov)

Clean Power

\$10B CIB Clean Power
Infrastructure

**Canada Infrastructure
Bank Priority Sector
Clean Power Infrastructure**

ongoing

[cib-bic.ca](https://www.cib-bic.ca)

Acceleration

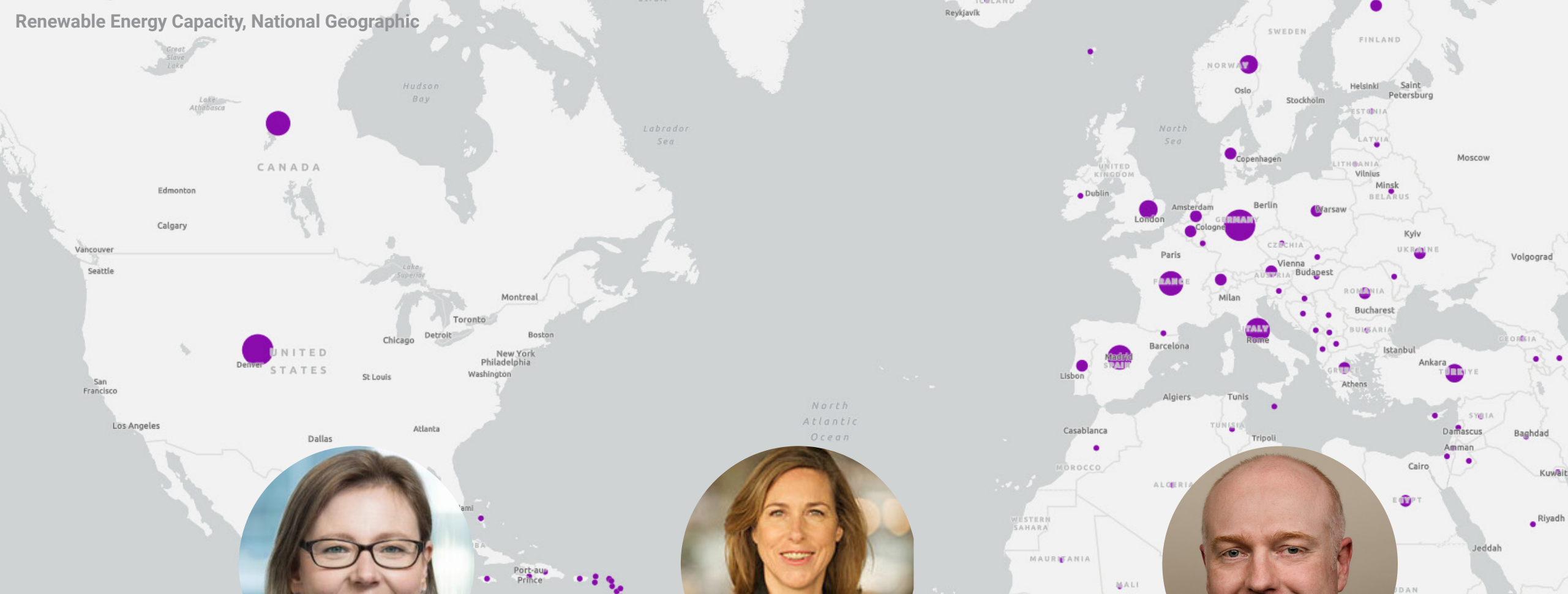
\$500M CIB Project
Acceleration

**Canada Infrastructure
Bank Priority Sector
Accelerate early works
Shorten critical paths to
construction**

ongoing

[cib-bic.ca](https://www.cib-bic.ca)

Renewable Energy Capacity, National Geographic



Morrigan McGregor
SVP of Planning &
Development, Enwave
Canada
speaker



Renee Schoonbeek
Senior Consultant, Stations and Urban
Development, Arcadis
Netherlands
moderator

