Practical Decarbonization:

Balancing Energy Investments & Affordability

Moderator: John Ciovacco / *Aztech Geothermal & NY-GEO Board*

Panel: Brian Welsch / *National Fuel Gas*

Joseph Kessler / *NYPA*

Rachel Carpitella / *Wendel*

Richard Donnelly / *VGS*

National Fuel®

Targeting Cost Effective Solutions for Emissions Reductions

Brian Welsch, Vice President

National Fuel Gas Distribution Corporation

Who Are We?

National Fuel Gas Company

A diversified energy company rooted in reliable, innovative, and responsible energy delivery for over 120 years

Headquartered in: Williamsville, NY

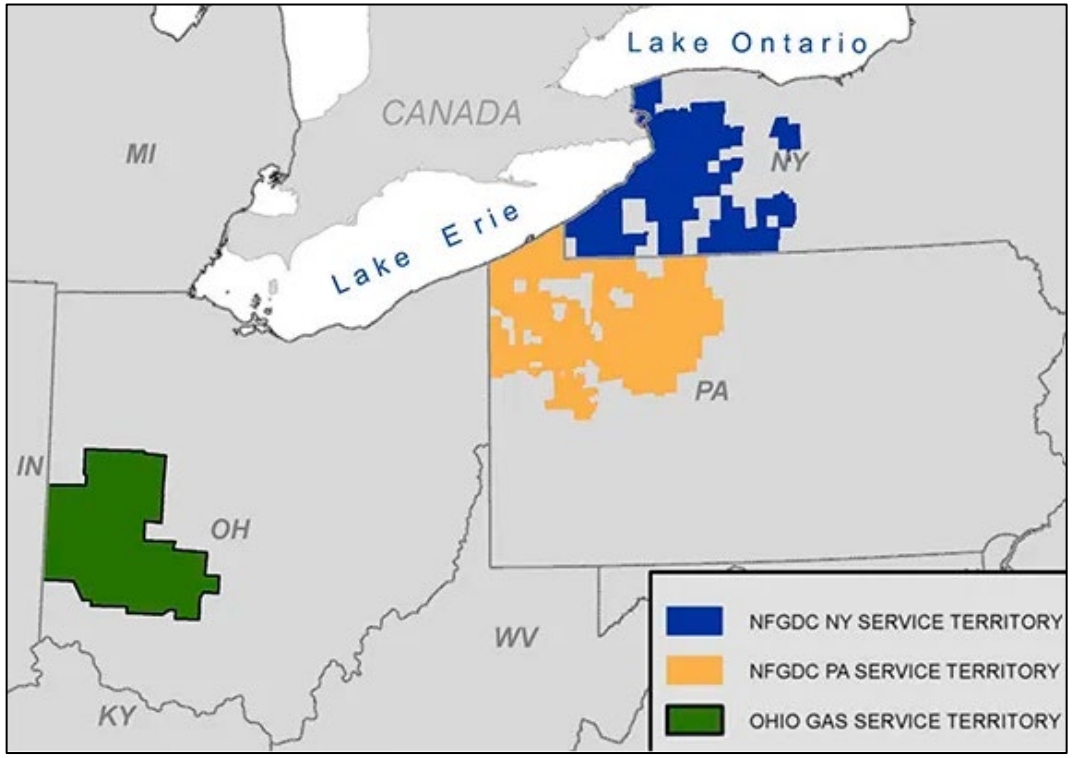
Founded: 1902

Core Segments:

- Exploration & Production
- Pipeline & Storage
- Utility Distribution

Customer Base:

Nearly 750,000 utility customers in Western New York and Northwestern Pennsylvania (and soon 335,000 customers in Southwest Ohio coming Fall 2026)



Regulated Utility Territories

Our Mission:

To deliver safe, affordable, and sustainable energy while driving innovation and value for our customers, communities, and stakeholders

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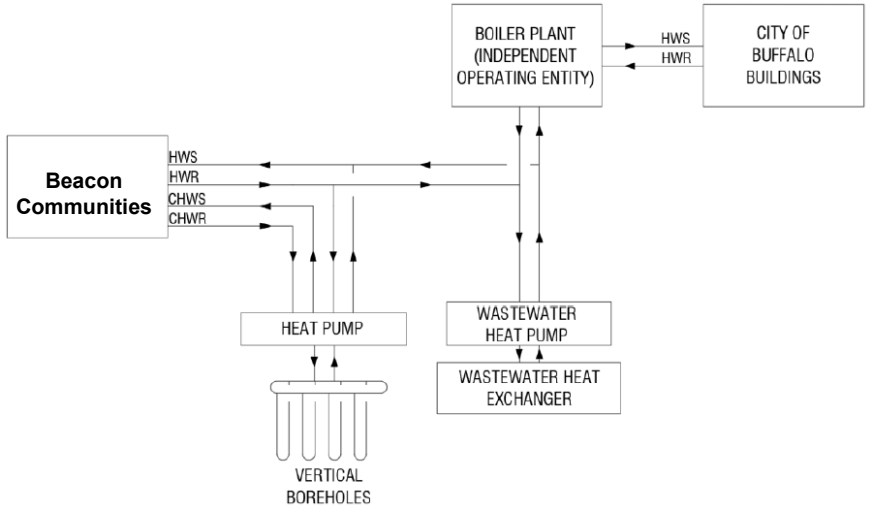
Buffalo District Heating Pilot UTEN Project

BEACON communities

1



Estimated Thermal Load:
Over 11,000 MMBtu/Yr
71.5% City of Buffalo & 28.5% Beacon Communities

Estimated Project Cost: $44.6 Million[2]

Additional Sewer Waste Heat Available for Future Connections

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1. Proposed National Fuel Gas UTENJA Project and Historical Buffalo District Heating System
2. Before Incentives and Rebates

