



Revolutionizing urban sustainability

District energy systems as key
players in the decarbonization
of commercial buildings



Commercial buildings significantly contribute to carbon emissions in the U.S.—[826 million metric tons](#) per year, to be exact. Building operations alone contribute nearly [30%](#) of global carbon emissions annually. To tackle this substantial carbon footprint and combat climate change, urgent action is necessary, including a swift transition from fossil fuels to cleaner heating and cooling methods.

According to the World Meteorological Organization’s [report](#), the *State of Climate in 2021: Extreme Events and Major Impacts*, “record atmospheric greenhouse gas concentrations and associated accumulated heat have propelled the planet into uncharted territory, with far-reaching repercussions for current and future generations....The past seven years are on track to be the seven warmest on record....Global sea level rise accelerated since 2013 to a new high in 2021, with continued ocean warming and ocean acidification.”

As described in the report, extreme weather events occur more frequently each year as a result of climate change. Cities and states already feel the impacts of flooding, hurricanes, wildfires, and other climate-related crises. Many areas, especially coastal areas, are preparing for how these emergencies will affect them. Leaders are considering infrastructure enhancements to protect citizens from the impacts of climate change, such as rising sea levels and extreme weather events. It’s clear that our cities need resilient, reliable, and agile solutions to face an uncertain climate future.

In addition to operational flexibility and reliability, district energy systems have expedited restoration capability, making it possible to recover much faster than electric and gas utilities during emergencies. Unlike other utilities, flood waters will not damage district distribution systems because they are fortified underground. Given the rising ocean levels worldwide, this is an essential benefit of district energy, especially for coastal cities.

For decades, building owners, developers, and tenants have embraced district energy for its reliability, ease of use, cost competitiveness, and notably lower carbon footprint compared to alternative heating and cooling methods. Originating over a century ago, many district

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energy systems were historically owned by local electric utilities, strategically co-located with electric substations, paving the way for electrification with easy access to existing transmission infrastructure.

The resilience of district energy systems is evident in their transformative journey of fuel-switching—from coal to oil, natural gas, and, more recently, cogeneration and biogenic fuels. Designed for seamless fuel-switching and adaptability to cleaner energy sources, these systems continue to evolve with new, environmentally friendly technologies and fuel options.

Pioneering a carbon-free future in the next energy transition

The global shift towards clean energy is at a critical juncture, with district energy systems leading the way. District energy solutions guide us towards a future free from carbon emissions, reducing our dependence on fossil fuels. District energy systems are at the forefront of aggressive climate action, emerging as invaluable assets in achieving ambitious sustainability goals. These systems, comprised of centralized facilities that produce and distribute thermal energy for the heating and cooling of building spaces through underground piping networks, offer a compelling solution for cities and communities.

The centralized nature of thermal energy and chilled water generation positions district energy as a catalyst for change. Each and every building connected to a district energy system immediately benefits from any technology, efficiency, or carbon reduction strategies implemented at the system's central facilities. This eliminates the need for individual, costly in-building retrofits and associated capital investments, offering a scalable and cost-effective approach to reducing carbon emissions in cities. Decarbonized district energy service also meets the challenges posed by retrofitting and decarbonizing existing building stock, particularly for cities with aging infrastructure and historic buildings.

Transforming North America with decarbonization solutions

As the largest owner and operator of district energy systems in the U.S., Vicinity Energy is at the forefront of bringing decarbonization solutions to North America. Currently serving 12 cities with 19 systems, our extensive underground networks serve over 900 buildings, totaling 250 million square feet of space. The steam, hot water, and chilled water we provide plays a vital role in essential community services, serving major hospitals, hotels, biotech facilities, and higher education campuses for heating, cooling, humidification, and sterilization.

After committing to net-zero carbon emissions by 2050, Vicinity has taken significant strides in this direction. Our strategy revolves around the electrification of our operations, incorporating proven technologies such as electric boilers, industrial-scale heat pumps, and thermal storage. Notably, we're set to install our first industrial-scale electric boiler in 2024, marking a milestone in our journey toward decarbonization.

This technological advancement, coupled with the procurement of carbon-free electricity, enables Vicinity to introduce a groundbreaking carbon-free product—eSteam™. This reliable and cost-effective offering empowers our customers to achieve their decarbonization goals while contributing to the sustainability goals of the cities we proudly serve.

MALMÖ, SWEDEN

Sweden is arguably one of the world's leaders in decarbonization and introducing tech-forward, large-scale renewables into its energy mix. The City of Malmö is on the cutting edge, incorporating low/no carbon resources to fuel its district energy infrastructure to heat buildings sustainably.

In collaboration with the City of Malmö, Sweden, Germany-based E.ON, one of Europe's largest energy networks and infrastructure operators, announced the construction of five geothermal heating plants to feed the city's existing district heating network. The ultimate objective is for Malmö to be emissions-free, leveraging the district infrastructure and the world's deepest wells for using geothermal energy.

E.ON intends to drill its first well to a depth of 5 to 7 kilometers, where it expects to find temperatures of 160 degrees Celsius. Water is pumped into a borehole, which heats up at depth and then exits through a second borehole. The energy is fed into the district heating network via a heat exchanger, which transfers thermal energy to the district network. The company is now preparing to construct the first five planned plants, which will go live in 2027. The first plant will produce 40MW of heating power.

[Learn more](#)

To meet our net-zero carbon emissions target ahead of schedule, Vicinity has devised a comprehensive investment and execution strategy. This involves deploying various technologies and access to ongoing renewable energy sources from the grid, ensuring a multi-pronged approach to electrifying steam generation processes across our district energy systems. Vicinity is dedicated to leading the way in revolutionizing North America's energy landscape with innovative and sustainable solutions.