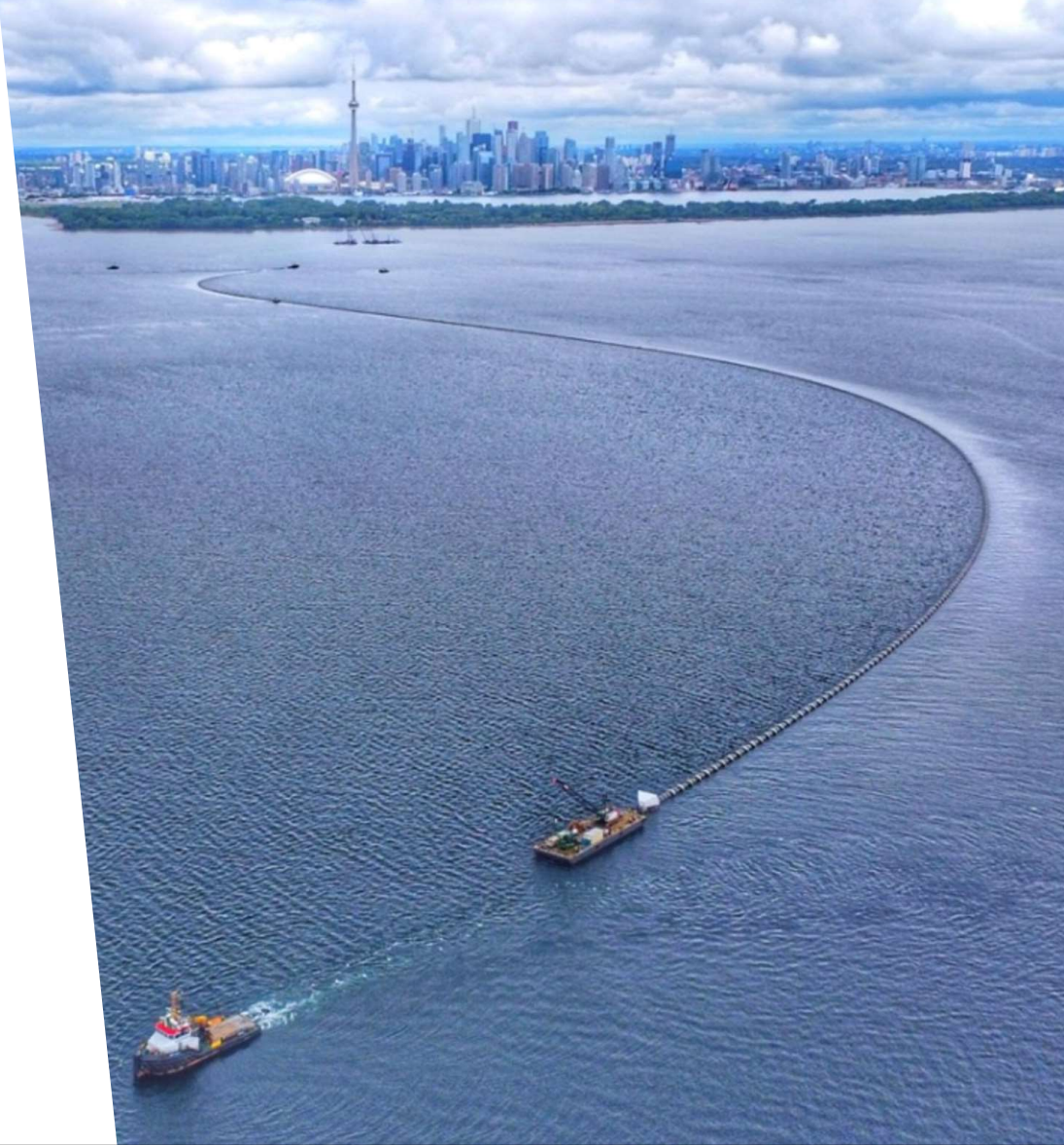


Martijn Duvoort
Director Energy and Industry
Arcadis
Netherlands
speaker



Enwave | Sustainability at Scale

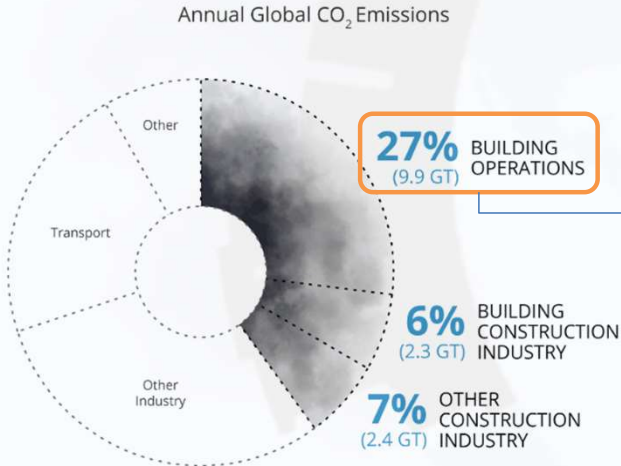
June 8, 2023



The Challenge of Decarbonizing the Built Environment

The built environment is set to **double** its footprint in GFA by **2060**

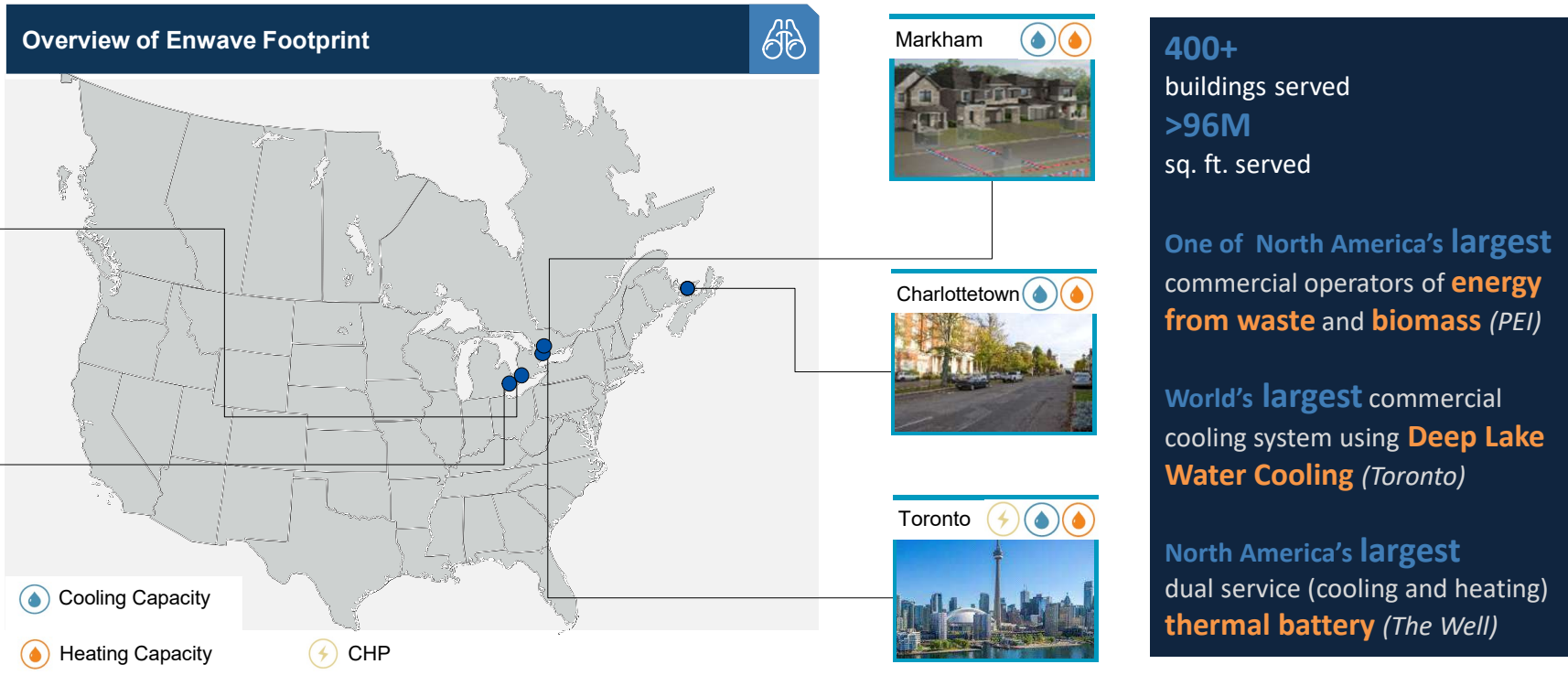
Enwave is a leading platform that enables low carbon energy solutions which will create positive impact in our communities for generations to come



27% of the **World's Carbon Emissions** come from the **Built Environment**

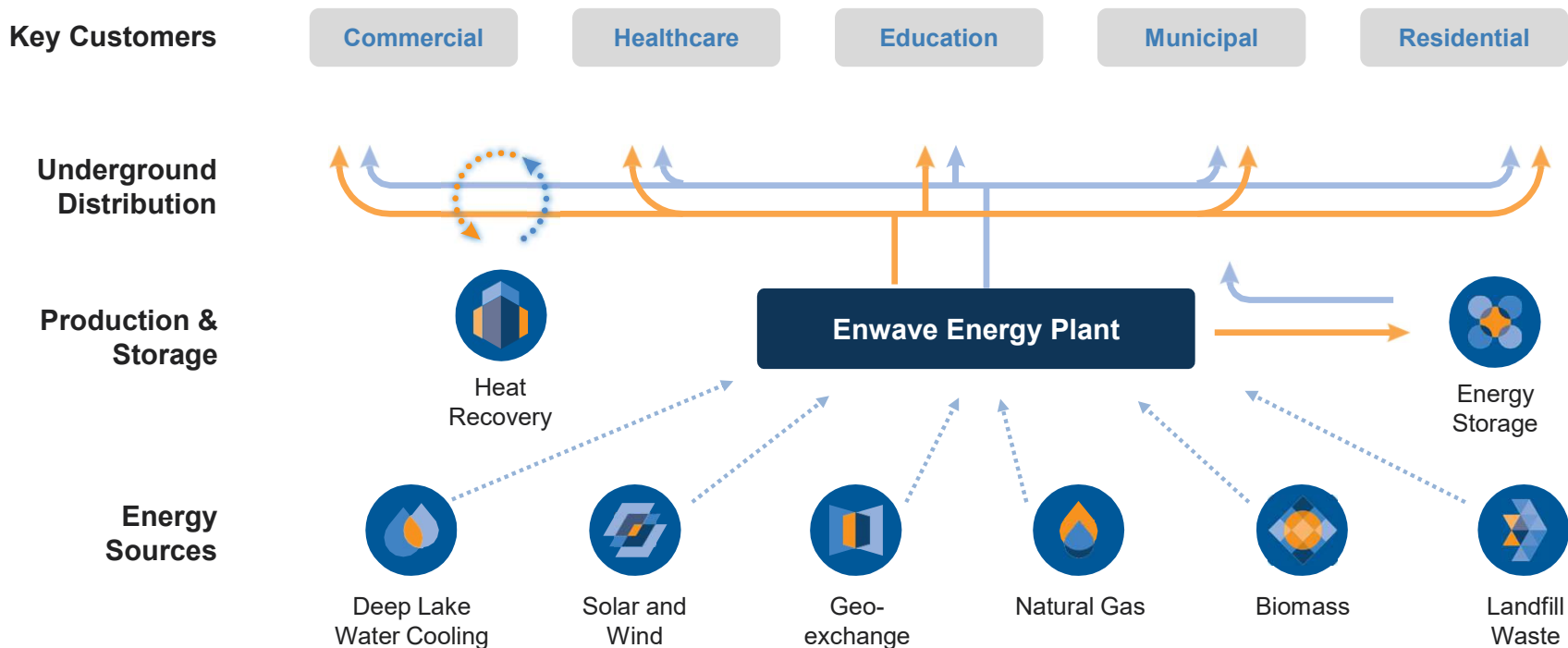
Enwave | What We Do

Enwave is a **developer-owner-operator** of **low carbon energy** systems. We are **aggregators** of demand load and application specialists for integrating low carbon technologies.



