



CONFERENCIA INTERNACIONAL ENERGÍA DISTRITAL LAC 2025



Robert P. Thornton
President & CEO, IDEA

**District Energy in
North America: Growth, Innovation, and
Decarbonization
at Scale**



About IDEA

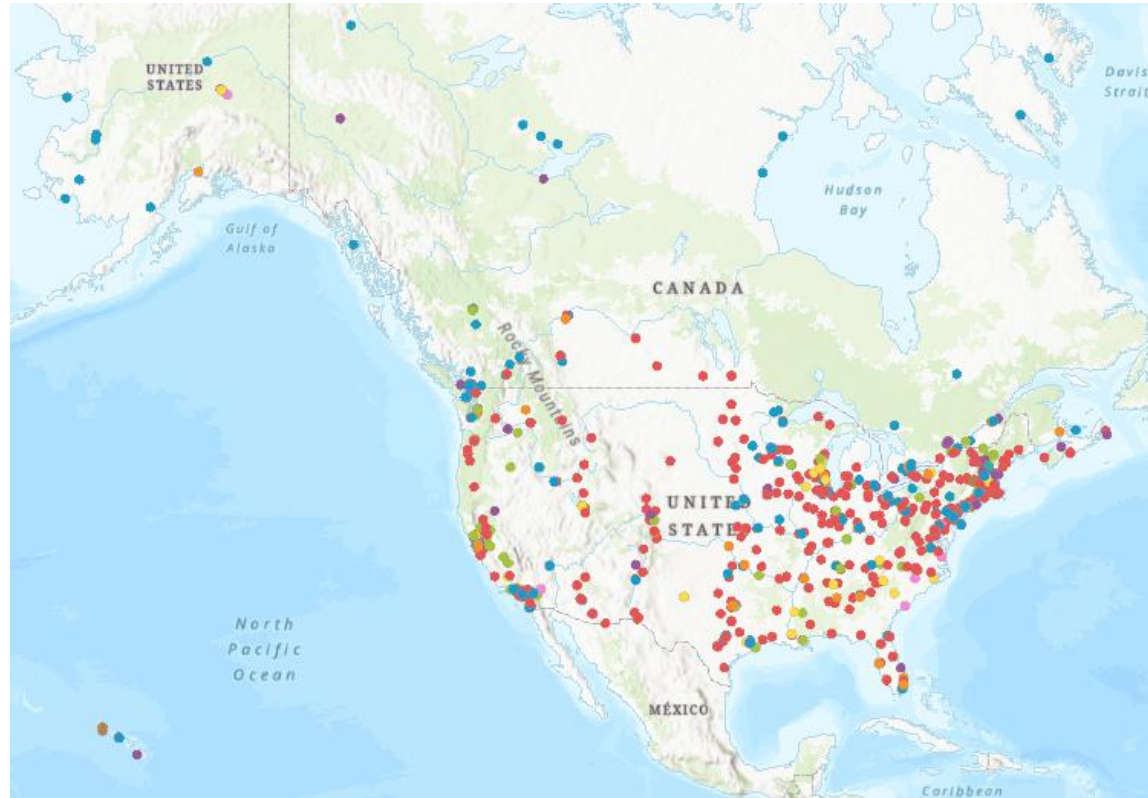


- **Founded in 1909** with headquarters near Boston, MA, USA
- A nonprofit industry association representing **over 3,000 members from 28 countries.**
- Advancing best practices/advocating for community-scale thermal energy systems for **over 115 years.**
- Members include: District energy systems in cities, communities, campuses, clusters, and airports, as well as equipment, technology, and service providers.