The Continuing Role of Natural Gas

Natural Gas has a proven track record of being…

- Abundant
- Reliable
- Affordable
- Clean Energy *Enabler*

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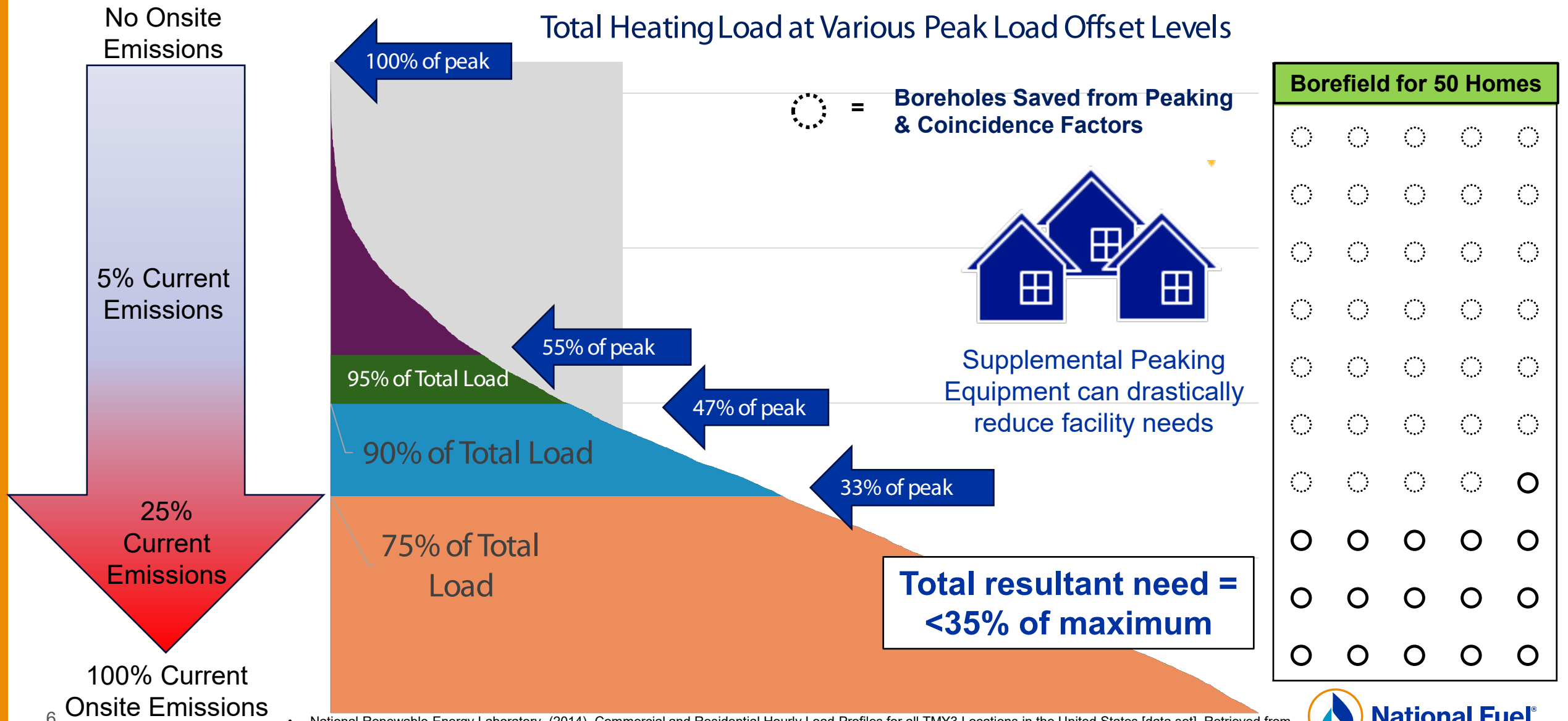
Clean Energy Enabler – Gas Fired Peak Shaving



- National Renewable Energy Laboratory. (2014). Commercial and Residential Hourly Load Profiles for all TMY3 Locations in the United States [data set]. Retrieved from https://dx.doi.org/10.25984/1788456.
- USA_NY_Buffalo-Greater.Buffalo.Intl.AP TMY3 Base

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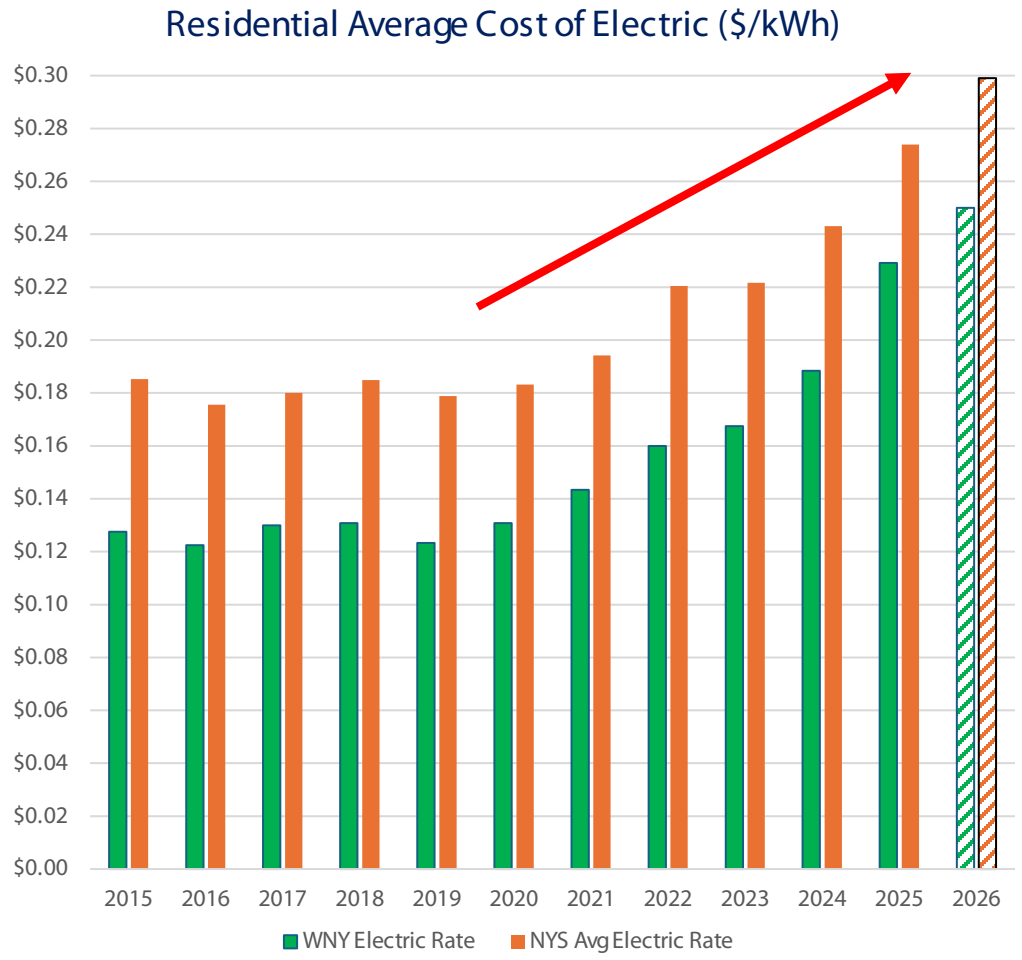
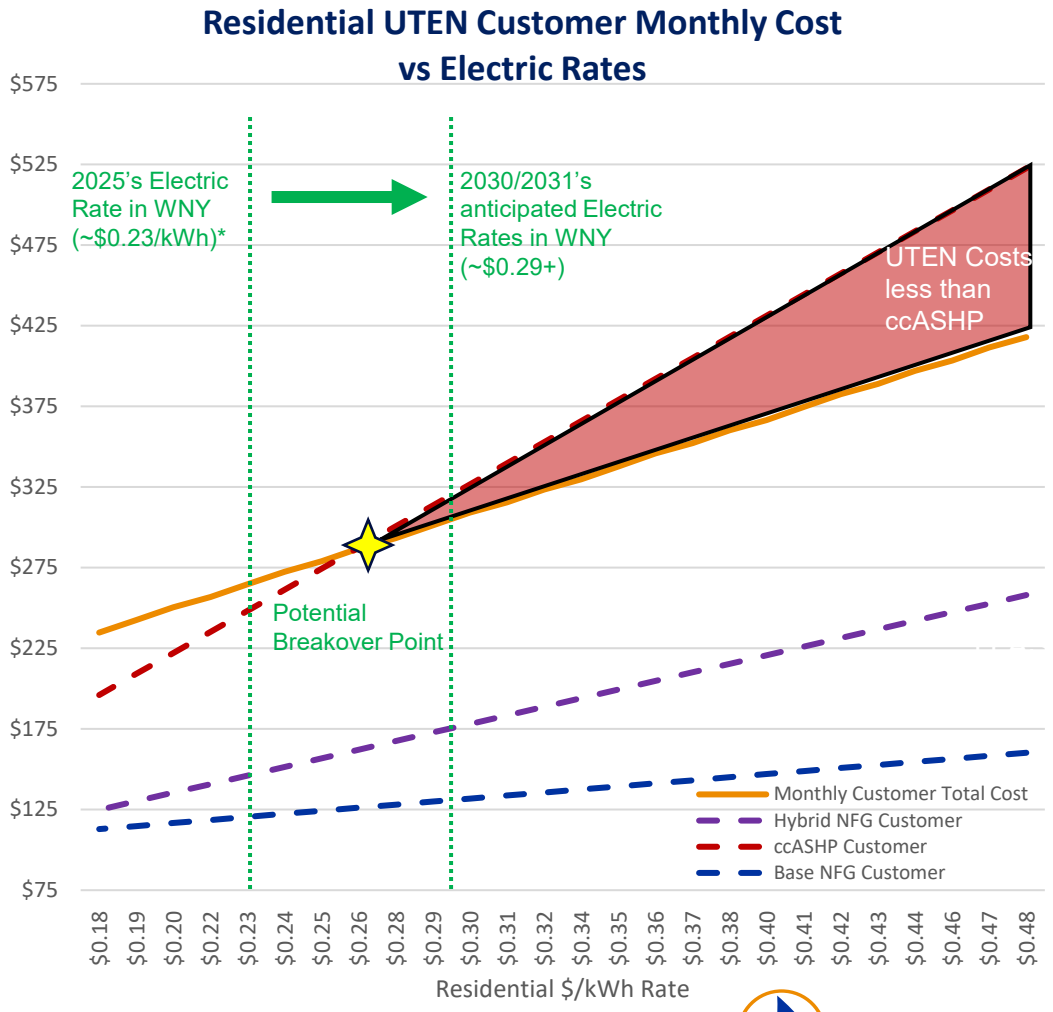
Electrification Economics