Enwave | Sustainability at Scale

We **integrate** a variety of **low carbon** technologies on a **commercial** basis that we can make available to our customers based on the **scale** of our districts.



Enwave | Downtown Toronto



North America's Largest Dual Service Thermal Battery

The Well, Toronto



North America's Largest Recycler of Building Waste Energy

Enwave Toronto



World's Largest Commercial Cooling System with Deep Lake Water Cooling

Deep Lake Water Cooling, Toronto

Deep Lake Water Cooling

DLWC cools ~100 buildings in downtown Toronto, saving enough electricity to power a town of 25,000. Due to the system's success, Enwave is constructing a 4th intake pipe in the lake to expand the capacity of the system by 33%.



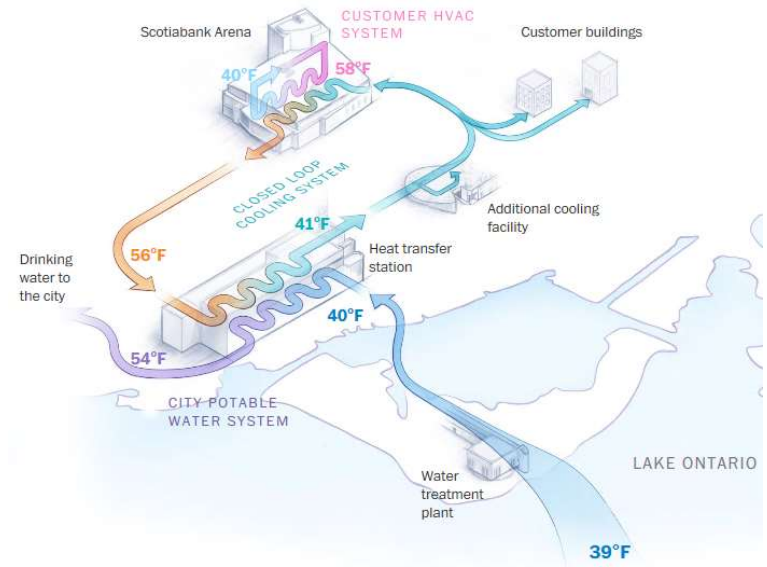
THE ASPIRATION

- Meet **growing demand for cooling** in the downtown core while supporting the **City of Toronto's GHG targets** of **65%** reduction by 2030 and **net zero** by 2040



THE APPROACH

- Instead of relying on energy-intensive equipment to cool buildings, DLWC uses **water** from **Lake Ontario**
- Cold, dense water is drawn from the lake, treated and than **passes through heat exchangers** prior to circulating through the **City's** potable water system
- DLWC can reduce electricity use by **~80% compared** to traditional systems and saves an estimated **220 million gallons** of water annually
- A fourth intake is currently being constructed that will expand system capacity by **>30%**



“Scotiabank Arena uses some **3 million kilowatt-hours less electricity annually** than if it cooled using traditional methods — **a reduction of about 70 percent.**”

– Kyle Lamkey, Director of Engineering for Scotiabank Arena

Enwave Community Energy Planning | Building Sustainable Communities

Municipalities and developers turn to Enwave to build sustainable, forward-thinking communities that reduce carbon emissions at scale through Community Energy Planning capabilities



Enwave's approach to community energy planning...

- Enwave partners with municipalities, planners, developers, and building owners to implement district energy at the local community level
- By partnering during early-stage master planning, Enwave can embed an optimized sustainable energy network into community design
- This approach allows connected buildings to realize the benefits of scale that come with district energy and make transformative sustainable energy solutions viable

Etobicoke Civic Centre

As the City of Toronto's low carbon thermal energy network partner, Enwave is working with the City to develop a new community energy system for the Etobicoke Civic Centre Precinct, a 13.8-acre site in the west end of Toronto



THE ASPIRATION

- Meet the **City of Toronto's GHG targets** of **65%** reduction by 2030 and **net zero** by 2040, while supporting growth
- Provide heating and cooling for the Etobicoke Civic Centre Precinct, a **3 million ft²** mixed-use development on City land that can transition to net-zero



THE APPROACH

- **Geoexchange system** to provide heating, cooling, and domestic hot water for the precinct
- Geoexchange borefields located throughout the development will be tied into a **central energy centre** located **beneath the City's new Etobicoke Civic Centre** building
- **Low carbon thermal energy** produced in the energy centre will be distributed throughout the community, achieving **>80% carbon savings** compared to conventional heating and cooling systems



Lakeview Village

Enwave is working with Lakeview Community Partners Limited to develop a low carbon wastewater energy recovery system for Lakeview Village, which will be highlighted as one of the key sustainability features in this vibrant community



THE ASPIRATION

- Transform a **177-acre** brownfield remediated coal plant site on Lake Ontario's shore into a vibrant, sustainable, world-class, mixed-use community
- Develop a **low carbon district energy system** that supports the **City of Mississauga's carbon reduction targets** and **LCPL's vision for sustainable living** while enabling growth



THE APPROACH

- Enwave is developing an innovative district energy system that will incorporate **wastewater energy recovery** from the **adjacent wastewater treatment** plant to supply heating, cooling and domestic hot water to Lakeview Village
- Thermal energy will be produced at the **Sustainability Centre** located in the district's new Innovation Corridor, as a showcase of sustainability
- Energy will be distributed through the development via a **pipng distribution network** located in the **rights-of-way** and **integrated** into the overall **design and construction** of the development



Springwater

Enwave worked with Mattamy Homes to develop a low carbon geexchange system that includes boreholes under public streets for their residential development of over 300 homes



THE ASPIRATION

- **Mattamy Homes**, North America's largest privately owned home builder, is building a new neighborhood in Markham, Ontario and wanted to develop a **new model for sustainable development**
- The **City of Markham** has set out to become a **net-zero emissions city by 2050**



THE APPROACH

- A **geexchange system** that supplies sustainable heating and cooling to the neighbourhood of approximately **300 net-zero-ready homes**
- The system is based on an innovative design that has been integrated into **standard right-of-way construction** and is designed to achieve a **>90% GHG reduction** when compared to traditional in-home heating and cooling systems
- Geexchange boreholes are distributed throughout the community within the **public rights-of-way** and interconnected within an **ambient loop**, and all infrastructure is buried, preserving **space** and maintaining the **aesthetic vision** of the community



Keys to Success

Setting the Stage...

- Right **partners** and right **people** with the vision and mandate to get the project delivered
- **Early** engagement and ongoing collaboration
- **Government** partners with a **strong carbon reduction vision** and supporting **actions**

...For Successful Execution

- **Integration** into the **development, design, and construction** processes
- **Support** and engagement from **approval agencies**
- Leveraging **infrastructure synergies**
- Easement and **access** rights
- Targeted **funding, incentives** and **policies**



Thank You

Morrigan McGregor
SVP, Energy Planning & Development
Enwave Energy Corporation
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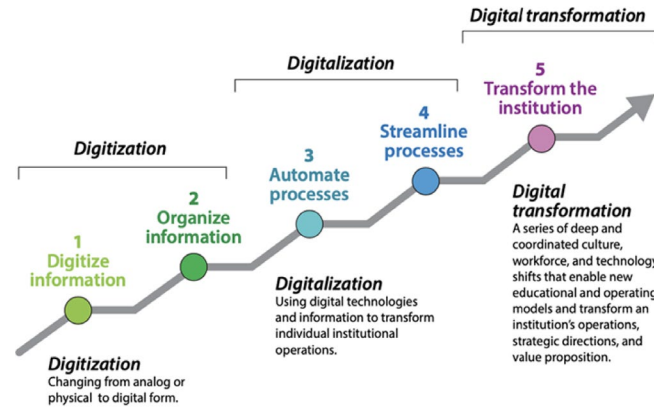
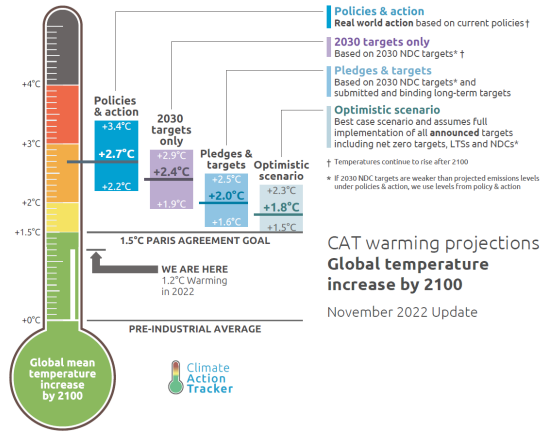
How to Create Tomorrow's Energy System

