
MT2030
CLIMATE
SUMMIT
SUN VALLEY 26
PRESENTED BY TORUS

MT2030 CLIMATE SUMMIT · SUN VALLEY
10.14.2026

The Mountain Town TENs Playbook

Why TENs? | What is a TEN? | Where does it make sense? | How does a community get started? | Best Practices

Megan Lim and Matt Garlick

The GreyEdge Group



01

Why TENs?



Community Impacts

Cleaner Air

Cuts emissions and improves local air quality for residents and visitors alike.

Stable Energy Costs

Stabilizes long-term energy costs, shielding the community from volatile utility markets.

Sustainability Leadership

Positions municipality as a regional and national leader in clean energy innovation

Phased, Flexible Redevelopment

Enables scalable, phased redevelopment that grows with the community's needs.



Who benefits and how?

Municipal Government

Communities and Residents



Developers and Project Owners

Gas and Electric Utilities

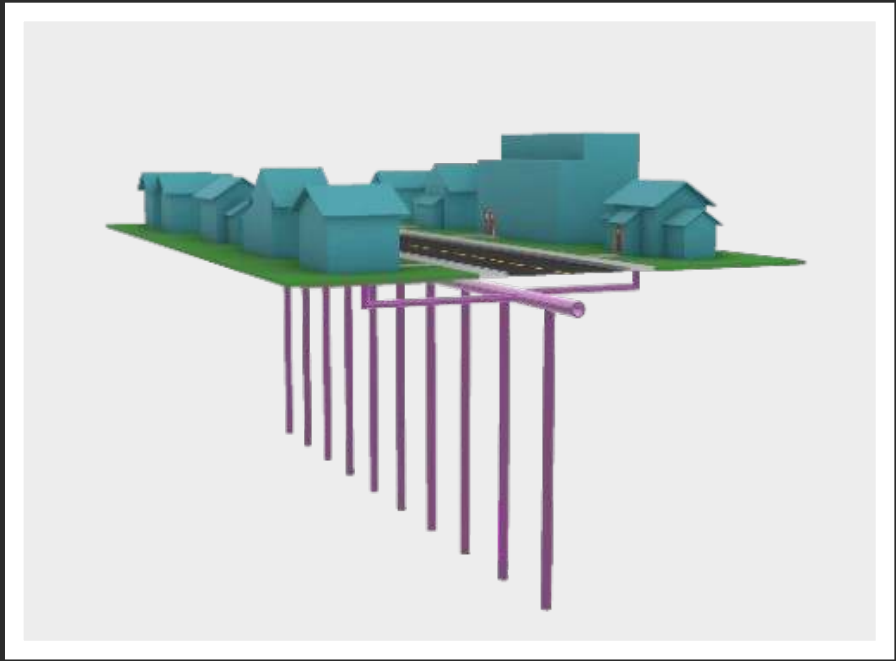
Water and Wastewater Utilities

Hospitality

the GreyEdge group

02

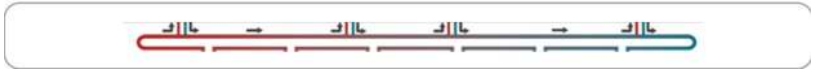
What is a TEN?

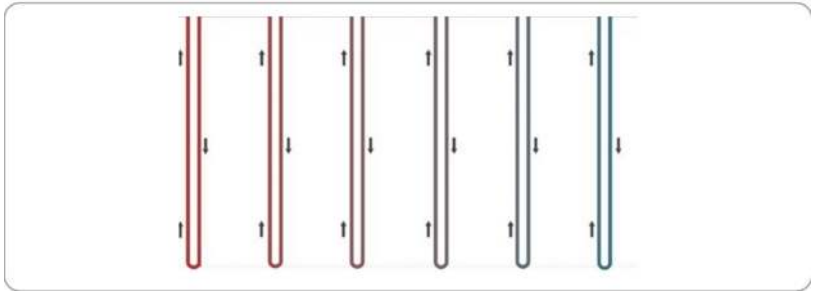


the GreyEdge group

What is a thermal energy network?