*Residential Electric Rate in WNY = $0.229/kWh, Twelve Month Average Ending 12/2025; Electric rate increases based on New York State 2025 Energy Plan

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NEW YORK STATE | NY Power Authority | Canal Corporation

03.25.2026

Practical Decarbonization: *Balancing Energy Investments & Affordability*

NY-GEO 2026

Joseph Kessler
EVP and Chief Operating Officer

NEW YORK STATE | NY Power Authority

VISION

A thriving, resilient New York powered by clean energy

MISSION

Lead the transition to a carbon-free, economically vibrant New York through customer partnerships, innovative energy solutions, and the responsible supply of affordable, clean and reliable electricity

NEW YORK STATE | NY Power Authority

NYPA by the Numbers

17
Generating Facilities

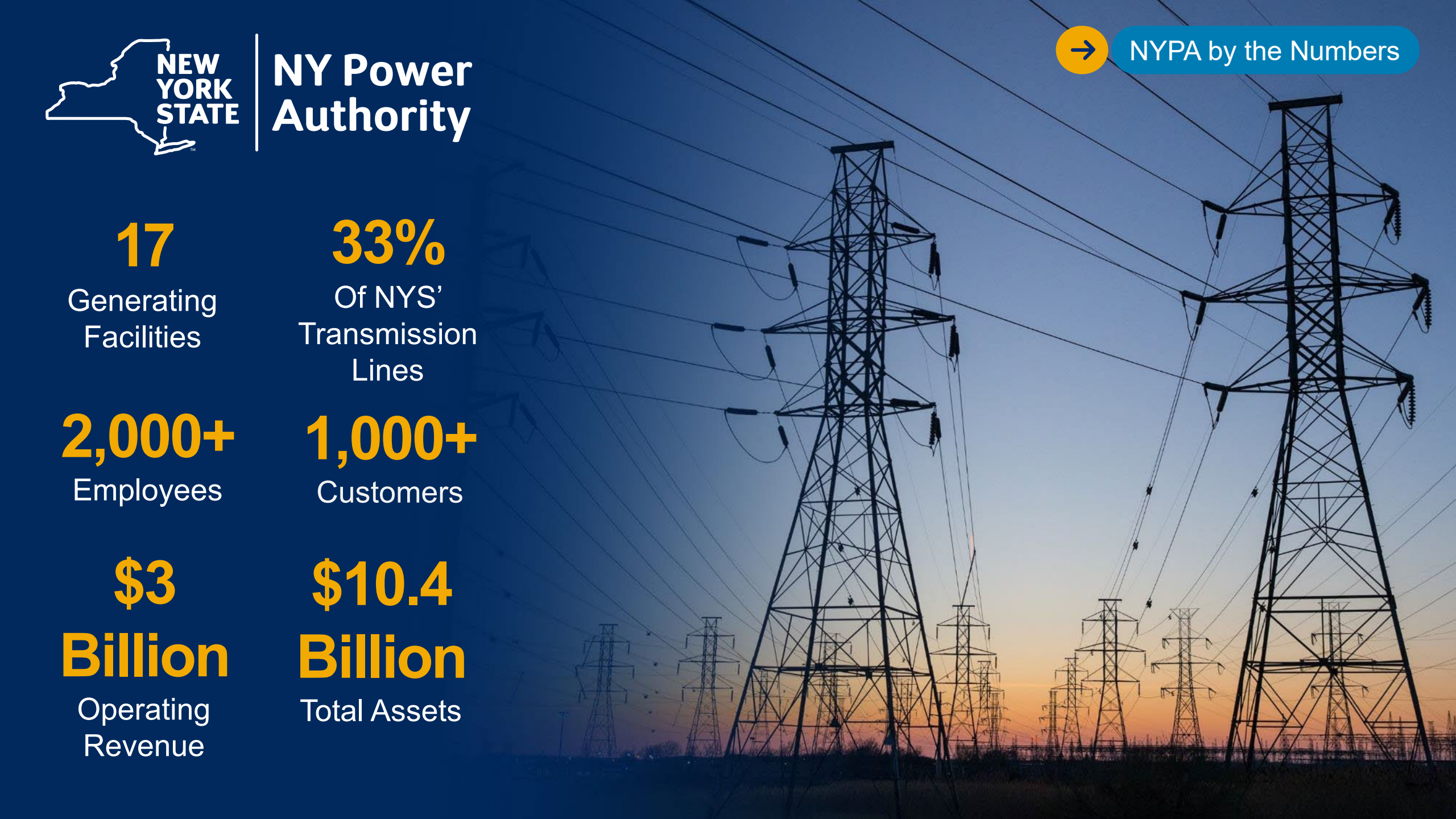
33%
Of NYS' Transmission Lines

2,000+
Employees

1,000+
Customers

$3 Billion
Operating Revenue

$10.4 Billion
Total Assets



NYPA customer programs drive New York's economy

1,000+
power & energy services customers

15%
of State's total electricity demand

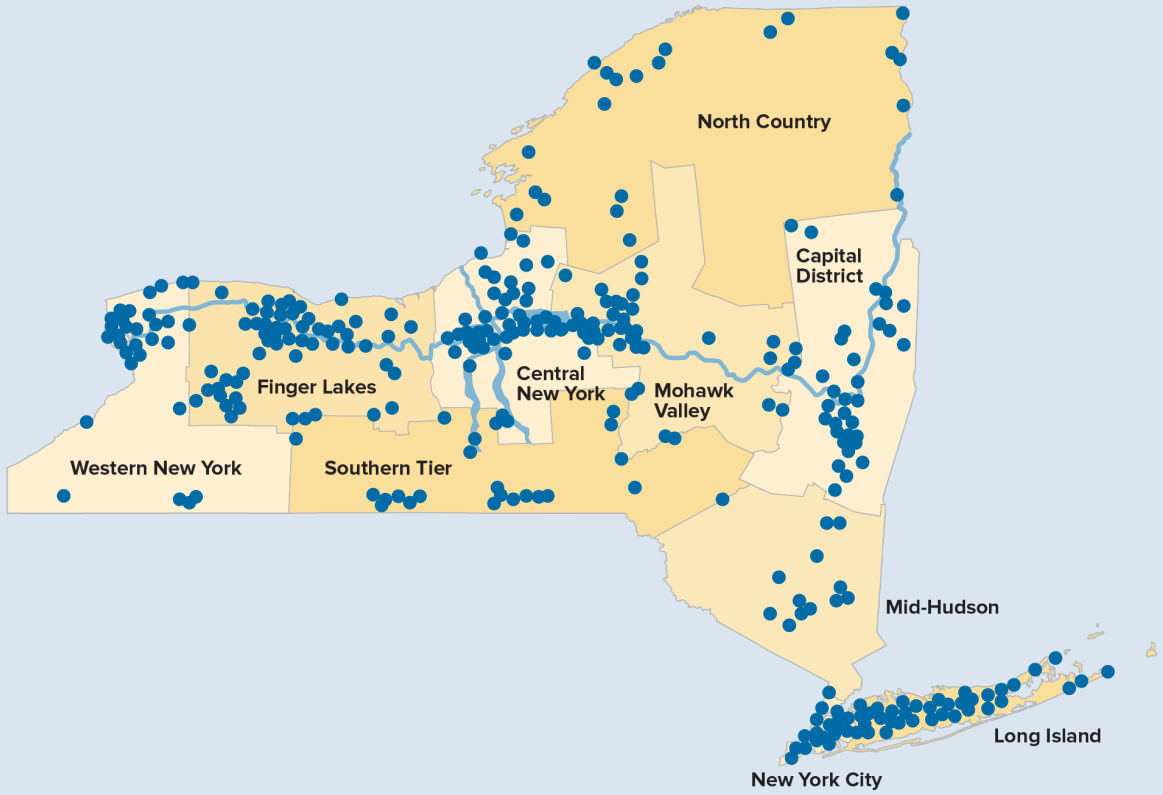
450K+
Jobs created and/or retained

$55B+
Capital committed in New York

Participating customers include:

Columbia University, CBS, GE, General Mills, Nestlé, Port Authority NY NJ, IBM, J.P.Morgan, Kraft, CUNY, Memorial Sloan Kettering Cancer Center, The New York Times, Verizon, Yahoo!

Customers



VISION2030 Renewed

STRATEGIC PRIORITIES

- Drive the **CLEAN ENERGY** transformation through emissions-free generation
- Be the leading **TRANSMISSION** developer, owner and operator for New York State
- Enable **CUSTOMERS** to achieve their decarbonization goals
- Revitalize the New York State **CANAL** System

FOUNDATIONAL PILLARS

- Uplift our **PEOPLE** and live our **VALUES**
- Support the diverse needs of the **COMMUNITIES** in which we operate and impact