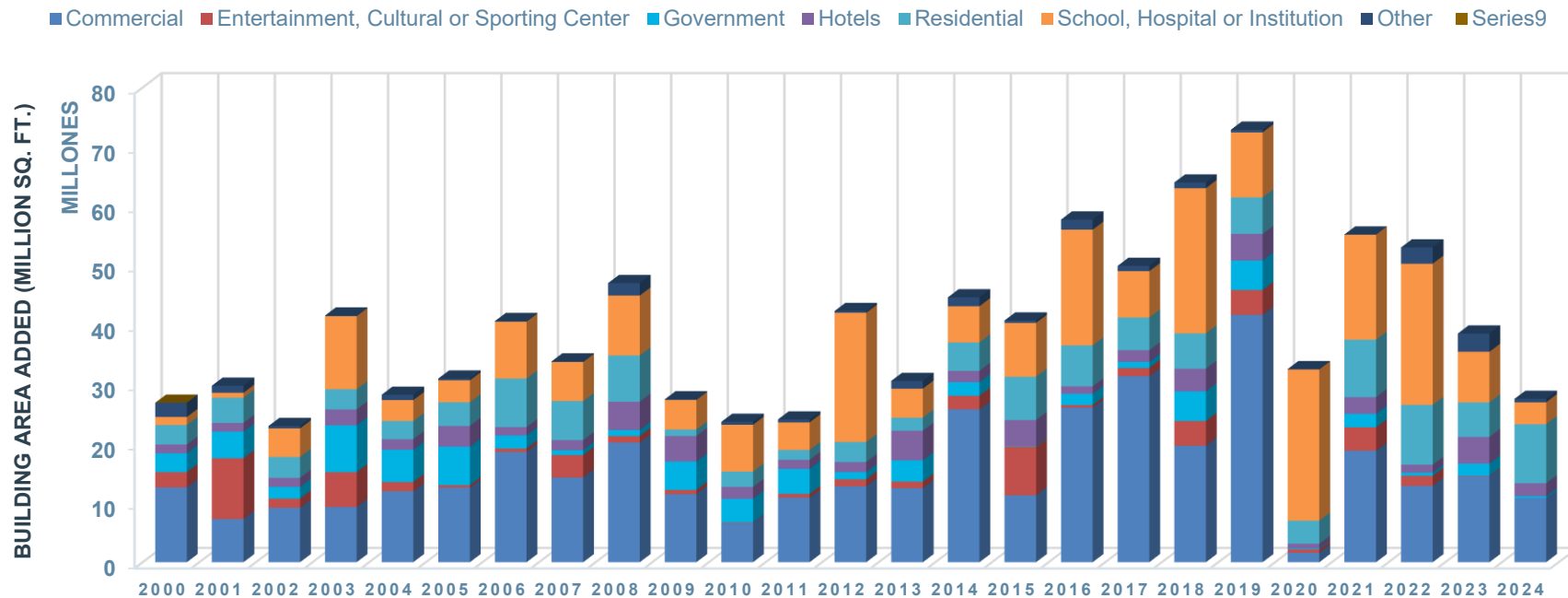
State of District Energy in North America

- 600+ operating systems across U.S. and Canada
- Serving **cities, higher ed campuses, healthcare, airports, industry, communities, clusters.**
- \$ Billions in private and public capital investment
- Industry growth factors include **economics, state/provincial policies, increased awareness.**