Our roadmap to net zero carbon emissions includes the following critical components:

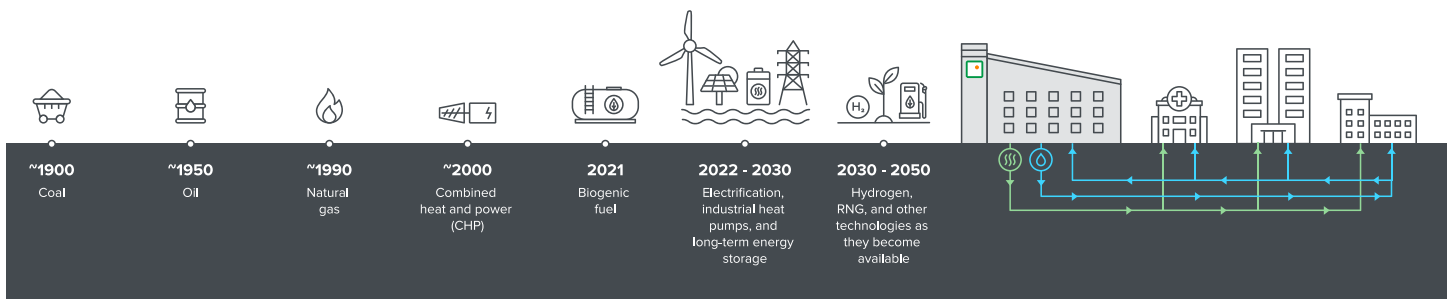
- Electrifying generation by converting our operations to heat pumps and electric boilers;
- Utilizing renewable or carbon-free electricity to power our equipment and integrating it into our fuel mix;
- Leveraging existing and installing new infrastructure to deliver renewable, carbon-free thermal energy;
- Installing thermal storage to buy renewable electricity when it's readily available and affordable and store it for use during peak district system demand;
- Investing in efficiency projects and upgrades to our existing energy infrastructure, and
- Exploring and implementing other leading-edge technologies to accelerate our decarbonization and the energy transition.

Empowering Environmental Justice communities

In the realm of climate legislation, Environmental Justice (EJ) communities rightfully take center stage due to the disproportionate impact of climate change on these areas. Vicinity's electrification plan aims to swiftly decarbonize urban spaces, focusing on ensuring direct benefits for EJ communities. This initiative promises access to a greener, more reliable, cost-effective energy solution, requiring no financial investment from EJ communities.

One notable advantage of connecting buildings to district energy services is eliminating the need for new smokestacks. Many structures in EJ communities currently rely on outdated, inefficient natural gas boilers for heating, known for unregulated emissions and a decades-long lifespan. Once installed, cities and states often overlook these boilers, leaving harmful greenhouse gas emissions unregulated. By transitioning to district energy systems, removing these unregulated boiler plants will help prevent unnecessary pollutants, safeguard community health, and address environmental concerns.

EJ communities often face capital constraints, making traditional decarbonization efforts challenging. Connecting buildings to district energy systems significantly reduces capital costs to mitigate this cost barrier, eliminating the need for onsite equipment management and maintenance. District energy service helps foster a more equitable and sustainable energy future for all by shifting energy and operations risk away from building owners to Vicinity's central facilities.



Fuel agnostic district energy systems have a 75-year history of greening their fuel sources. Vicinity is continuing this evolution, leveraging our existing district energy systems and deploying innovative technologies to reach net zero carbon emissions.

Revolutionizing North America's energy landscape: Vicinity's three-pronged electrification strategy

Electric boilers

Vicinity's journey to electrify district energy systems begins with adopting electric boilers—a proven, accessible technology that utilizes electricity to transform water into high-pressure steam. This process completes the electrical circuit by injecting water across oppositely charged plates, instantaneously heating water into steam. The advantages are manifold: once installed, Vicinity leverages existing distribution infrastructure to deliver electrically-generated, carbon-free steam, known as eSteam™, to customers.

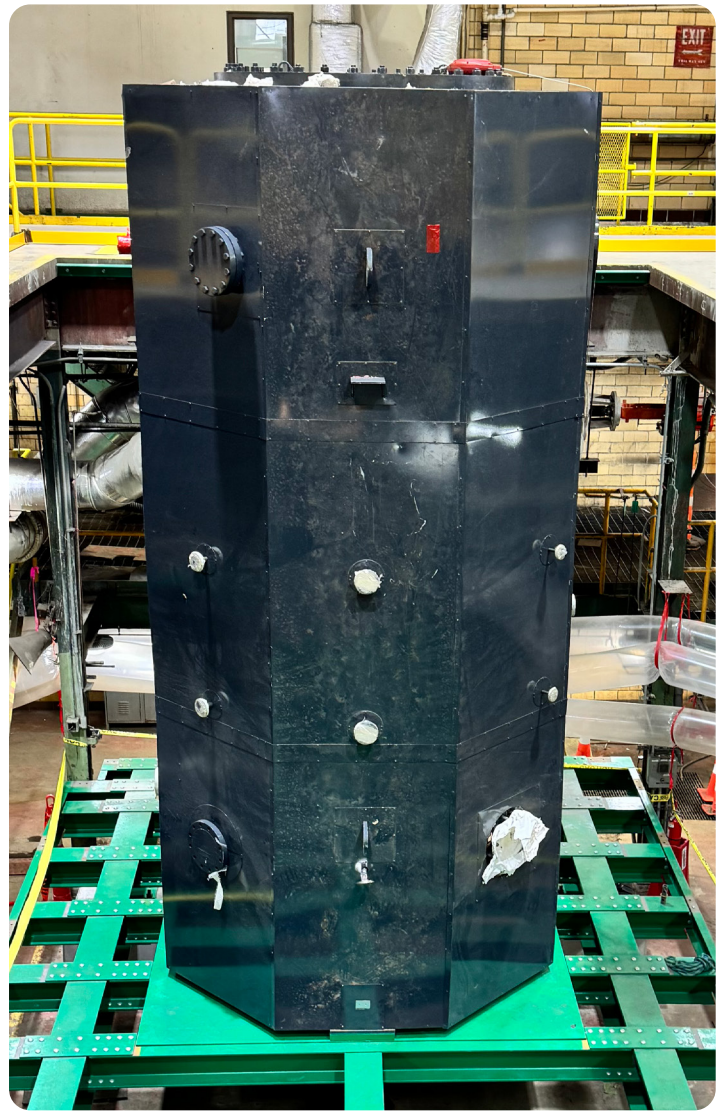
This approach capitalizes on our co-located facilities with large electric substations, ensuring reliable access to green electrons without requiring new electric infrastructure. This minimizes costs and sidesteps challenges associated with constructing new substations, such as permitting difficulties while generating public support. Vicinity's access to a lower-cost, high-voltage, electrical supply further reduces financial barriers, making eSteam™ a more affordable and sustainable alternative for customers.