- Build an **INNOVATION** ecosystem that accelerates customer and grid decarbonization
- Integrate **SUSTAINABILITY** into how we operate to drive value
- Strengthen our **RESILIENCE** for long-term viability

Forbes 2026 AMERICA'S BEST EMPLOYERS FOR ENGINEERS POWERED BY statista

Forbes 2025 BEST EMPLOYERS FOR NEW GRADS POWERED BY statista

Forbes 2025 AMERICA'S BEST MIDSIZE EMPLOYERS POWERED BY statista

Renewables

NYS FLEXIBLE BACKBONE

Accelerated development of renewable energy in New York State

Infrastructure Investment

GRID INVESTMENT & MODERNIZATION

Investments in new infrastructure and modernization of existing assets

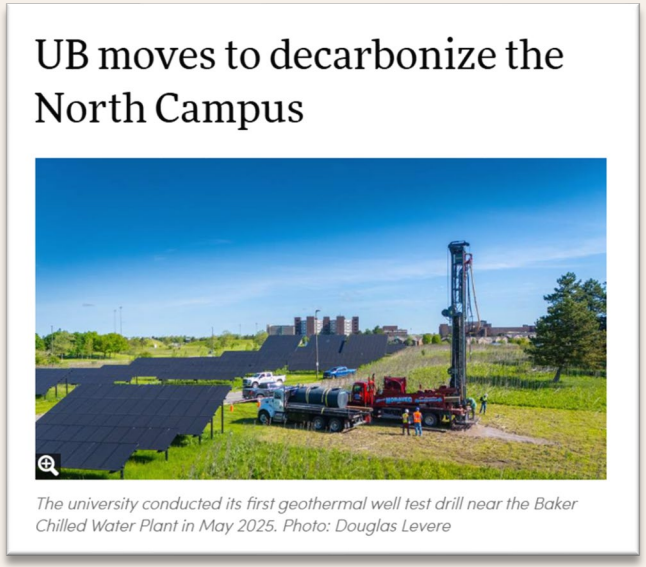
Asset Performance

DIGITAL INFRASTRUCTURE & ASSET MANAGEMNT

Investing in people, not just power – optimizing processes and digital infrastructure

New York State Decarbonization Leadership Program

- Evaluated all 15 facilities for the use of geothermal and thermal energy technology
- Feasible sites without existing geothermal systems or previous test wells received a test well and thermal testing at NYPA's expense
- Large geothermal and heat recovery project is now moving to the design phase for the University at Buffalo in partnership with NYPA

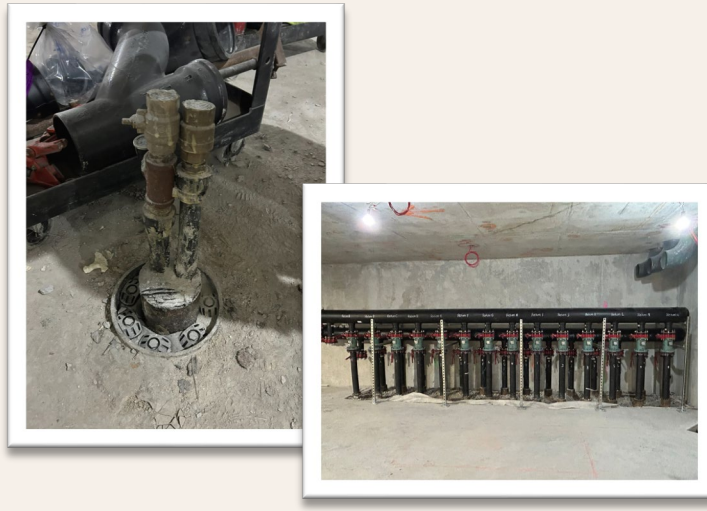


UB moves to decarbonize the North Campus

The university conducted its first geothermal well test drill near the Baker Chilled Water Plant in May 2025. Photo: Douglas Levere

New NYPA White Plains Headquarters Building

- Project is currently under construction; geothermal bore system is largely complete with testing underway.
- All Electric HVAC – closed loop geothermal heat pump system coupled with high performance air to water heat pump technology
- (141) 600-ft ground source wells, 243 tons heating capacity + additional 34 tons from air source boilers



NEW YORK STATE | NY Power Authority

Thank You

Practical Decarbonization: Phased Implementation & Energy Service Performance Contracts