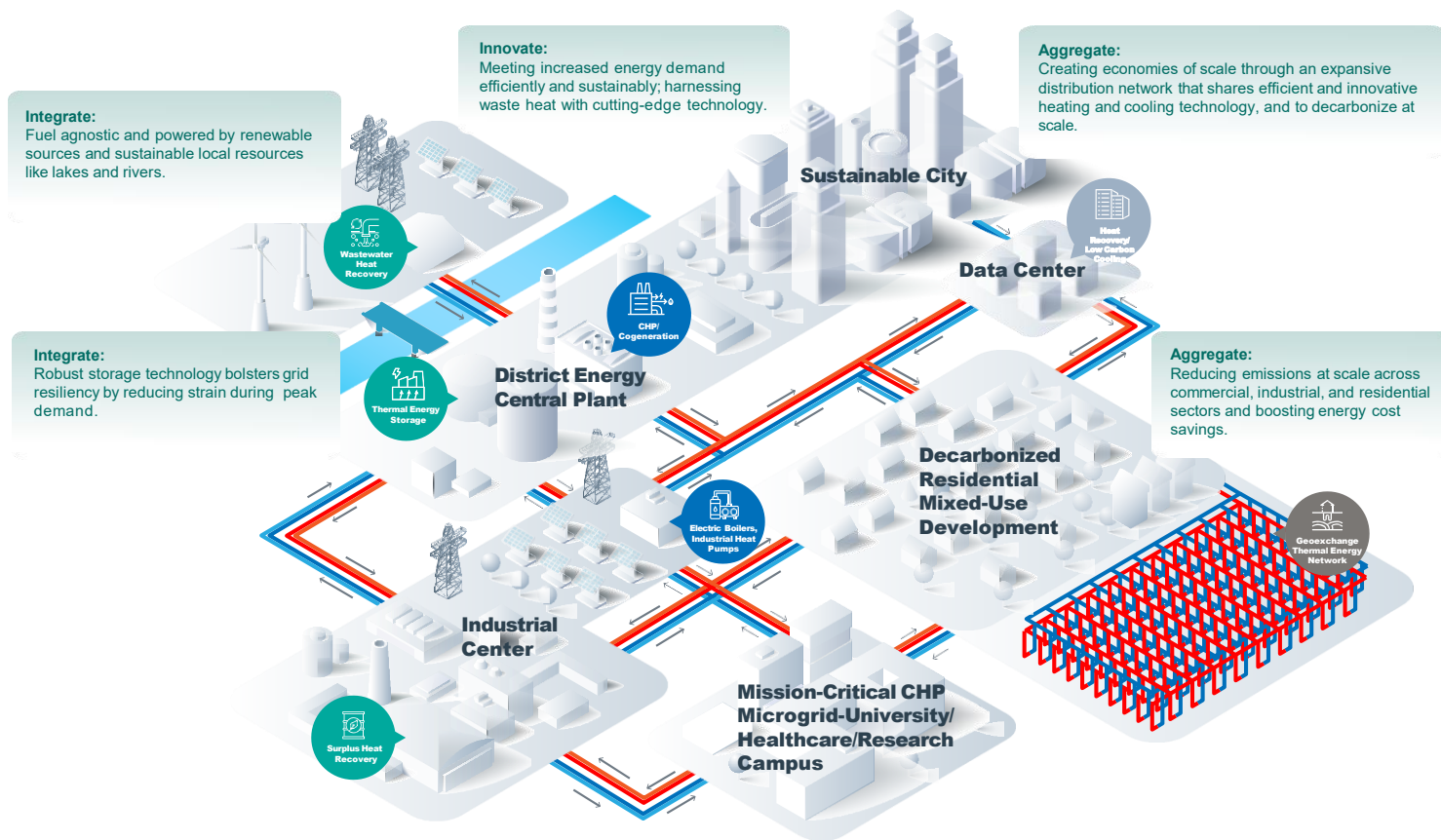
North America District Energy Space Growth: Annual Customer Space Committed by Building Type

Building Area Added: 2000-2024 (million sq. ft.)



District Energy Networks (DENs): Aggregate, Integrate, Innovate

A Blueprint for Efficient, Resilient and Sustainable Cities, Communities and Campuses



600

District Energy systems are operating in US cities, on college and university campuses, and at healthcare facilities, military bases, airports, and corporate headquarters, including Meta, Apple, and Google.

District energy networks distribute **steam, hot water, or chilled water through underground piping systems** to multiple connected buildings, creating economies of scale to enable investment in **lower-carbon solutions**.

The scale creates opportunities to integrate a range of technologies to optimize **energy efficiency**, **leverage local resources**, **strengthen the regional grid**, and **enhance economic resilience**.



Key Market Drivers

80% of North Americans will live in cities by 2050.