Over time, electric boilers will transition into peaking steam-generating equipment, providing flexibility in meeting evolving energy needs.

Industrial-scale heat pump complex

Vicinity is also in the process of deploying industrial-scale, steam-generating heat pumps as the baseload generating equipment for electrification. These innovative systems extract heat from local water sources, such as rivers, lakes, or oceans, utilizing them as energy reservoirs. Operating with a generation coefficient of performance (COP) exceeding 2, Vicinity's heat pumps demonstrate exceptional efficiency by generating twice the energy output for every unit of electricity input.

Powered by green electricity from the grid, these heat pumps contribute to reducing carbon emissions in our operations. The environmental impact is carefully



Vicinity's first 42MW electric boiler that was installed at our Cambridge facility.

managed, with Vicinity adhering to stringent regulations regarding water use and ensuring minimal disruption to local ecosystems. Ensuring that rivers and their ecosystems remain unharmed, the river intake system lifts heat from the river and brings it into our facilities.

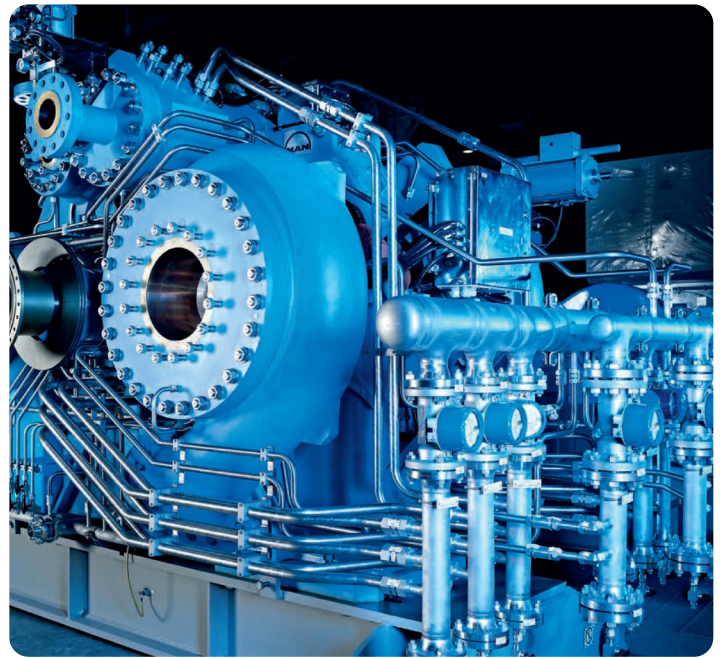
This heat pump will have a steam export capacity of 35MW and will occupy a space of approximately 25,000 sq ft. Lifting heat from the Charles River, the Kendall heat pump will circulate 24.5 million to 49 million gallons of water daily, returning the water at a cooler temperature.

Thermal storage

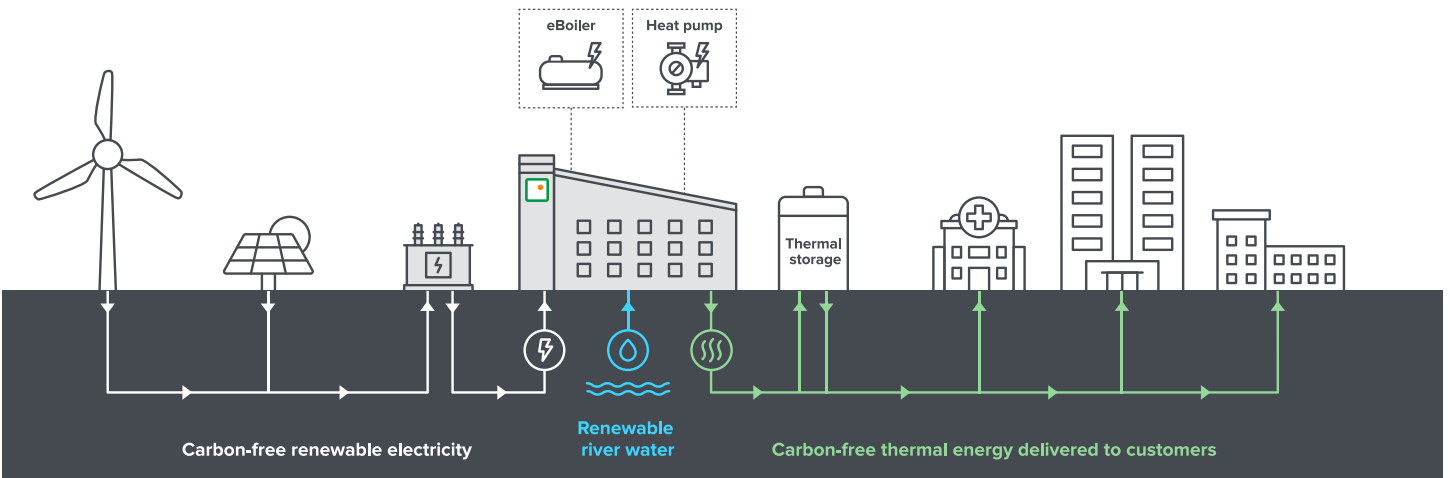
Vicinity’s electrification strategy also embraces extensive thermal storage facilities. Unlike traditional lithium battery storage systems, thermal storage leverages the favorable thermodynamics of molten salt or high-temperature substrate to store vast amounts of thermal energy efficiently. This approach allows Vicinity to “valley hunt” and “peak shave,” procuring green electricity during off-peak hours and storing it for periods of high demand. By strategically timing energy procurement and storage, Vicinity mitigates costs associated with peak demand periods, dramatically lowering customers’ average cost of renewable thermal energy.