June 8, 2023

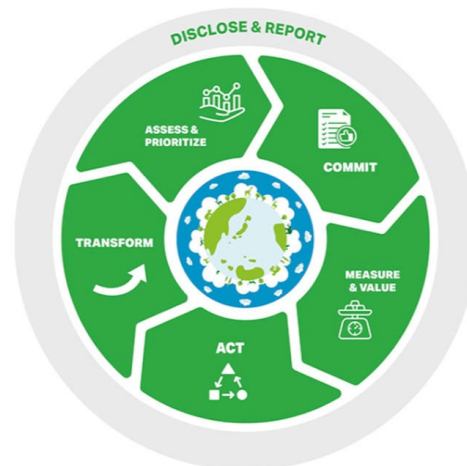
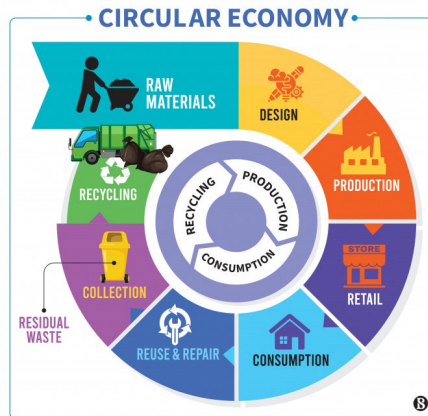
Martijn Duvoort
Director Energy & Industry



Multiple Drivers Fuel the Transition in Europe



Multiple transitions happening simultaneously are enforcing one another

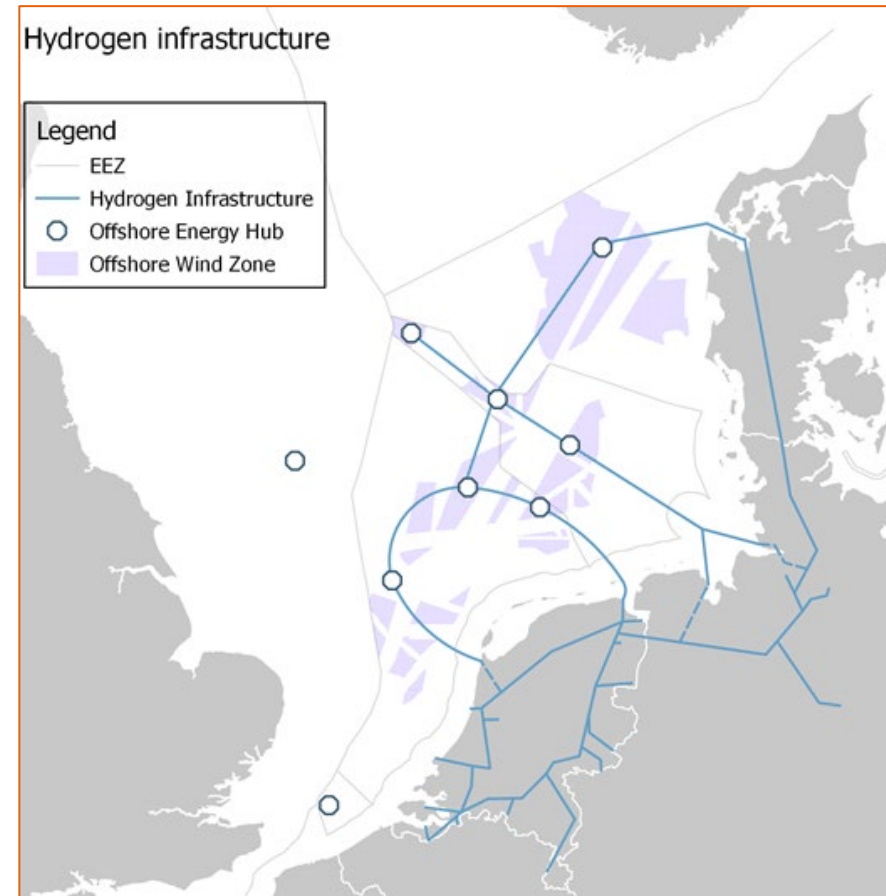
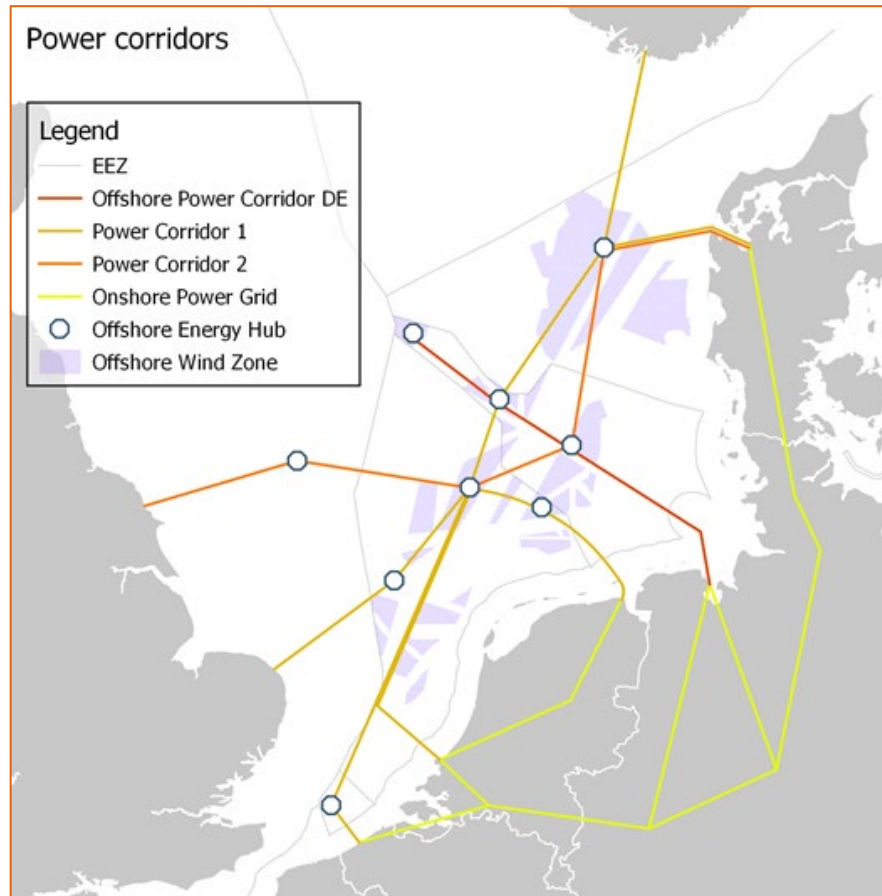