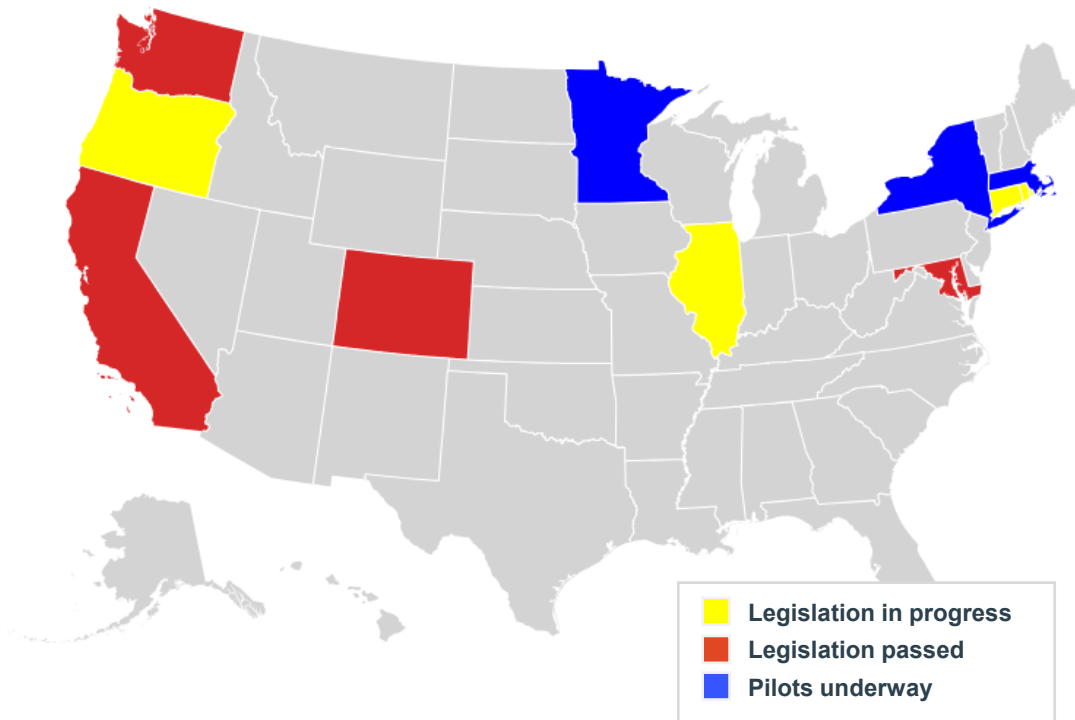
Cooling accounts for **up to 70% of electricity use** in urban areas.

Carbon neutrality mandates drive sustainability in **NYC, Boston, Toronto, and Vancouver.**