Furthermore, connections to high-voltage substations and transmission-level electricity rates reduce local utility distribution constraints, ensuring a reliable and cost-effective supply of renewable thermal energy.

As Vicinity progresses with our three-pronged electrification strategy, marked by installing the first electric boiler in 2024 and installing an industrial-scale heat pump complex in 2028, the company stands as a beacon of innovation in North America’s energy transition.



Mock-up of part of the industrial-scale heat pump complex that is being developed to be installed at Vicinity’s Cambridge facility.



Customers benefit from carbon-free eSteam™ generated with renewable electricity.

Nationwide momentum: navigating the evolving landscape of environmental legislation

In response to the urgent need for environmental action, a collective effort is underway nationwide, involving policymakers, business leaders, and communities. The commitment to address the impacts of climate change is evident in both federal and local initiatives.

On December 8, 2021, President Biden took a significant step by signing the Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability. This [executive order mandates](#) net-zero emissions from federal operations by 2050, with an interim target of a 65% emissions reduction by 2030. The directive includes specific requirements for federal buildings, reflecting a commitment to advancing sustainability and combating climate change.

In tandem with federal standards, various states and cities across the U.S. are taking decisive action by enacting regulations to limit fossil fuel usage and combat climate change. In response, organizations increasingly prioritize sustainability measures and decarbonization strategies at the highest level to comply with the evolving legislative landscape.

The cities we operate in are actively implementing or exploring strategies to reduce emissions. However, the decarbonization journey is unique for each city we serve, presenting distinct challenges and opportunities.

Recognizing the diversity in decarbonization progress, we engage closely with policymakers to align with and influence the scope and pace of emissions reduction laws and local ordinances. Our commitment extends beyond compliance, focusing on actively shaping the legislative landscape in collaboration with local authorities.

By working within the unique context of each system, we aim to contribute meaningfully to the broader mission of achieving sustainable and resilient urban environments. As we navigate this dynamic legislative landscape, our partnerships and advocacy efforts are crucial in fostering a collective commitment to a greener and more sustainable future.

Our commitment extends beyond compliance, focusing on actively shaping the legislative landscape in collaboration with local authorities.

Tailoring tomorrow: customized decarbonization solutions across Vicinity's footprint

While the district energy systems owned and operated by Vicinity share commonalities across our footprint, the unique characteristics of each city necessitate a customized approach to our decarbonization roadmap. Recognizing the diversity in operational profiles, regulatory environments, available space, access to water, and other considerations, we are committed to tailoring our electrification strategies for each city we serve.

Our decarbonization journey involves a thoughtful blend of technologies, focusing on adapting to each location's specific needs and nuances. The key components of our customized approach include heat pumps, electric boilers, and thermal storage technologies strategically combined to optimize efficiency and sustainability. Leveraging these technologies allows us to address each city's distinct demand for decarbonized thermal energy.

In the following sections, we offer a deeper insight into our tailored decarbonization roadmaps, showcasing our commitment to providing localized solutions that align with the unique characteristics and challenges of the cities we serve. Our dedication to flexibility and adaptability remains paramount, ensuring we meet and exceed each community's expectations for sustainable and resilient urban environments.

Boston and Cambridge electrification roadmap

Electrification implementation

Vicinity is leading the charge in Boston and Cambridge with a phased plan to deploy heat pumps, electric boilers, and thermal storage—the first district energy system in the nation to introduce fully decarbonized thermal energy, known as eSteam™.

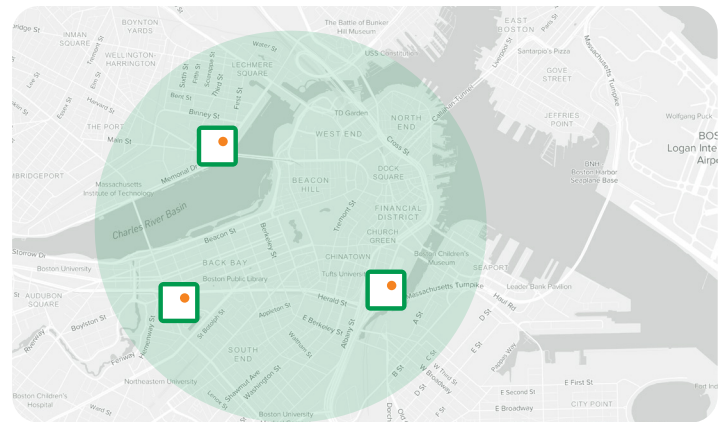
The 42MW electric boiler and 35MW heat pump are set to enter service at our Kendall facility in 2024 and 2028, respectively. This transformative phase positions Vicinity as a leader, leveraging carbon-free electricity, primarily from offshore wind power, to run the eSteam™ generating equipment. The near-term impact will significantly reduce carbon intensity and natural gas consumption, eliminating our reliance on fossil fuels.

Large-scale thermal storage is a critical component in optimizing energy procurement and distribution. The technology enables Vicinity to secure electricity during periods of excess renewable generation, storing it overnight when offshore wind production peaks. This stored energy will be strategically deployed during peak demand hours, enhancing the economic viability of eSteam™ for customers.

As the demand for decarbonized thermal energy grows, Vicinity commits to expanding electric boilers, heat pumps, and thermal storage capacity. We remain dedicated to exploring emerging technologies to offer customers the most efficient, reliable, cost-effective decarbonized solutions.

Building standards

Boston's Building Emissions Reduction and Disclosure Ordinance ([BERDO](#)), enacted in 2013 and updated as BERDO 2.0 in 2021, sets stringent building performance standards targeting net zero by 2050. Vicinity's



Illustrated map of Vicinity's service area in Boston and Cambridge. Reach out to our team of experts to explore eSteam™ for your building.

eSteam™ is recognized as emissions-free by BERDO 2.0 regulations, providing customers with a compliant and cost-effective solution.