Presenter: Rachel Carpitella

Date: March 25th, 2026

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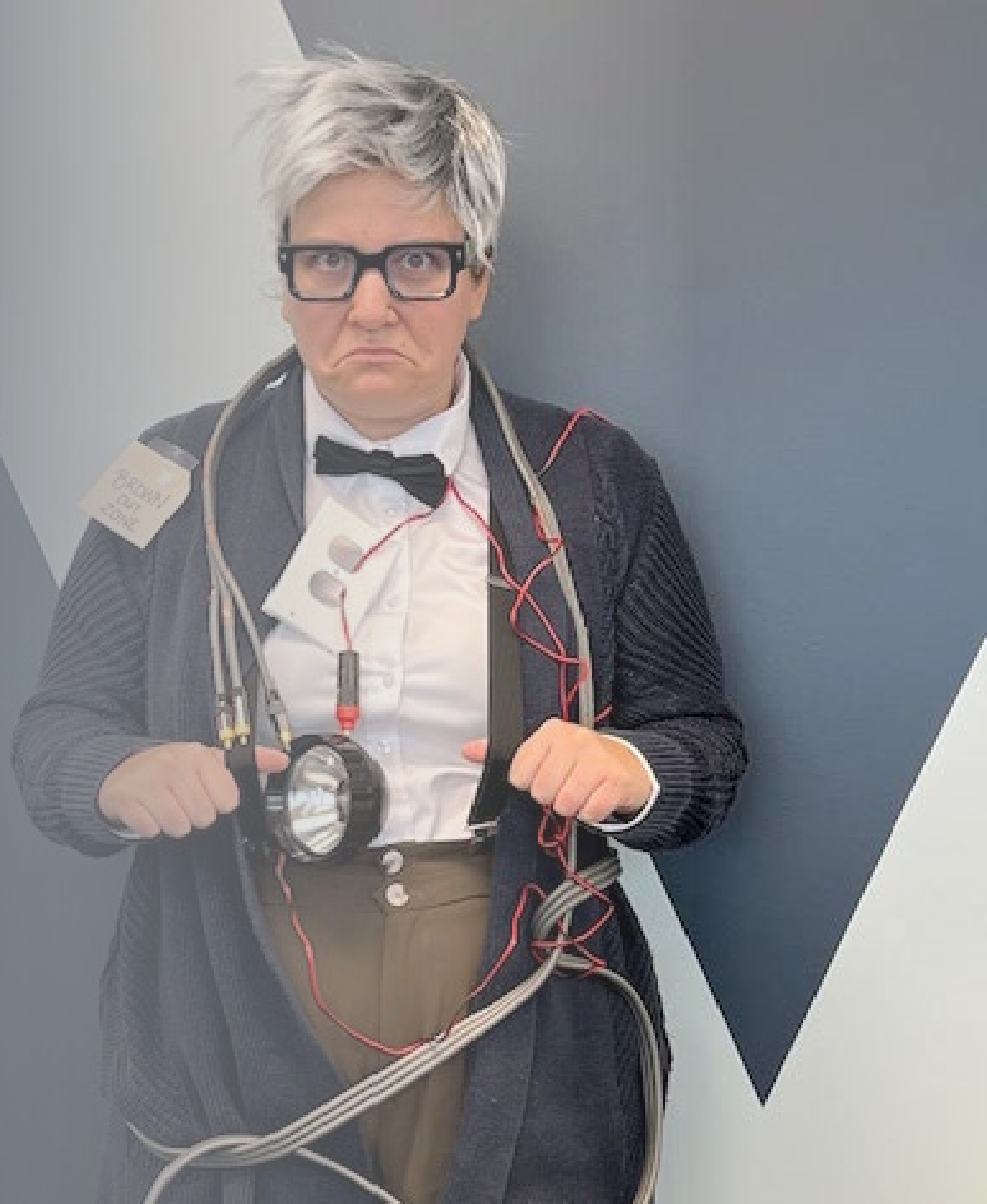
Grandpa Grid

Our Legacy Energy Infrastructure



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85 year-old

architecture, engineering, energy efficiency and construction management firm

4

Main practice areas

350+

Employees, nationwide.

15

Offices Nationwide

The Challenge: Decarbonization Must Be Practical

- Long-term carbon goals vs. near-term budget limits
- Competing capital priorities across public + institutional facilities
- Decision-makers need cost certainty, risk reduction, and clear sequencing
- “All at once” approaches can stall progress

Practical Path Forward

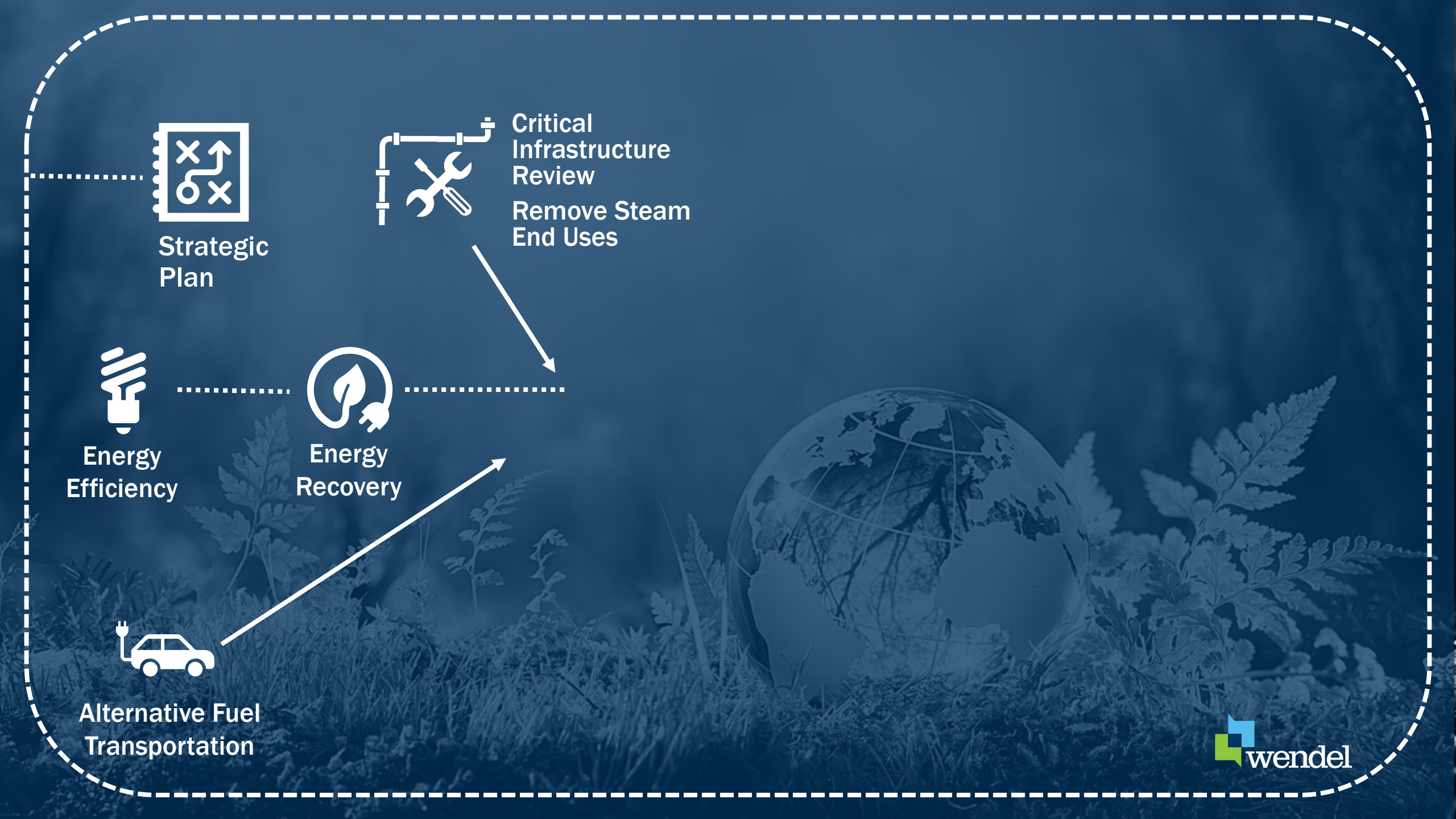
Phase 1: Efficiency + enabling infrastructure

Phase 2: System conversion (GSHP + heat pumps + controls)

Phase 3: Optimization + renewables

Phasing Benefits:

- Fits capital cycles
- Minimizes disruption
- Builds internal confidence
- Allows course corrections