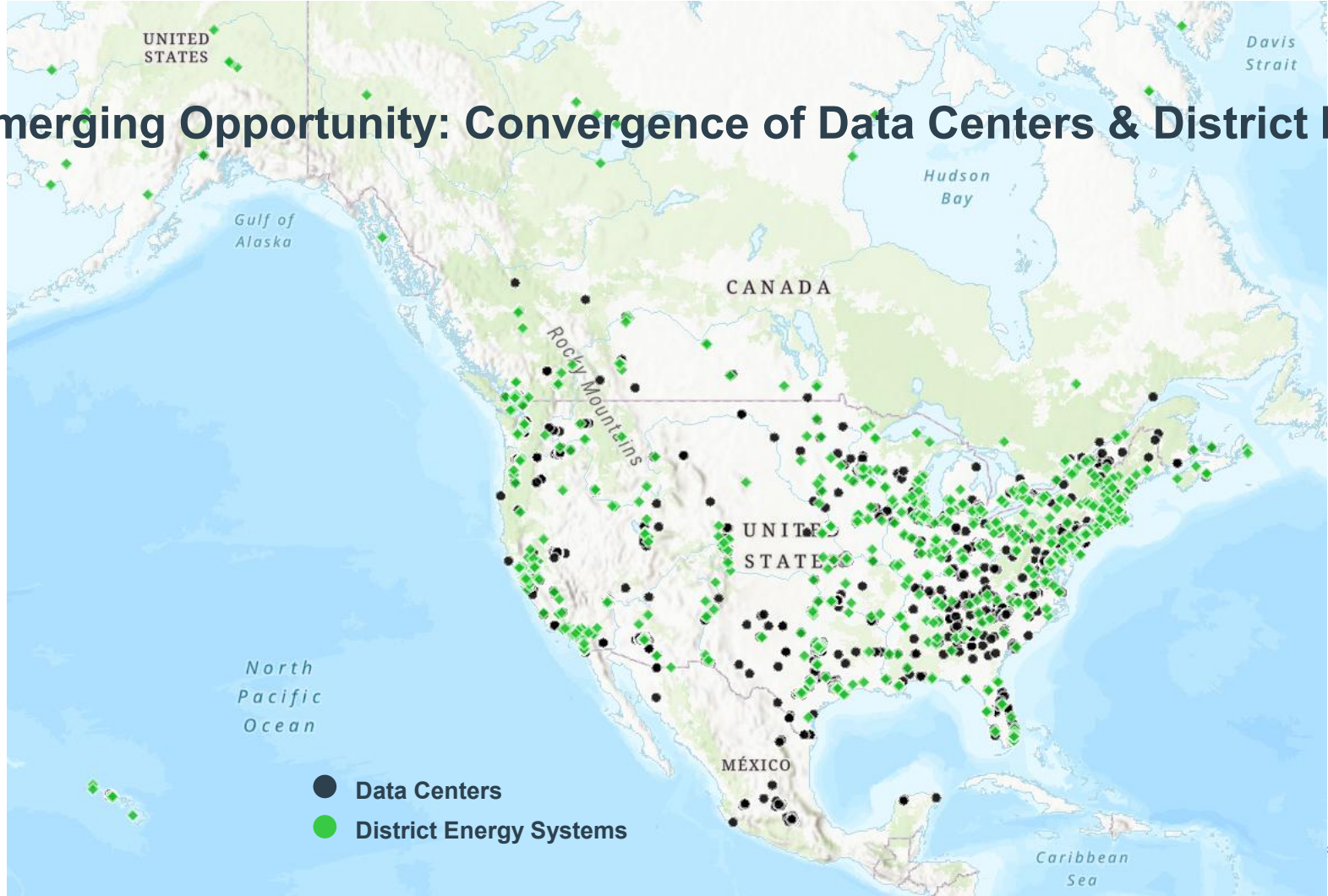
Extreme weather underscores the need for more **reliable, flexible infrastructure.**

State, Provincial & Local Momentum for Thermal Energy Networks

- **Federal** energy & environmental policies shifting in North America, due in part to **politics, energy affordability & inflation**
- **States, Provinces & Cities** are primary policy catalysts: New York State Climate Leadership & Community Protection Act; CA Climate Disclosure Law; NYC LL97; Boston BERDO; San Francisco Climate Plan
- Substantial funding support in CA
- State & local legislation spurring **pilot projects, private capital**, and acceleration of decarbonization.



Emerging Opportunity: Convergence of Data Centers & District Energy



Opportunities Ahead: Adaptable Systems Built to Evolve

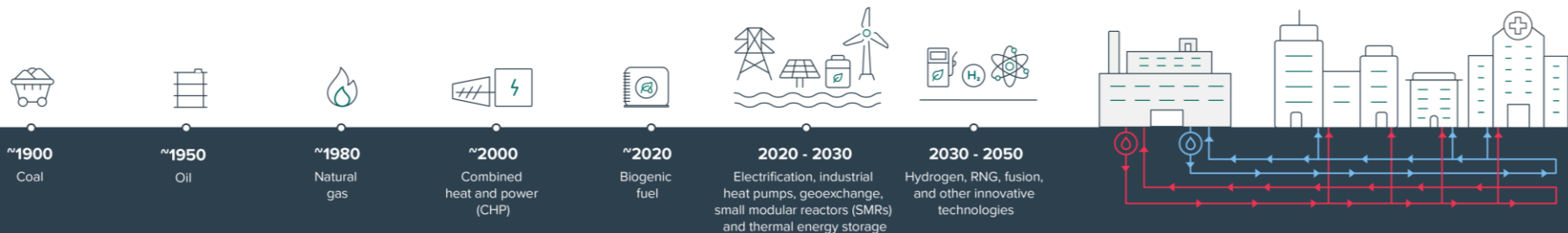
For more than 140 years, district energy systems have evolved—shifting to cleaner fuels and pioneering technologies to lower emissions—maximizing flexibility, resilience, and ROI over time.