Cambridge's Net Zero Action Plan aims for carbon neutrality by 2050, with the Building Energy Use Disclosure and Emissions Reduction Ordinance ([BEUDO](#)) setting requirements for net-zero emissions in commercial buildings. Additionally, Cambridge actively participates in a Massachusetts pilot program to ban fossil fuels in new construction or significant renovations.

The legislative and regulatory environment in Massachusetts, specifically in Boston and Cambridge, serves as a catalyst for aggressive decarbonization, creating a robust demand for Vicinity's eSteam™. Vicinity's pioneering approach allows customers to comply with local policies while ensuring reliability and reducing costs as opposed to the capital-intensive process of retrofitting and electrifying individual buildings. As these initiatives unfold, Boston and Cambridge set a precedent for other states and municipalities to follow, driving the nation toward a more sustainable future.

Philadelphia electrification roadmap

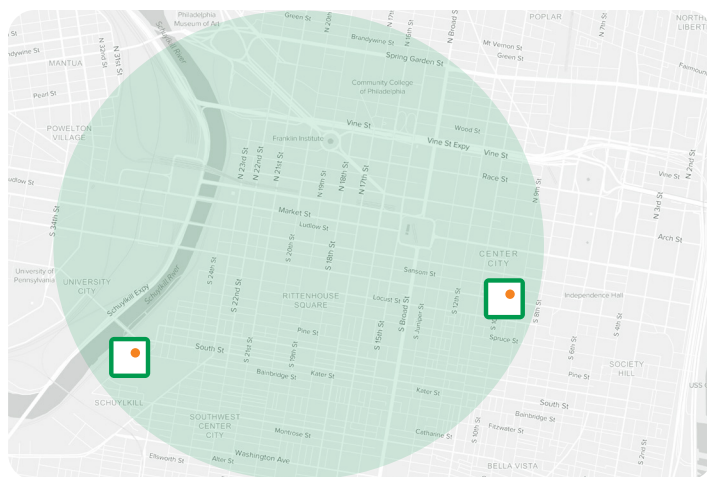
Electrification implementation

The engineering of our Philadelphia system's first 9MW electric boiler has commenced, targeting an in-service date of 2025. Leveraging the Schuylkill River's water intake infrastructure at our Grays Ferry facility, Vicinity plans to introduce large industrial-scale heat pumps, ranging from 37MW to 82MW, with the first installation expected in 2028. These heat pumps will tap into the 24/7 renewable power of the river, enhancing efficiency and baseload capabilities. The facility will also utilize large-scale thermal storage to optimize energy procurement and distribution.

In addition to electric boilers, heat pumps, and thermal storage technologies, Vicinity is exploring local projects like solar installations with electric vehicle charging and distributed thermal storage within customer facilities. We are committed to expanding the use of electric boilers and heat pumps over time to meet the growing demand for decarbonized heating. Vicinity is also actively pursuing emerging technologies such as RNG (Renewable Natural Gas) and hydrogen, collaborating closely with the City of Philadelphia.

Building standards

Aligned with Philadelphia's Greenworks Vision for a Sustainable Philly, the city aims for carbon neutrality by 2050. The Building Energy Benchmarking Ordinance, initiated in 2012, requires large commercial and multifamily buildings to submit annual energy and water usage reports. In recent advancements, the Building Energy Performance Program ([BEPP](#)), known



Illustrated map of Vicinity's service area in Philadelphia. Reach out to our team of experts to explore eSteam™ for your building.

as "Building Tune-ups," has been introduced. Covering non-residential buildings over 50,000 square feet, BEPP focuses on assessing building systems and proposing corrective actions to enhance energy and water efficiency. These small tweaks are anticipated to result in over 10% annual savings, reducing approximately 200,000 tons of carbon pollution. As cities like Philadelphia embrace bolder legislation and carbon regulation, the demand for Vicinity's eSteam™ is rising.

Vicinity's multifaceted approach in Philadelphia underscores its commitment to environmental stewardship, innovation, and collaborative efforts with local authorities to realize a sustainable and resilient future.

Baltimore electrification roadmap

Electrification implementation

Vicinity is actively assessing its facilities at BRESCO, Central Ave, and Saratoga St. for electrification in Baltimore. We are also exploring additional chilled water capacity in various locations across the city. Plans include pursuing district electrification, deploying double-ended heat pumps, and innovative technologies like RNG (Renewable Natural Gas) and hydrogen. Installing electric boilers at the Saratoga St. and Central Ave facilities is a key component of Vicinity's strategy for electrification in Baltimore.

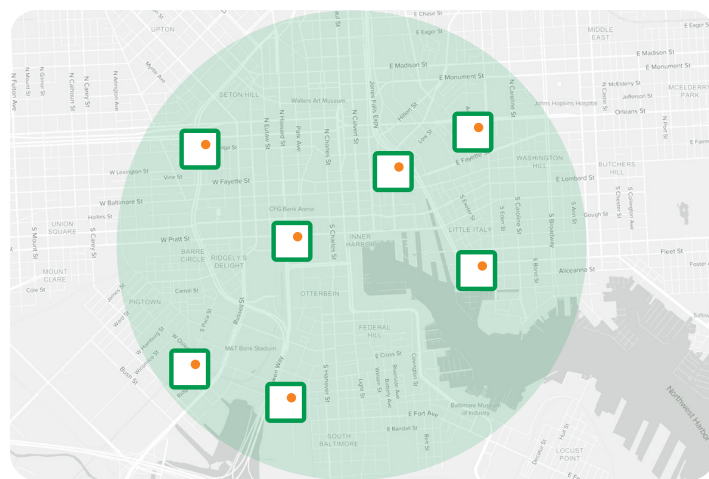
Building standards

The Maryland legislature's passage of the Climate Solutions Now Act in 2022 has set ambitious targets for greenhouse gas emissions reduction in the state. The Maryland Building Energy Performance Standards (BEPS) are central to this effort, which requires specific actions for buildings to reduce net direct greenhouse gas emissions.