Biodiversity/
Nature Positive

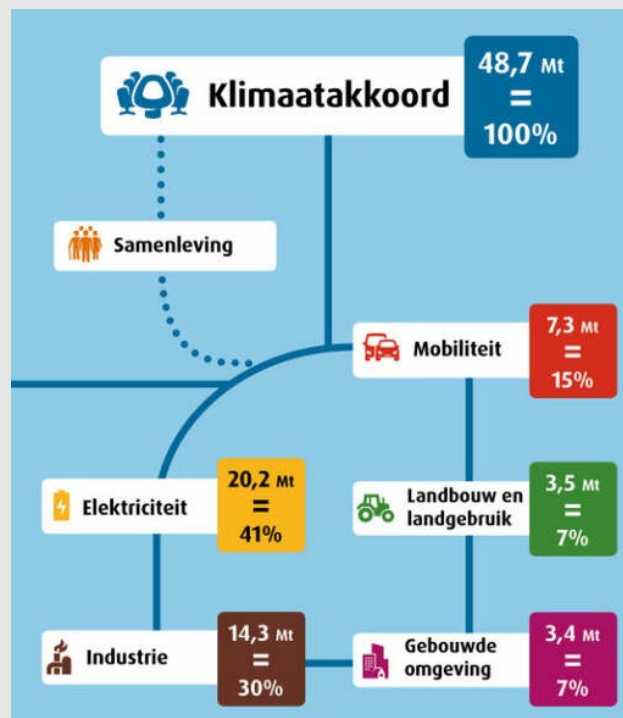


To integrate the 150GW Offshore Wind on the North Sea, HVDC power and Hydrogen grids are built

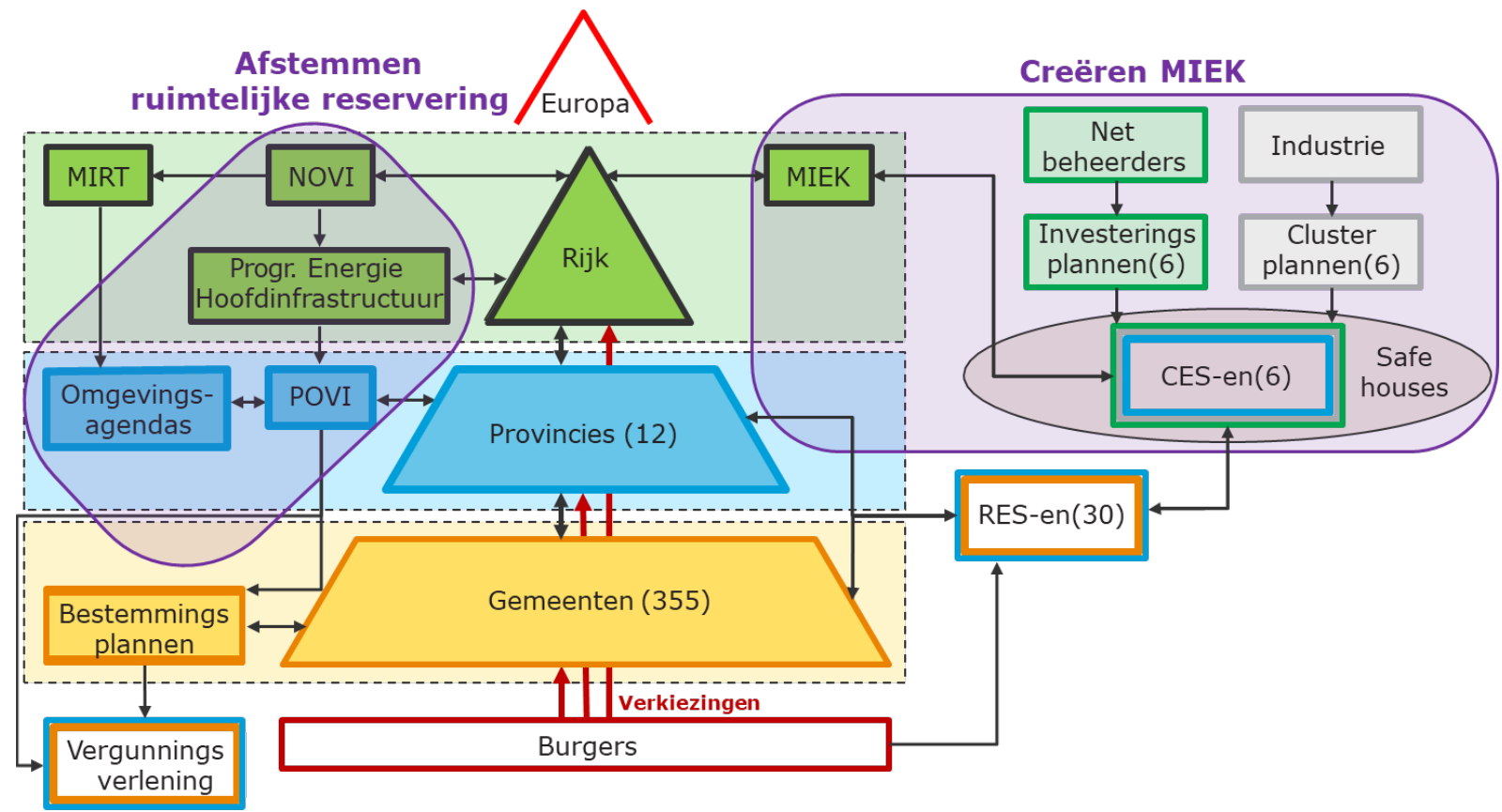
Both TenneT and Gasunie published their 2050 Target Grids



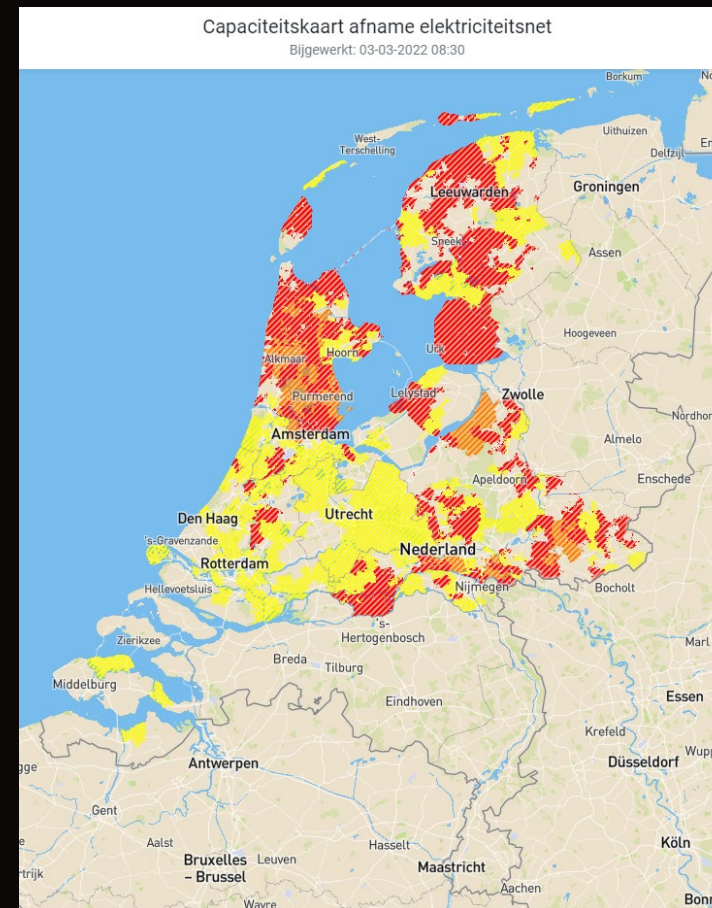
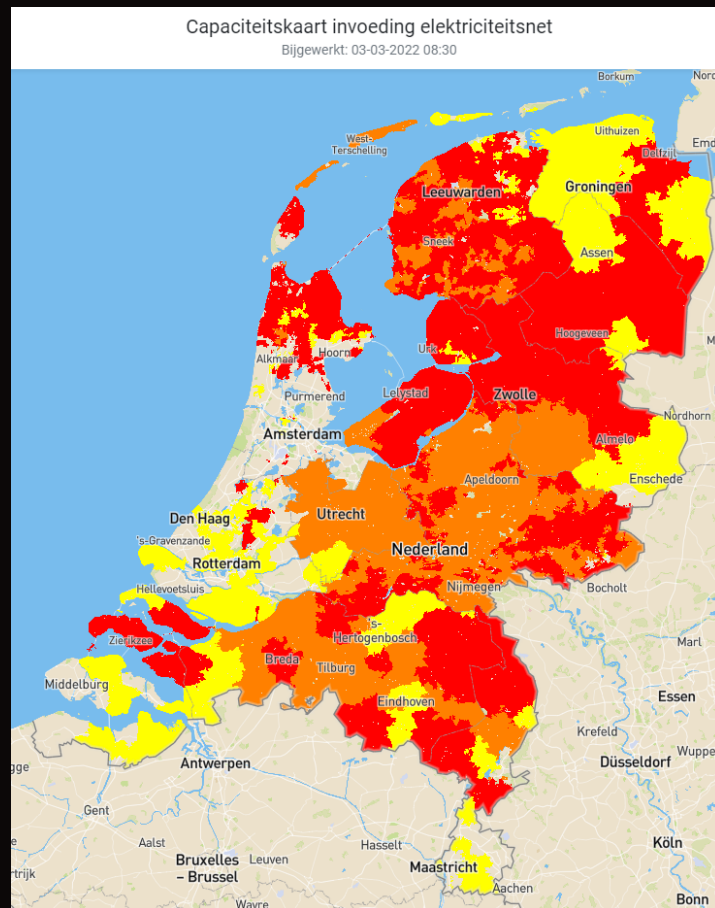
The Dutch 2019 Climate Agreement for 2030 spreads the effort across multiple sectors