Many systems are built to “plug and play” emerging solutions without full system overhauls; supporting customers at

- **Today:** Energy recovery, energy from waste, thermal storage, industrial heat pumps, electric boilers, geo-exchange; combined heat & power (CHP)
- **Mid-Term:** Bio-fuels; Small Modular Reactors (SMRs);?
- **Long-Term:** Fusion?

Strategic advice

Act now to meet today's decarbonization goals by planning thermal infrastructure with a 50–100-year horizon.



Boston and Cambridge: Electrifying a Historic Network

System: Vicinity Energy District Energy System

Start Date: 1948, Ongoing electrification and modernization

Scale: Downtown Boston and Cambridge

Key Points:

- CHP provides reliable steam distribution while enabling clean energy integration.
- A 42 MW electric boiler enables shift to renewable power during favorable grid conditions.
- Planned integration of industrial heat pumps using Charles River as a source and thermal storage to manage peaks.
- System upgrades enable compliance with BERDO (Boston) and BEUDO (Cambridge) carbon mandates.
- A Stepwise approach allows the city to reduce emissions without disrupting critical services.





Manhattan: Clean Steam in the Heart of NYC

system: Con Edison Steam System

Start Date: 1882; modernizing in 20th century

Scale: Largest in U.S.; serves 1,500+ buildings

Key Points:

- Originated to replace thousands of coal furnaces in dense buildings, improve urban air, reduce risk of fires.
- Dramatically cut chimney soot and urban air pollution.
- Today provides space heating, domestic hot water, cooling, humidification, and sterilization in a dense, vertical energy-intensive market.
- Combined heat & power (CHP) recovers surplus heat to produce least carbon-intensive energy.
- Critical asset to accelerate electrification of steam supply, reduce compliance costs and mitigate disruption.



Toronto: Deep Lake Water Cooling

System: Enwave Energy Corporation, Toronto

Start Date: Legacy steam system, district cooling added 2004; expanded in 2024 and ongoing

Scale: 75,000 TR capacity, expanded by 40% in 2024; serves 100+ buildings in downtown Toronto

Key Points:

- Uses cold water drawn from Lake Ontario to provide efficient, large-scale cooling, as well as city water supply
- Cuts electricity use for cooling by up to 90%, reducing peak demand by 61 MW annually.
- Avoids ~79,000 tons of carbon emissions annually—equivalent to taking 15,800 cars off the road.
- Eliminates use of ozone-depleting refrigerants, improving air quality and reducing harmful NOx & SOx.
- A flagship example of how cities can integrate natural resources into resilient, low-carbon infrastructure



Vancouver: Private Capital:Public Good

System: Creative Energy (formerly Central Heat) & other citywide networks

Start Date: 1968

Scale: Downtown core and expanding neighborhoods

Key Points:

- Created to combat severe air pollution caused by hundreds of coal and oil-fired boilers.
- Early private investment catalyzed Vancouver's clean energy transition.
- System now incorporates biofuels, sewer heat recovery, geo-exchange, and energy-from-waste technologies.
- District energy is a cornerstone of Vancouver's "Greenest City" and Zero Emissions Building Plan.
- Case for how policy, infrastructure, and private capital can unlock local economic value and climate impact

Ottawa: Federal Government Leads on District Energy Transformation

System: One of the largest government-owned district energy systems in the world

Start Date: 1950s; ongoing transition to modern hot water and chilled water networks

Scale: Serves 80+ federal buildings in Canada's National Capital Region

Key Points

- \$3.4B capital investment to modernize and decarbonize
- Designed for renewables, industrial heat pumps, and sewer heat recovery
- Smart digital controls for system optimization & resilience
- Removes rooftop mechanicals, freeing valuable real estate
- Cuts 60,000+ tons of emissions annually—equal to 14,000 cars off the road
- Generates significant local economic value