Key provisions include: buildings covered by BEPS regulations, with a floor area of 35,000 square feet, must achieve a 20% reduction in net direct greenhouse gas emissions by January 1, 2030. By January 1, 2040, these buildings must attain net-zero greenhouse gas emissions.

The BEPS regulations encompass various building types, including warehouses, office buildings, multifamily housing dwellings, retail stores, and shopping malls. However, exemptions exist for buildings in financial distress, those with low occupancy, and multifamily dwellings participating in energy and emissions reduction programs.

The Climate Solutions Now Act [outlines specific](#) greenhouse gas reduction goals, including a 20%



Illustrated map of Vicinity's service area in Baltimore. Reach out to our team of experts to explore eSteam™ for your building.

reduction by 2030 (compared to 2025 levels), a 60% reduction by 2035 (compared to 2025 levels), and reaching net-zero direct carbon emissions by 2040. Owners of covered buildings must report their "direct greenhouse gas emissions" to the Maryland Department of the Environment starting in 2025.

Additionally, the Maryland Energy Administration (MEA) and the Public School Construction Program (PSCP) have collaborated on a Net Zero School Initiative, aiming to construct three new net-zero energy schools in Maryland. The Climate Solutions Now Act mandates that each local school district in Maryland builds at least one net-zero school by 2033. The Net-Zero School Grant Fund supports this initiative, offering school districts up to \$3 million to cover the cost difference associated with building a net-zero school.

Vicinity Energy is aligning its decarbonization efforts in Baltimore with these regulatory initiatives, ensuring compliance while contributing to Maryland's broader sustainable energy and emissions reduction goals.

Kansas City electrification roadmap

Electrification implementation

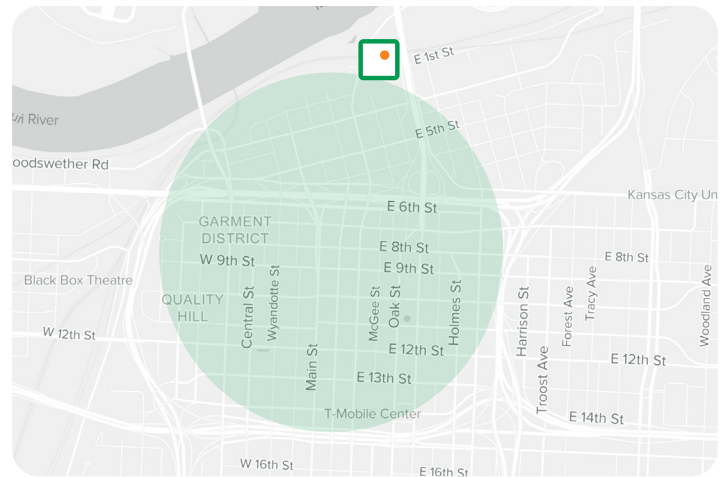
Vicinity's electrification plan for Kansas City is poised to capitalize on existing electric infrastructure and the synergistic co-location of steam and chilled water systems. The strategy involves installing decentralized heat pumps, introducing electric boilers, and optimizing waste resources to achieve a high coefficient of performance.

Additionally, Vicinity is exploring the adoption of the Energy Renewables Direct Green Tariff Offering or other renewable power purchase options. This multifaceted approach aligns with Vicinity's commitment to leveraging innovative technologies and sustainable practices to benefit Kansas City's energy landscape.

Building standards

Kansas City's proactive stance on sustainability is reflected in the 2022 Climate Protection and Resiliency Plan ([CPRP](#)), which outlines a comprehensive roadmap to achieve carbon neutrality by 2040. This visionary plan underscores the city's commitment to addressing climate challenges and building resilience against environmental risks.

As Vicinity embarks on its electrification journey in Kansas City, aligning with the city's CPRP ensures a synergistic effort towards shared sustainability goals. Vicinity contributes to realizing a net-zero carbon and resilient future for Kansas City by adhering to and collaborating with local standards.



Illustrated map of Vicinity's service area in Kansas City. Reach out to our team of experts to explore eSteam™ for your building.

Vicinity's electrification initiatives in Kansas City embrace cutting-edge technologies and align seamlessly with the city's broader vision for environmental stewardship and resilience. Through this strategic approach, Vicinity aims to be an integral partner in Kansas City's sustainable journey, fostering innovation and contributing to a resilient, carbon-neutral future.

Morgantown electrification roadmap

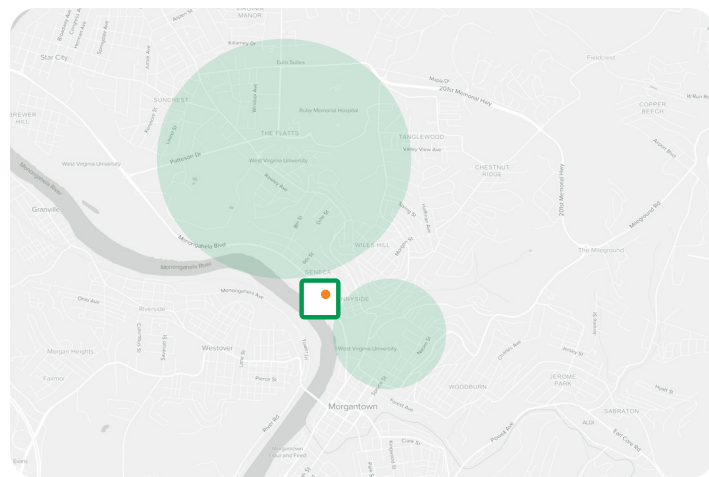
Electrification implementation

Vicinity Energy's strategy for decarbonizing our operations in Morgantown revolves around a comprehensive electrification plan. The plan encompasses the deployment of electric boilers, heat pumps, and thermal storage to transition the Morgantown operations to a more sustainable and environmentally friendly energy model. The strategic location of the system on the banks of the Monongahela River provides a unique advantage, allowing heat pumps to tap into the renewable power of the river and convert it into carbon-free steam.