Strategic Plan
Critical Infrastructure Review
Remove Steam End Uses
Energy Efficiency
Energy Recovery
Alternative Fuel Transportation
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Complicated Infrastructure Issue Solutions: Stony Brook University

Infrastructure Issues	Potential Solutions
Multiple Campuses	Different Solutions Campus Bases
~150 Buildings	Building by building solutions, stress testing
High Temp Hot Water	Convert to Low temp hot water
Steam generated Chilled Water	Convert to electric chilled water generation
Buried Piping	Replacement and /or GIS mapping of buried infrastructure with easier maintenance possibilities
Hospital	Battery Storage / Power Quality, isolation
Grid Power Unreliable	Use current technologies to address this, battery storage, thermal storage
High O&M Expenses	Solution should provide options for lower O&M expenses

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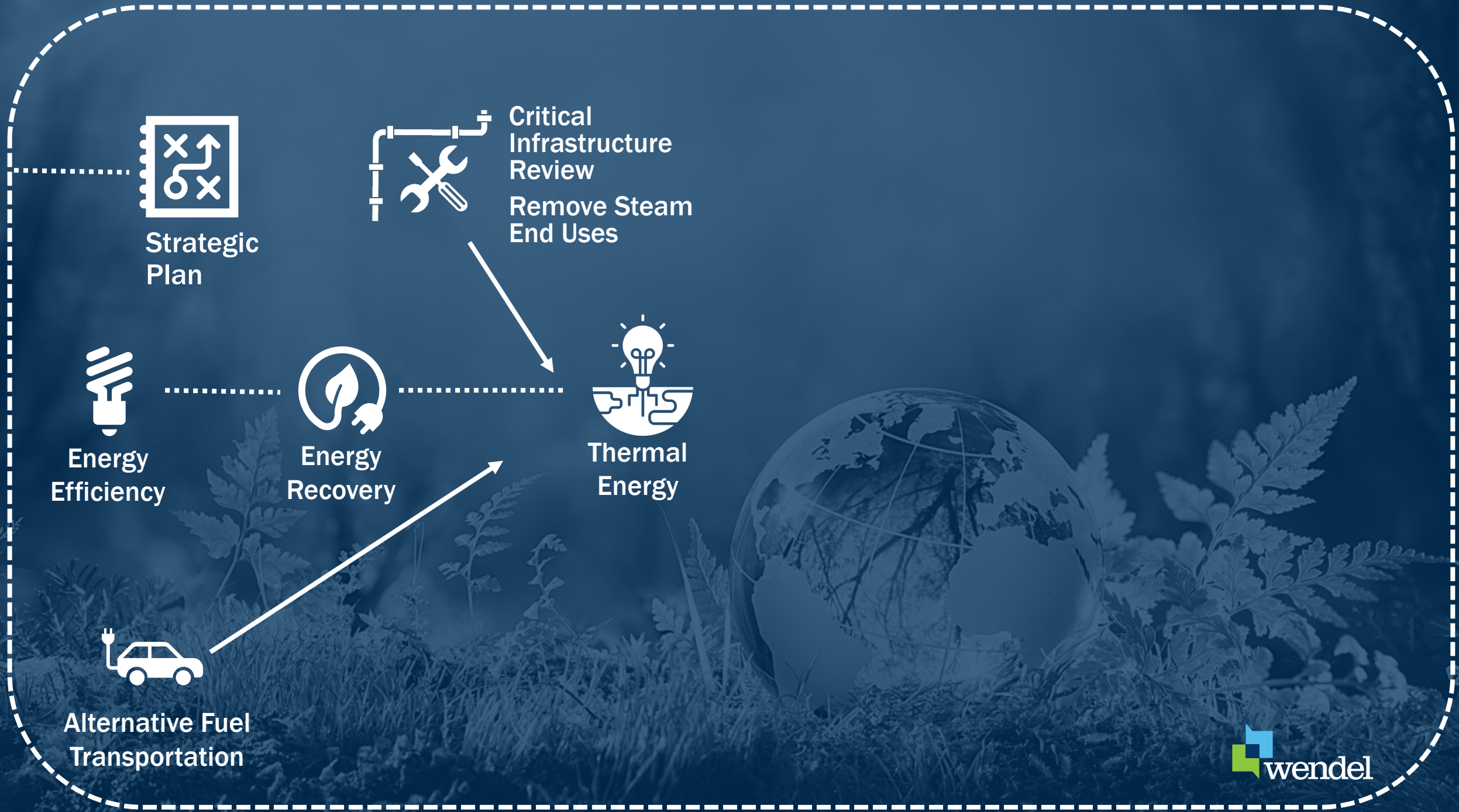
Strategic Plan
Critical Infrastructure Review
Remove Steam End Uses
Energy Efficiency
Energy Recovery
Thermal Energy
Alternative Fuel Transportation
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NYS Decarbonization Leadership Program

NEWS & EVENTS

Home » News » **Brooklyn College Breaks New Ground—Literally—in Statewide Push for Clean Energy**