The Dutch Way of System Planning



Grid Congestion Poses a Challenge to Onshore Transition

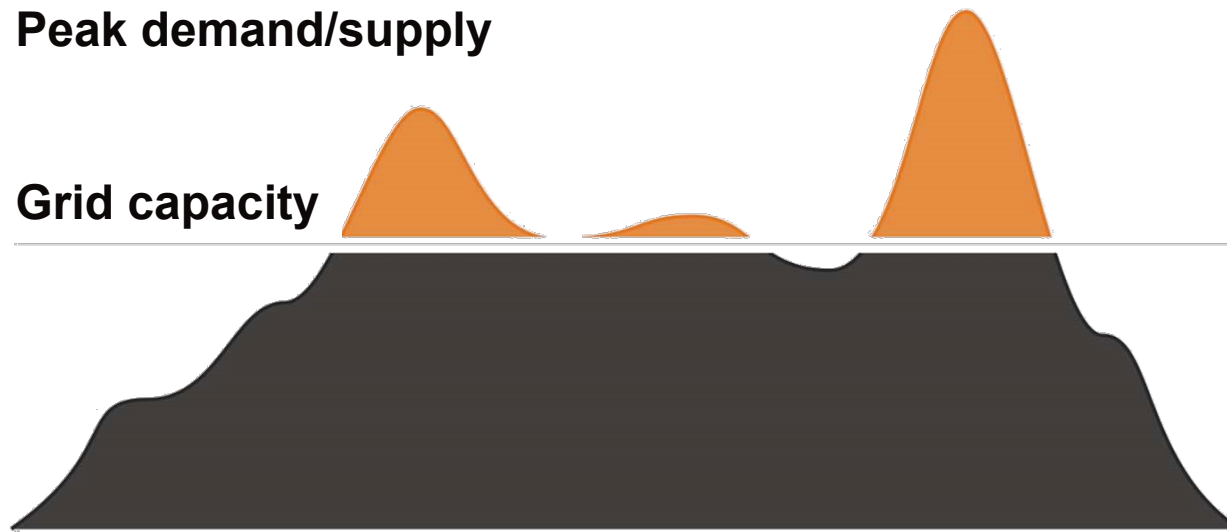


<https://capaciteitskaart.netbeheernederland.nl/>

Yet Local Solutions are Necessary to Cope with Congestion: Balancing Load and Supply

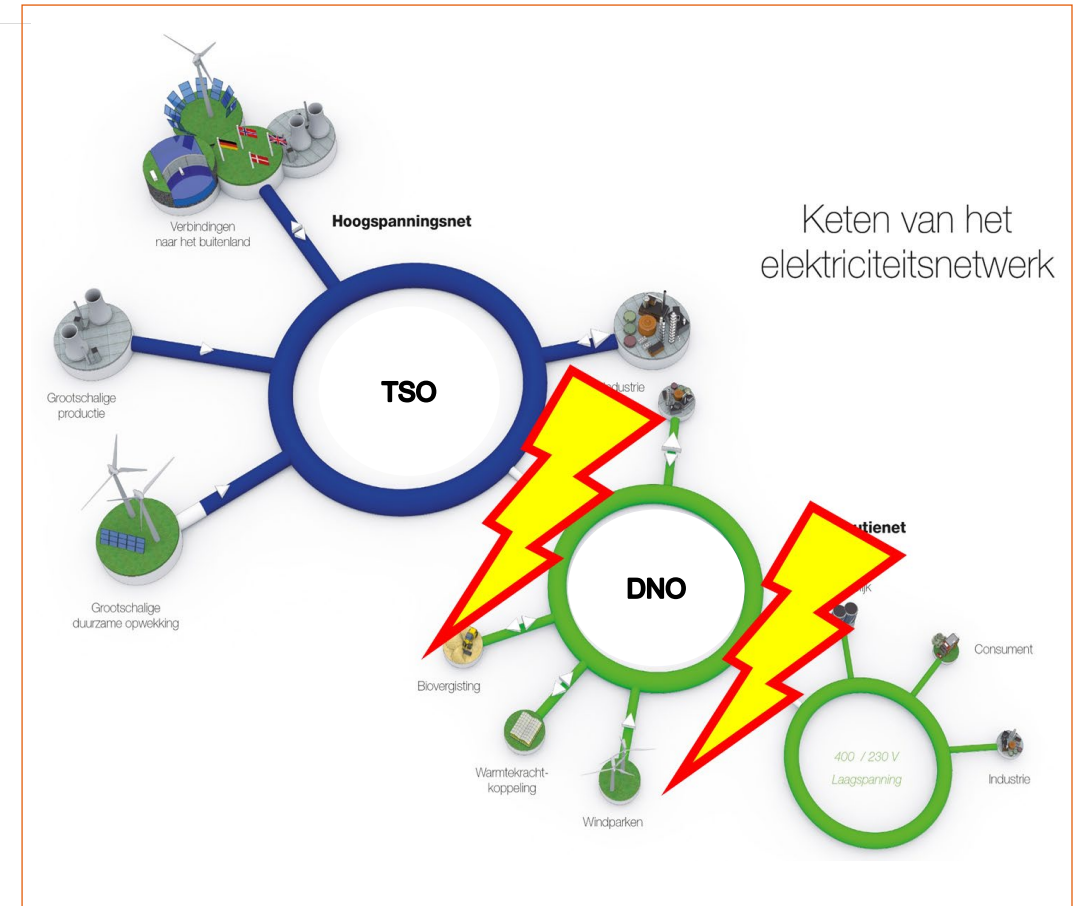
Peak demand/supply

Grid capacity



Arcadis works to:

- Reinforce the Power grid
- Smart solutions for Load Shaving and Peak Shaving
- Apply local supply and storage