Vicinity is also actively exploring the possibility of entering into a Virtual Power Purchase Agreement (VPPA) or other renewable power purchase options, demonstrating a commitment to maximizing the use of clean and green energy sources for the Morgantown system.

Building standards

Morgantown's commitment to environmental stewardship is underscored by a resolution passed in 2022, signaling a determined effort to reduce greenhouse gas emissions. The solution outlines specific targets, including a 28% reduction in greenhouse gas emissions by 2025 and a more ambitious goal of achieving a 52% reduction by 2030. The city has begun developing and implementing a Climate Action Plan to achieve these targets.



Illustrated map of Vicinity's service area in Morgantown. Reach out to our team of experts to explore eSteam™ for your building.

Vicinity's electrification roadmap for Morgantown aligns seamlessly with the city's sustainability objectives, contributing to realizing the greenhouse gas reduction goals outlined in Morgantown's resolution. By embracing clean energy technologies and aligning with local building standards, Vicinity aims to play a pivotal role in Morgantown's journey toward a more sustainable and resilient future.

Oklahoma City and Tulsa electrification roadmap

Electrification implementation

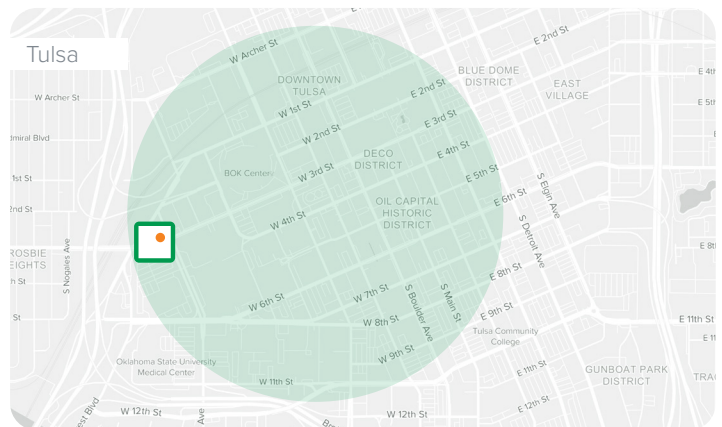
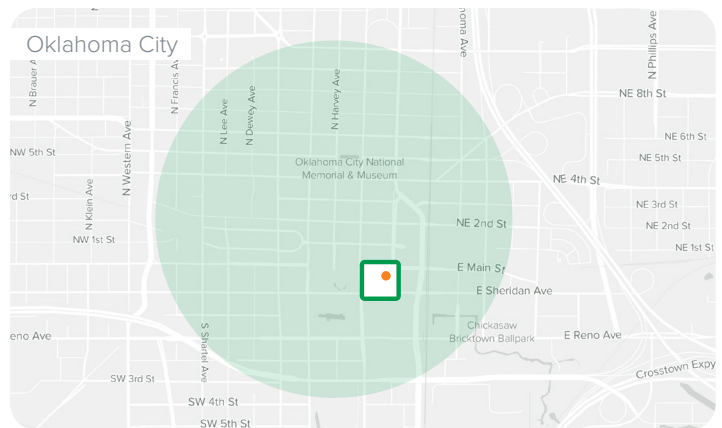
Vicinity's operations in Oklahoma City and Tulsa are set for a transformative shift toward sustainability through a strategic electrification plan. The existing hybrid steam and electric cooling facility, primarily fueled by natural gas for steam production, has already witnessed efficiency improvements by installing a back-pressure turbine generator to efficiently power in-house electric loads.

Building upon this foundation, we aim to electrify our Oklahoma City and Tulsa operations by incorporating electric boilers and double-ended heat pumps. This approach leverages the colocation of steam and chilled water systems, optimizing energy synergies. The regulated electric market provides an avenue for further greening the system, with options such as the OG&E Solar Program TOU and PSO Windchoice. Through this comprehensive electrification strategy, Vicinity seeks to align its operations with sustainable practices and contribute to reducing fossil fuel consumption in the region.

Building standards

Oklahoma's commitment to sustainable energy and environmental responsibility is evident in its 2021 State Energy & Environmental Plan. The plan outlines key goals, including maintaining a prominent position in conventional fossil fuel production, ranking among the top five producers of clean, renewable energy, and fostering a climate conducive to embracing new technologies and alternative fuels for environmental change.

Vicinity's electrification roadmap aligns seamlessly with Oklahoma's broader vision for sustainable energy. By embracing electrification technologies and



Illustrated map of Vicinity's service area in Oklahoma City and Tulsa. Reach out to our team of experts to explore eSteam™ for your building.

renewable power purchase options, Vicinity actively contributes to the state's objectives of maximizing renewable energy potential, exploring new technologies, and driving environmental change. Vicinity is poised to play a vital role in empowering Oklahoma's sustainable energy transformation through collaboration and innovation.

In pursuit of a greener and more sustainable future, our electrification initiatives in Oklahoma City and Tulsa align with the state's strategic goals.