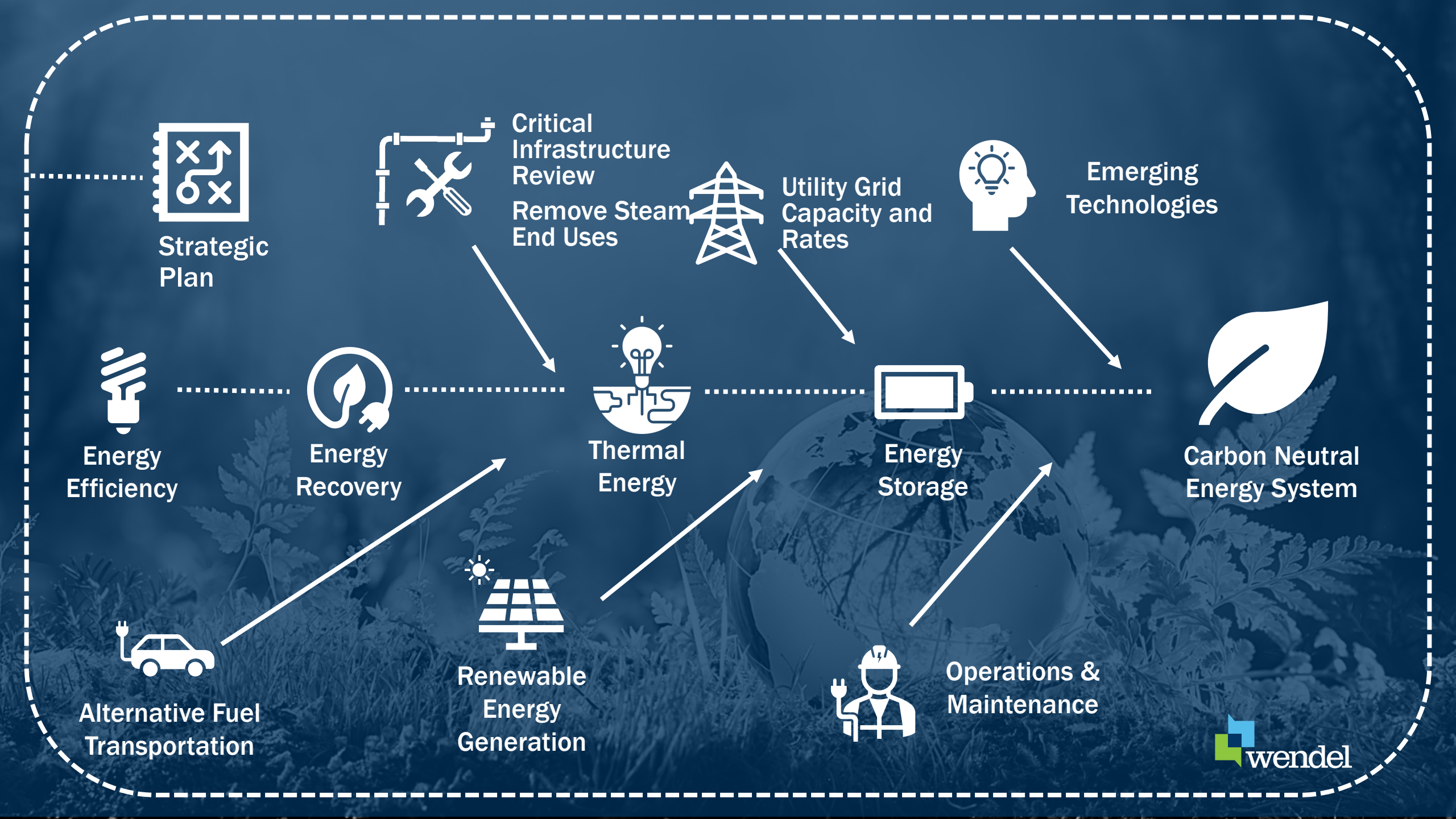
BC News

Brooklyn College Breaks New Ground—Literally—in Statewide Push for Clean Energy

By Richard Pietras |

6.9.25

Senior CUNY campus will explore the viability of geothermal energy systems as part of New York State's Decarbonization Leadership Program.


Strategic Plan
Critical Infrastructure Review
Remove Steam End Uses
Utility Grid Capacity and Rates
Emerging Technologies
Energy Efficiency
Energy Recovery
Thermal Energy
Energy Storage
Carbon Neutral Energy System
Alternative Fuel Transportation
Renewable Energy Generation
Operations & Maintenance
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Energy Performance Contracting

- Guaranteed performance
- Cost and schedule certainty
- Savings leveraged to fund improvements
- Supports enabling work and electrification

Phased + EPC = Actionable Decarbonization

CASE STUDY
Student Life Geothermal at a University in Ohio

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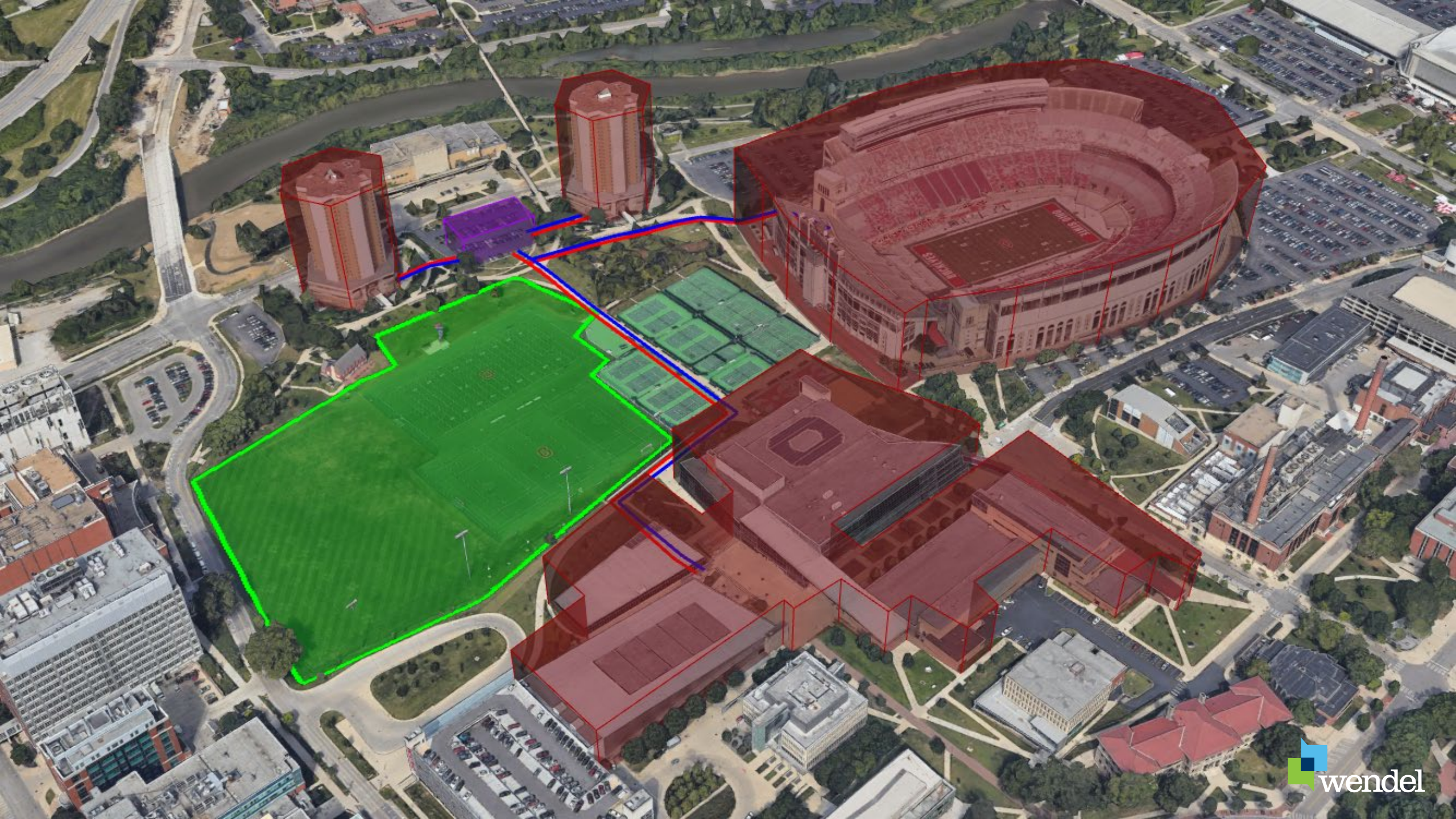
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Heat Pump Plant
• Quantity: 6
• Size: 400 Tons
• Style: Mag Bearing Heat Pumps
• Ref.: 513A
Gen 4 Distribution
• Low Temperature Hot Water
• Chilled Water
Geothermal Wells
• Quantity: 363 Vertical Wells
• Style: 550’ Vertical Wells
Option
• Quantity: 196 Inclined Wells
• Style: 800’ Inclined Wells

Project Scope

PROJECT | Geothermal Heat Pump Plant

STRATEGY
- Install a centralized heat pump plant
- Connect to existing and future bldgs.
- Install a geothermal wellfield

WELLFIELD
- 363 Wells
- 550’ Depth
- 2.4 Tons of capacity each (measured)

HEAT PUMP PLANT
- Six (6) 400ton Heat Pumps
- Heat exchangers
- Condensing Hot Water Boilers
- Pumps
- 6000 Amp 460V Electrical Service
- 230kVA Generator

DISTRIBUTION SYSTEM
- Hot Water 12” Dist. | 5,500 FT
- Chilled Water 12” Dist. | 5,500 FT
- Geothermal 20” Dist. | 1,100FT

FINANCIAL OVERVIEW
- Project Cost: $4.5M
- Payback: 14 years
- Annual Cash Flow: $292K

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architecture | engineering | energy efficiency | construction management

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Vermont Gas Services:

Navigating Policy, Affordability, Customers, & Growth

NY GEO March 2026
Richard Donnelly, Director of Innovation

A Little Background on Vermont Gas & Innovation

1966

VGS serves customers with affordable and reliable natural gas. Also leases, installs, and services natural gas equipment!