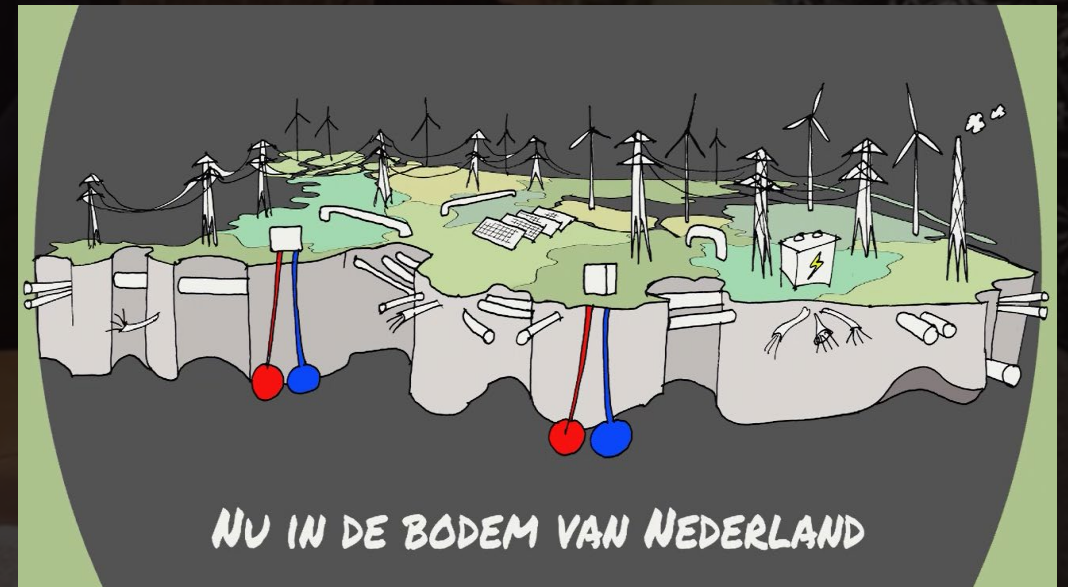


Yet All These Local Solutions Require Space and Public Support

To integrate local demand, supply and storage participation and public engagement programs are key:

- To integrate wind turbines and Solar PV
- Subterranean as important as on the ground
- Local support by information programs and participation
- Prosumer combining solar PV and storage (V2G)
- Energy pooling and local cooperations

By understanding one-another's perspective, solutions are found that are beneficial for all.

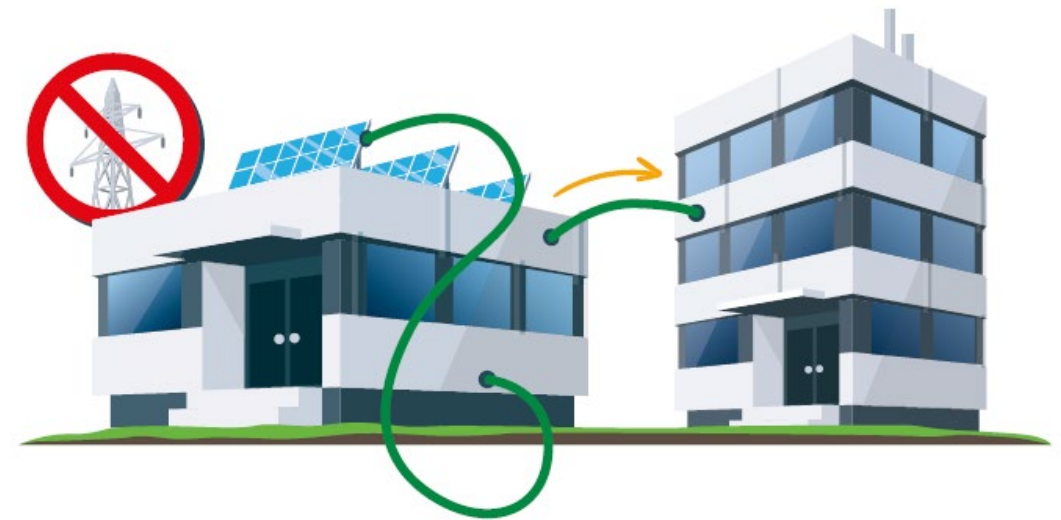


Also Companies Take a More Active Role in the Energy System

Energy Transition actions are implemented once they become profitable for companies, e.g.:

- (Own) green energy is already more profitable than grey
- Grid congestion blocks growth: there is value there, and therefore money to eliminate congestion
- Trade on wholesale power market was only for large consumers (industry, greenhouse horticulture) and is becoming more interesting for smaller companies
- Gas-free and emission-free mobility give new revenue models

Mobilization of the business community will accelerate the transition.



AMSTERDAM LOGISTIC CITYHUB

Business Park Under One Roof

ctPark Amsterdam Cityhub

- 120,000m² for zero emission urban logistics
- 10 – 20 independently rentable units
- Charging facilities for trucks, vans, cars and boats
- Own sustainable generation
- ...
- And grid congestion



Groningse miljardair koopt Amsterdam Logistic Cityhub

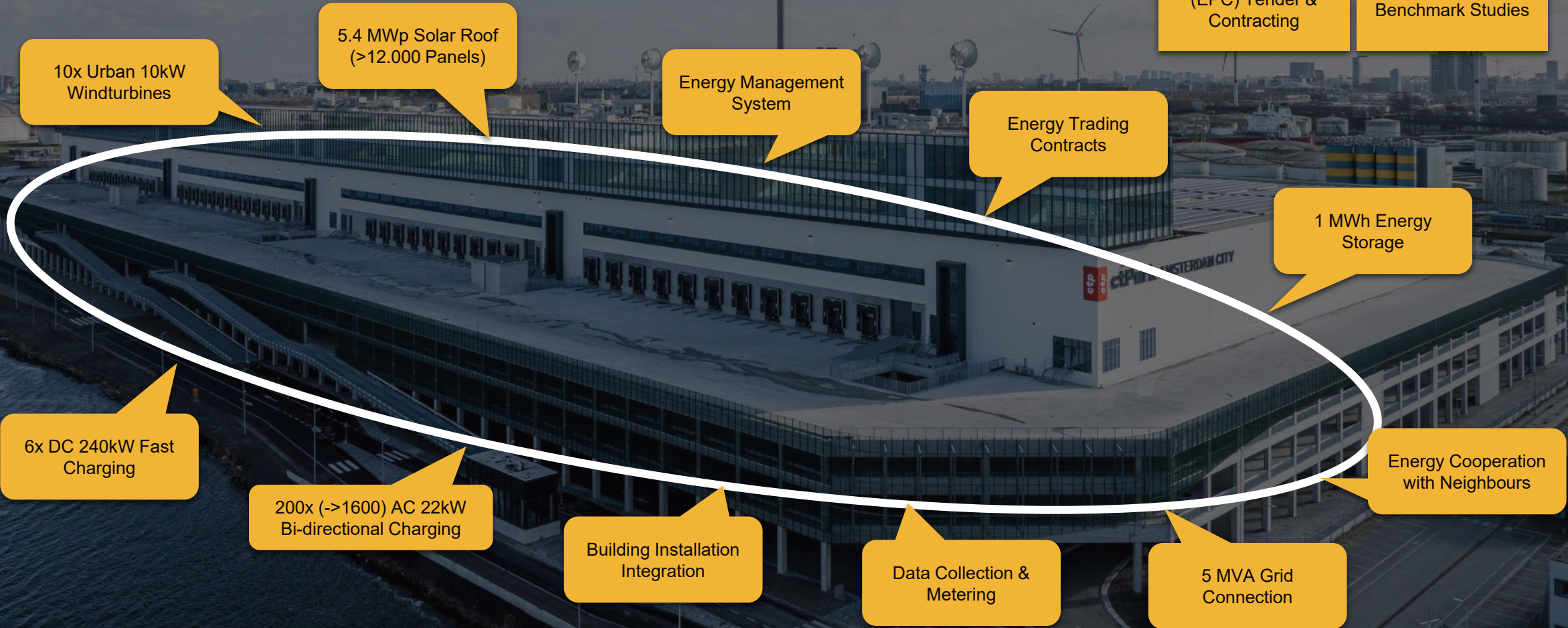
307 MILJOEN EURO

Vastgoedontwikkelaar CTP neemt het in aanbouw zijnde Amsterdam Logistic Cityhub (ALC) over van de voormalige afval-en sloopkoning