Princeton University: Steam to Hot Water Campus Conversion

System: Comprehensive transition from steam to hot water district energy across Princeton's main campus

Start Date: 2019 – 2044 phased conversion program

Scale: 180 building conversions to hot water; 13+ miles of distribution piping; 2,500 geoexchange bores (850 ft deep)

Key Points

- Construction of new T.I.G.E.R. central plant and upgrades to West Plant
- Designed for 145°F supply temperature, capable of operating at 120°F for efficiency gains
- Integration of large-scale geoexchange to provide renewable thermal energy
- Deployment of 3 thermal storage tanks to balance loads and enhance flexibility
- Long-term modernization to enable low-carbon heating and cooling across the campus



Small Cities, Big Impact: District Energy at Community Scale



Burlington, Vermont

A city powered by 100% renewable electricity is planning to create a biomass-fueled district heating network to further decarbonize building heat.

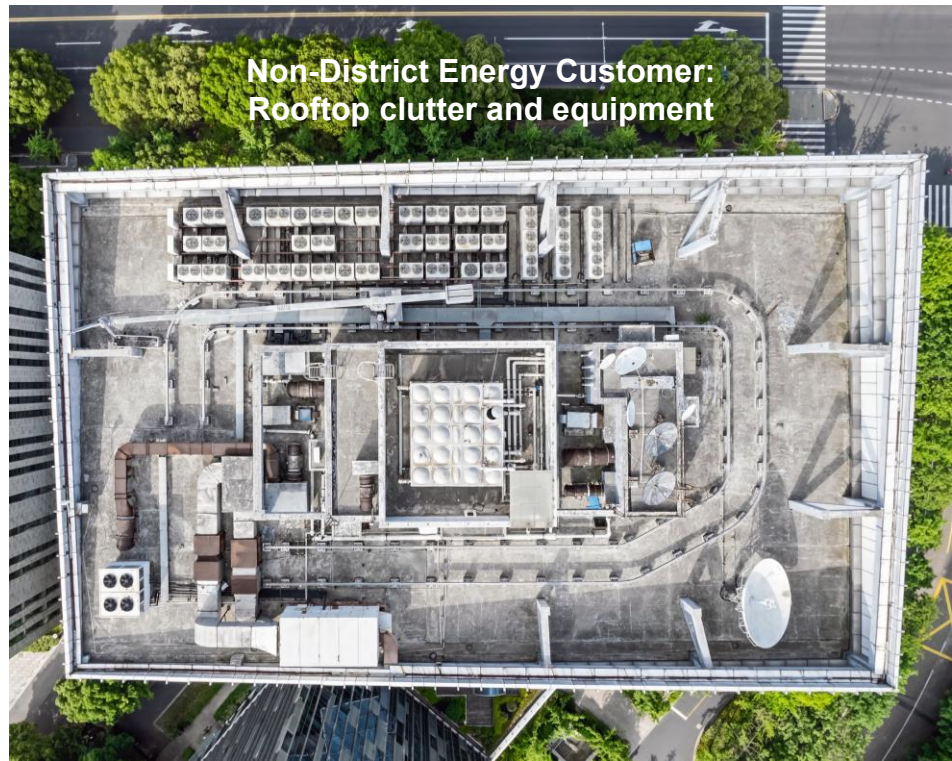
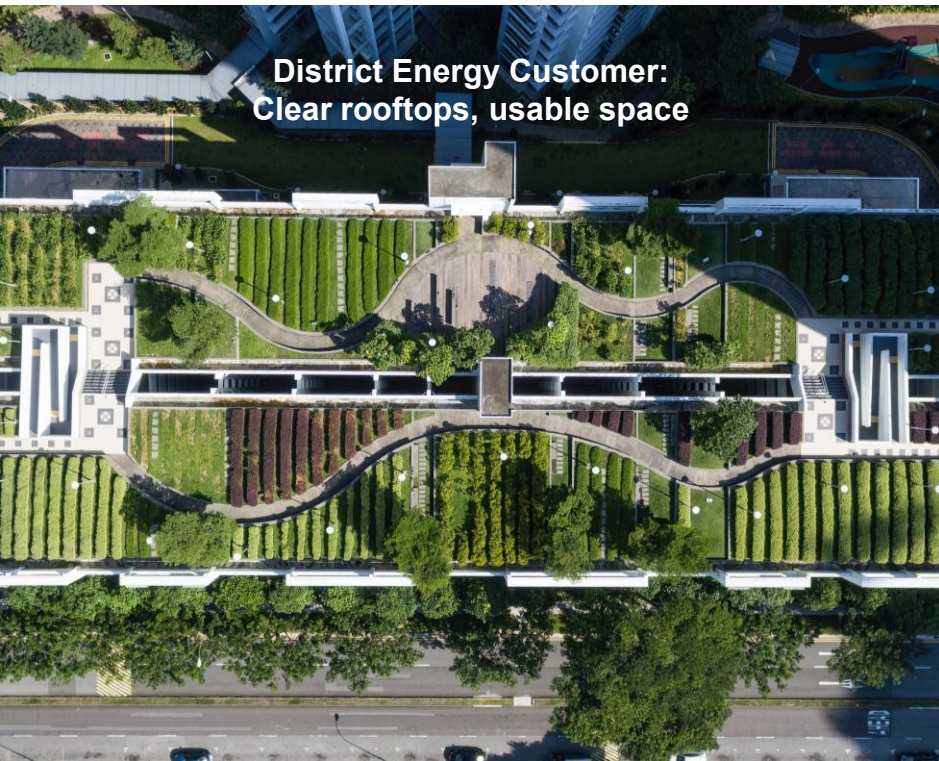