1992

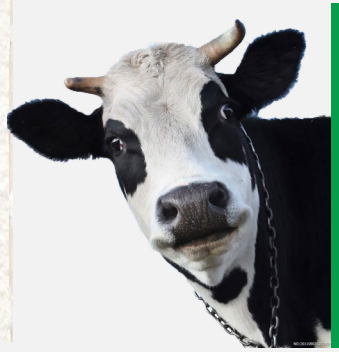
VGS provides thermal efficiency services to help customers save money, improve comfort, and reduce usage.

2016

VGS'S efficiency work takes a leap forward and VGS is designated one of three rate-payer funded energy efficiency utilities in the state.

2018

VGS is the first natural gas utility to offer customer renewable natural gas. In 2020 VGS begins to offer a second, "locally sourced" RNG option.



2022

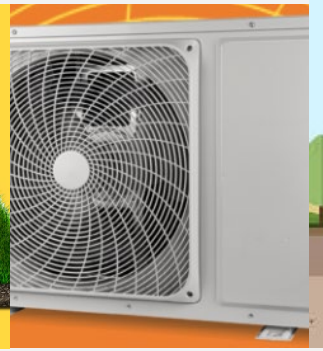
The Heat Pump program is launched with VGS installing, selling, leasing, and servicing heat pump water heaters.

2023

The Heat Pump program expands to include centrally-ducted heat pumps, providing customers with a dual fuel home heating and cooling solution.

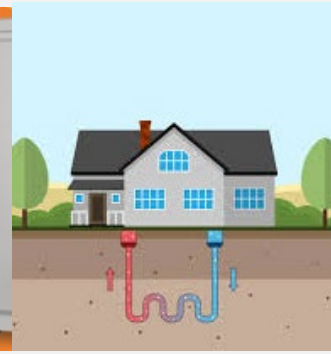
2024

Ductless Mini-Split heat pumps are offered. VGS now offers a heat pump solution for all residential customers.



2026...

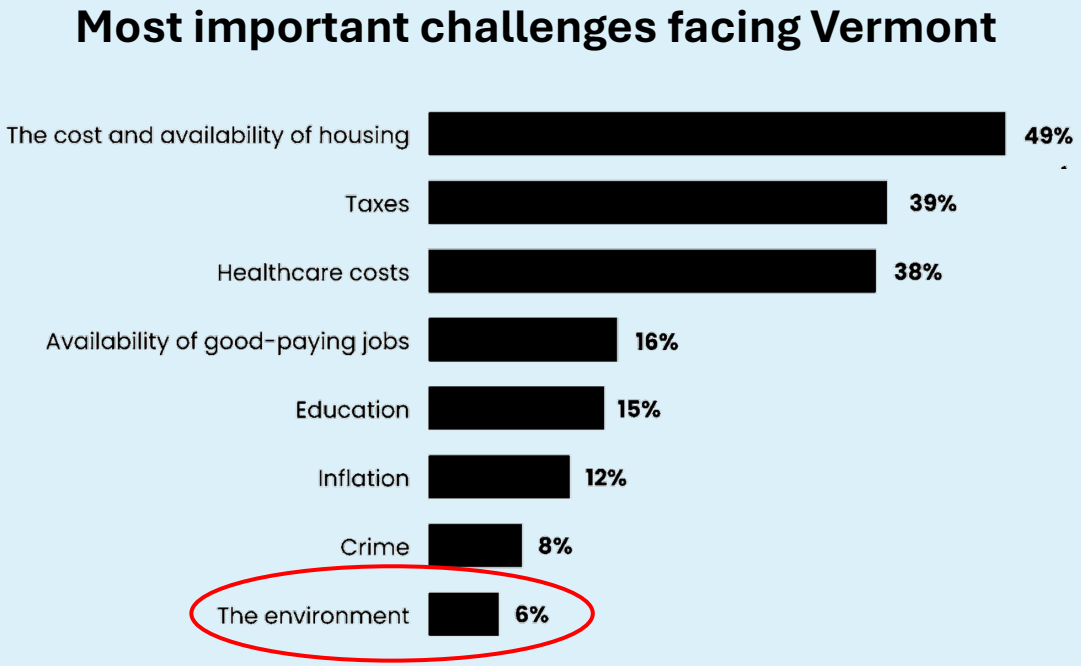
The first VGS community geothermal project.



The State of Vermont

- Vermont has a history of progressive energy policy
  - GWSA in 2020
  - Our largest communities restrict gas in new construction; others may follow
  - Clean Heat Standard: B. 2022 D. 2025

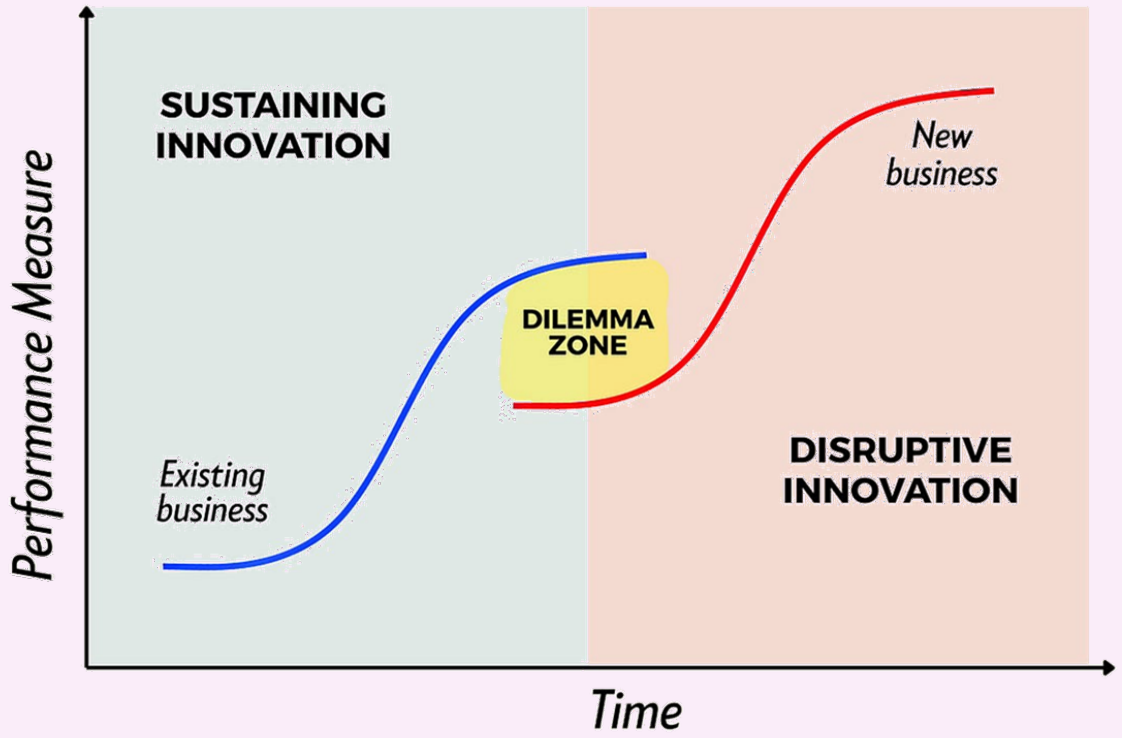
- **However, affordability has emerged as the #1 concern in the state**



https://www.letsbuildhomes.org/news/2026-02-25-lbh-housing-poll/

The State of Vermont Gas

- VGS is an active participant in carbon policy discussions, headwinds or tailwinds
- VGS unlikely to extend NG system
- Over last 5 years we have begun to diversify our services & revenue
- With diversification VGS seeks optionality: investments that meet our customers needs, help mitigate rate pressure, and work in any policy scenario
  - Hybrid heating for existing homes Vermont
  - Geothermal for new homes



Thank you!

Richard Donnelly, Director of Innovation
rdonnelly@vermontgas.com

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