AMSTERDAM LOGISTIC CITYHUB

Integrated Systems Approach

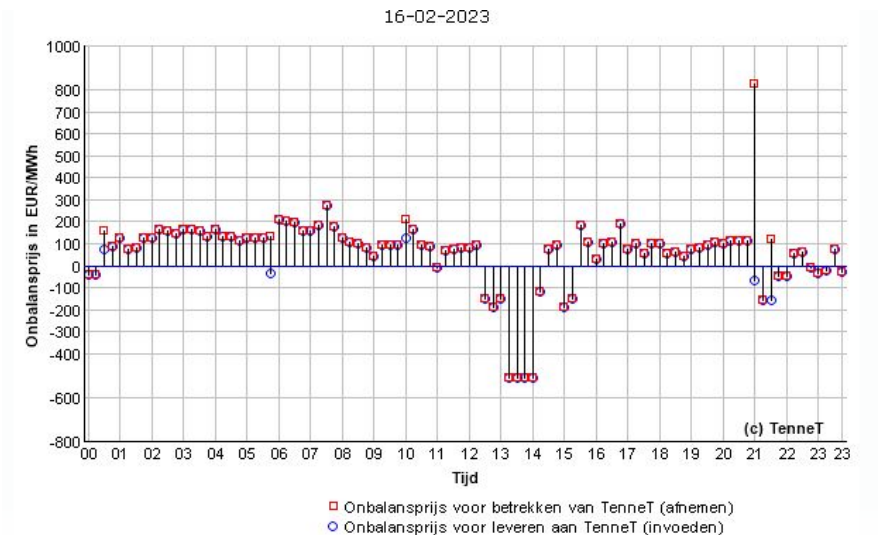
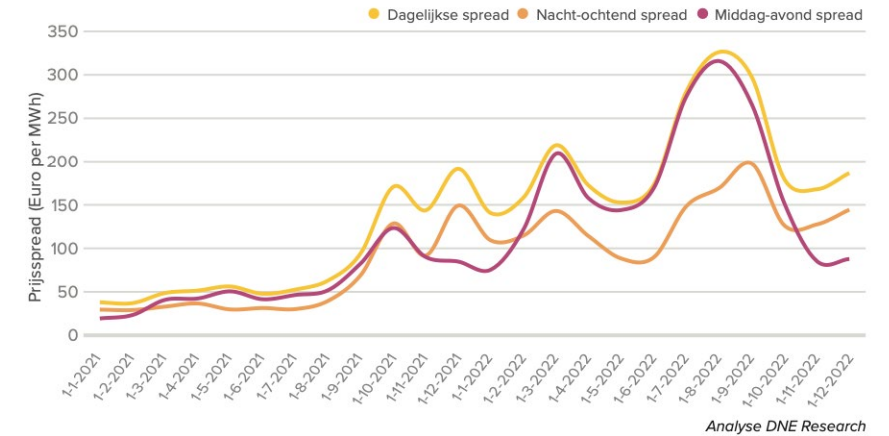
Financial Business Case	Project Management
Legal Organisation & Governance	Contractual Framework
(EPC) Tender & Contracting	Benchmark Studies



AMSTERDAM LOGISTIC CITYHUB

Financially Great Value!

- A local energy system:
 1. Cheap power through own generation 5.5 MW
 2. Double by selling itself to charging stations (+40ct/kWh)
 3. Tripling by earning RFU (Renewable Fuel Units) when directly coupled to charging (+20ct/kWh)
- A flexible energy system with battery and bi-directional charging infrastructure gives additional gains:
 4. Additional RFUs by indirectly linking solar to charging
 5. Purchase energy when prices are low: dynamic contract. Price difference up to factor 4 per day!
 6. Trade on imbalance markets



AMSTERDAM LOGISTIC CITYHUB

A best practice of local value creation

- How to get things done in limited space and facing power grid limitations.
- As “Trusted Advisors,” we were able to build a shared vision:
➔ 1+1 > 2.
- Taking all stakeholders on board is essential: typical Dutch consensus-oriented approach.



Owner finances and operates own energy system. Independent, sustainable and profitable with >10% margin. Resolving grid congestion is a side benefit.

Contact Us



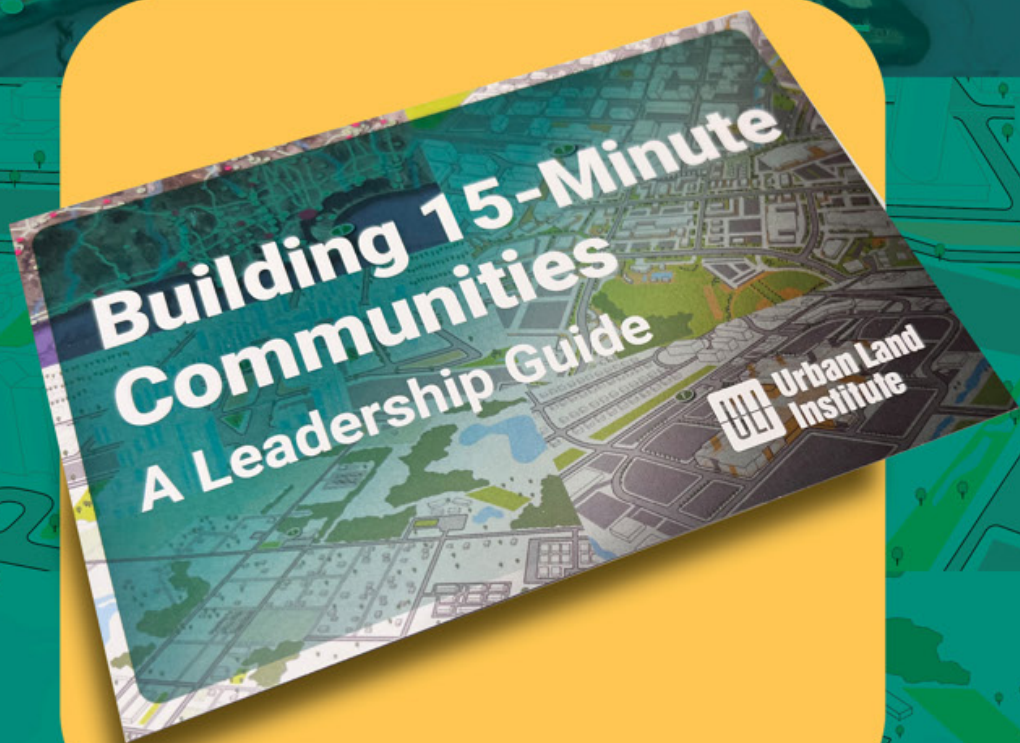
Martijn Duvoort

Director Energy and Industry

Martijn.Duvoort@arcadis.com

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To learn more,
scan this QR code



Join the movement at
uli.org/infrastructure



Shape by Five Forces for Change

Align Actions
with Innovative
Initiatives

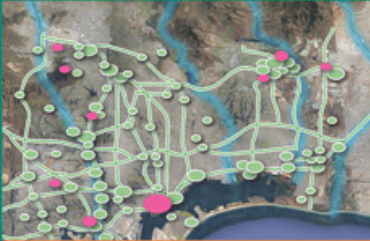
Streamline
Infrastructure
Delivery

Make
Infrastructure
Multifunctional

Apply Walkable
Catchment
Decisions

Bringing
Infrastructure to
Life with "One"

Transform by Six Leadership Strategies



Decarbonize
Metro regions
with TOCs



Diversify CBDs
into Live-in
Downtowns



Humanize &
Heat-proof
Edge Cities



Innovate
Suburban
Densification



Transform
Malls into
Communities



Activate
Exurbs as
Working NBS

Integrate by Five Infrastructure Systems

One
Vision

One
Environmental

One
Community

One
Energy

One
Mobility



Hong Kong, SAR

Toronto Region, Canada

Thank you!

Next ULI InfraXchange: Smart Commute in the City

Friday, June 23, 2023 12-1:30pm EST

uli.org/infrastructure

yvonne.yeung@uli.org 647 4661776