Surrey, British Columbia

The city is expanding its district heating network powered by waste heat recovery, supporting population growth and climate goals.

Generating Value for Customers

District energy unlocks real estate value by eliminating bulky rooftop and basement equipment—freeing space for tenant amenities, leasable square footage, and higher property value.



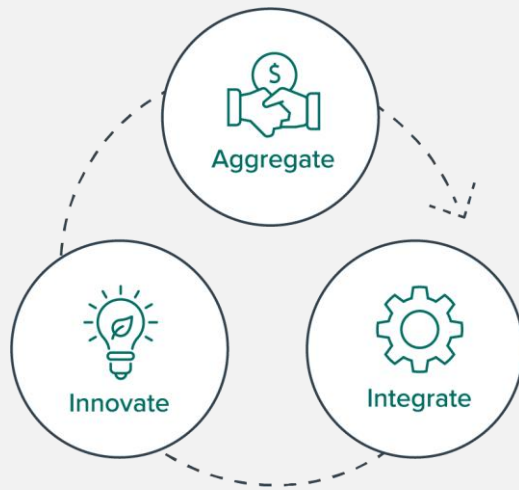
North America Takeaway

Aggregate, Integrate, Innovate

- **Aggregate:** Large customer loads attract private capital and unlock economies of scale.
- **Integrate:** Diverse technologies—TES, geo, sewer heat, electrification—built into one system.
- **Innovate:** New models for policy, finance, and technology accelerate decarbonization at scale. Integration of AI & machine learning.
- **Pace Is Quickening:** Urban growth and rising demand require systems that adapt in real-time. Private investment on the rise.

From Linear to Circular

Energy systems must be flexible, iterative, and built to evolve—not fixed in place.



You're Invited!

IDEA welcomes you to two capital cities next year—Washington D.C. and Ottawa, ON.

For more information, please visit districtenergy.org.

CampusEnergy2026

Advancing Thermal Networks

FEB. 17 – 20, 2026 | WASHINGTON, DC



DISTRICT ENERGY

IDEA2026

Connecting Networks

June 23 – 26, 2026 | Ottawa, ON, Canada



IEA DHC



*“Never doubt that a small group of thoughtful,
committed citizens can change the world.
Indeed, it's the only thing that ever has.”*

— Margaret Mead

Thank You

Robert P. Thornton
President & CEO, IDEA

Email: rob.idea@districtenergy.org
www.districtenergy.org



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para los expositores en el link

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