Trenton electrification roadmap

Electrification implementation

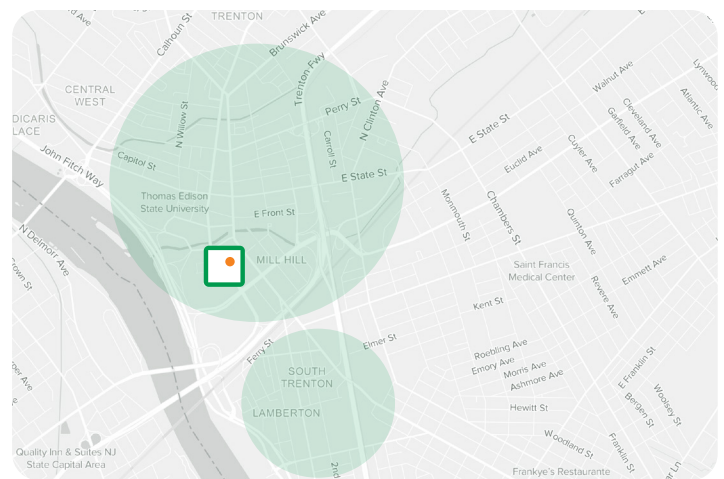
Vicinity's operations in Trenton are taking a multifaceted approach to achieving sustainability and reducing carbon emissions. The Trenton system's current fuel mix includes natural gas, oil, and electricity to power electric and absorption cooling systems. A significant step towards enhancing efficiency has been realized by completing an Optimum Energy efficiency project. This project involves implementing an operations control system that optimally dispatches various chilled water system components, including plant chillers, condenser water pumps, chilled water pumps, cooling tower fans, and the chilled water storage tank. This optimization maximizes the efficiency of the chilled water system, reflecting Vicinity's commitment to operational excellence.

Looking ahead, the electrification of our Trenton system involves the adoption of heat pumps for electrified steam production, marking a substantial shift towards net zero carbon emissions. The strategic evaluation of reciprocating engines for peak shaving, exploration of renewable or emission-free energy procurement options, and the potential addition of LR100, a biogenic fuel, into the fuel mix underscores Vicinity's dedication to exploring diverse avenues for sustainable energy solutions.

By embracing electrification technologies and renewable energy sources, Vicinity is a leader in pursuing a greener and more environmentally conscious future for Trenton.

Building standards

In alignment with the broader vision for a sustainable future, Trenton's building standards are shaped by executive orders issued by the governor. Executive



Illustrated map of Vicinity's service area in Trenton. Reach out to our team of experts to explore eSteam™ for your building.

Order No. 315 accelerates the schedule for clean energy adoption, aiming for 100% clean energy by 2035, a significant advancement from the previous target of 2050. Introducing a statewide Clean Energy Standard complements this ambitious shift, emphasizing the state's commitment to transitioning towards cleaner energy sources.

Executive Order No. 316 focuses on 2030, aiming to install electric space heating and cooling systems in many residential households and commercial establishments. This proactive strategy sets a goal for the transition to electrification in a specified number of low-to-moderate income (LMI) properties, ensuring inclusivity and accessibility in pursuing sustainable energy solutions. Vicinity's electrification roadmap for Trenton aligns seamlessly with these executive orders, contributing to the collective efforts to combat climate change and ushering in a new era of clean energy adoption in New Jersey. Through collaborative initiatives and innovative solutions, Vicinity is pivotal in realizing the "Next New Jersey" vision.

Grand Rapids electrification roadmap

Electrification implementation

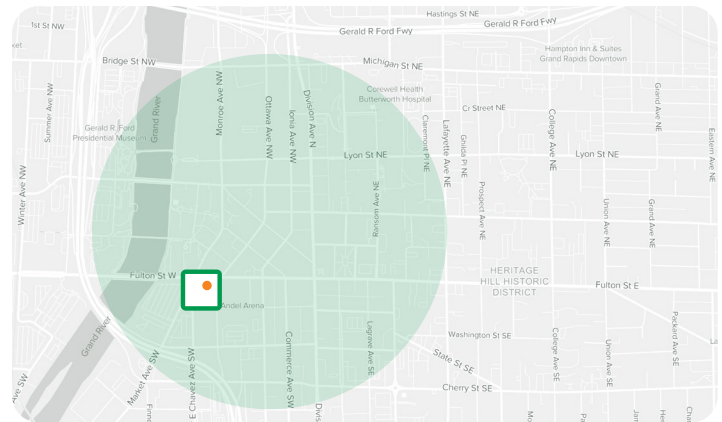
Vicinity's electrification strategy for Grand Rapids is grounded in a forward-thinking approach that aligns with the evolving landscape of energy procurement. While the system in Grand Rapids currently relies on natural gas, Vicinity is proactively positioning itself to become a regulated electric market participant. This strategic move will significantly enhance the procurement options for clean energy, offering a broader spectrum of choices to contribute to the reduction of carbon emissions.

The future expansion plans for Grand Rapids revolve around distributed electrification, leveraging existing systems that already benefit from distributed generation, and access to renewable resources. A key component of this expansion involves increasing the capacity of the Kent County Waste-to-Energy facility, a sustainable initiative that aligns with circular economy principles. This expansion addresses waste management and provides a valuable source of renewable energy.

The core of Vicinity's electrification plan for our district energy system in Grand Rapids includes the integration of electric boilers. This transition represents a significant step towards reducing reliance on traditional fuel sources and embracing cleaner, more sustainable alternatives.

Building standards

In accordance with Vicinity's commitment to sustainability, our electrification roadmap for Grand Rapids aligns seamlessly with Michigan's broader energy and climate goals. Governor Gretchen Whitmer's [Michigan Healthy Climate Plan](#), published in 2022, sets ambitious targets for the state, including economy-wide carbon neutrality by 2050.



Illustrated map of Vicinity's service area in Grand Rapids. Reach out to our team of experts to explore eSteam™ for your building.

The plan also outlines specific goals for reducing emissions-related heating by 17% by 2030 and emphasizes the expansion of electric vehicle (EV) infrastructure.

The legislative backing for clean energy in Michigan took a significant step forward with the signing of a clean energy package into law by Governor Whitmer in November 2023. This legislation establishes a 100% clean energy standard, mandating that all utilities source 100% of their electricity from carbon-free sources by 2040. The legislation defines renewable energy systems as encompassing facilities using renewable energy resources to generate electricity or steam.

Vicinity's electrification strategy for Grand Rapids is in harmony with these state-level initiatives and positions the district energy systems as key contributors to achieving these ambitious goals. By embracing electrification and renewable energy procurement, Vicinity is pivotal in driving the transition towards a cleaner and more sustainable energy landscape in Grand Rapids and beyond.



To take the next step in decarbonizing your building, contact our energy experts at www.vicinityenergy.us, or **email** info@vicinityenergy.us