Adapted from HEET and MIT D-Lab

1. BUILDING LOADS

TENs “share” building loads via distributed heat pumps

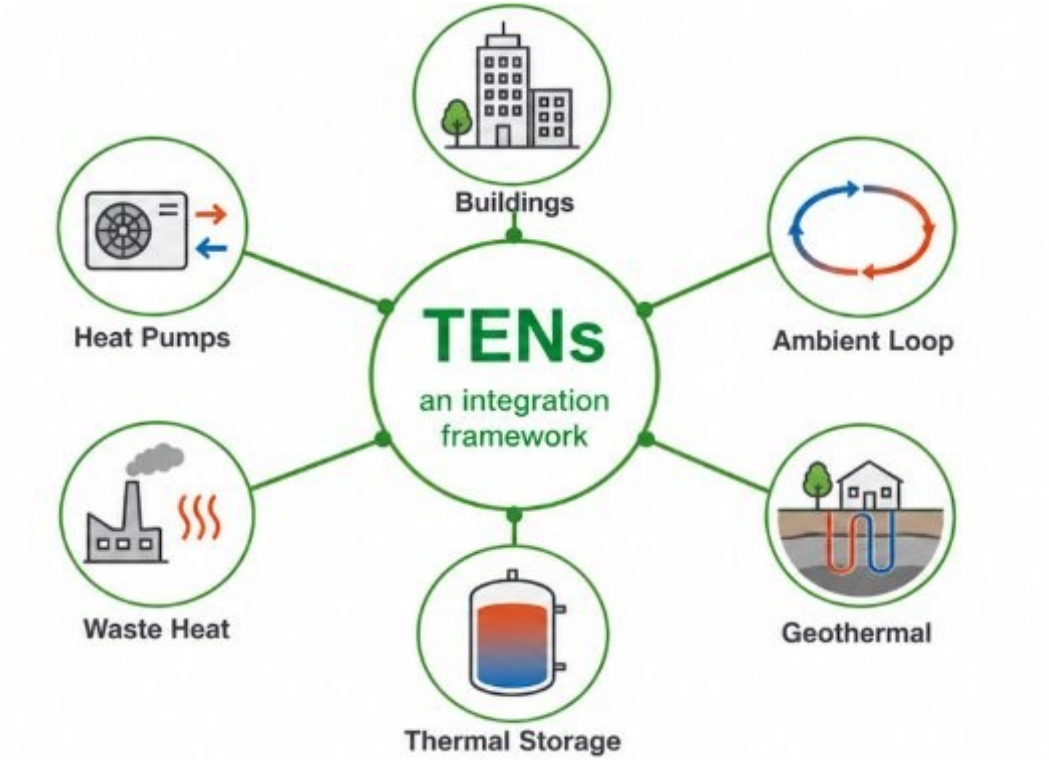
2. AMBIENT LOOP: 45°F – 95°F

Connects distributed heat pumps and thermal assets, such as…

3. ENERGY SOURCES / SINKS / STORAGE

- Waste heat recovery (ie system diversity)
- Geothermal boreholes
- Lakes, rivers, ponds
- Piped water network
- Wastewater pipes
- Other potential assets…

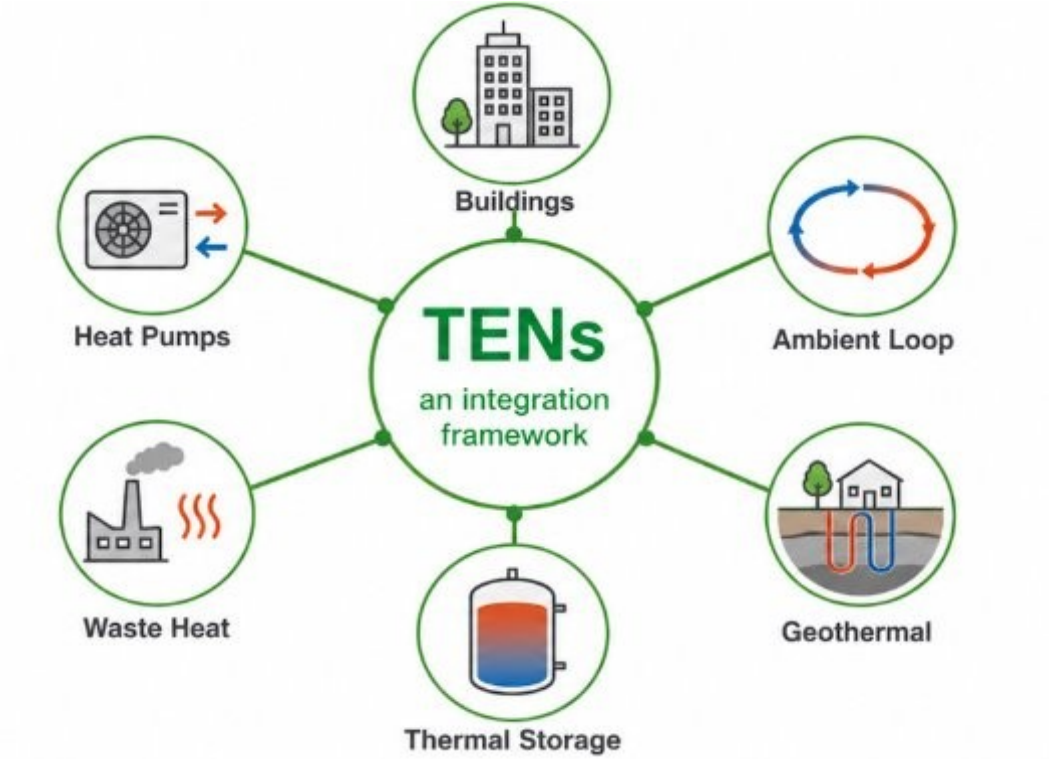
Advancing Thermal Systems: A Paradigm Shift



TENs are a way of thinking that connect existing technologies that already work by themselves

Source: Geo@MIT

Advancing Thermal Systems: A Paradigm Shift



TENs are a way of thinking that connect existing technologies that already work by themselves

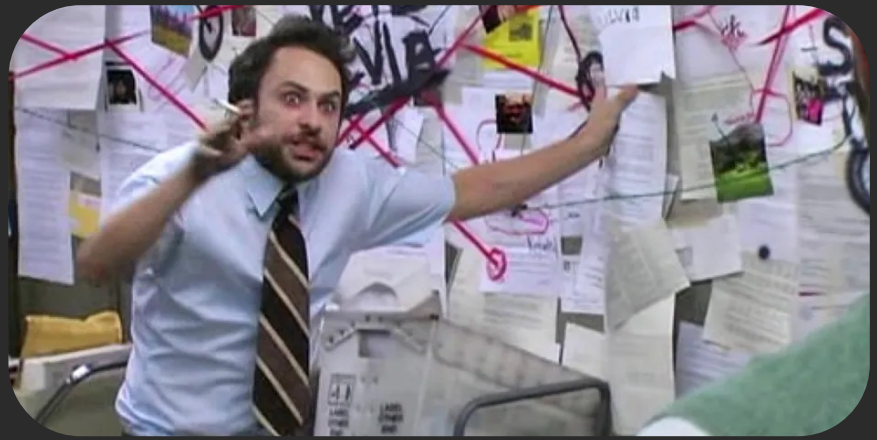
Mountain Towns are leading the way!

Source: Geo@MIT

03

Where does a TEN make sense?

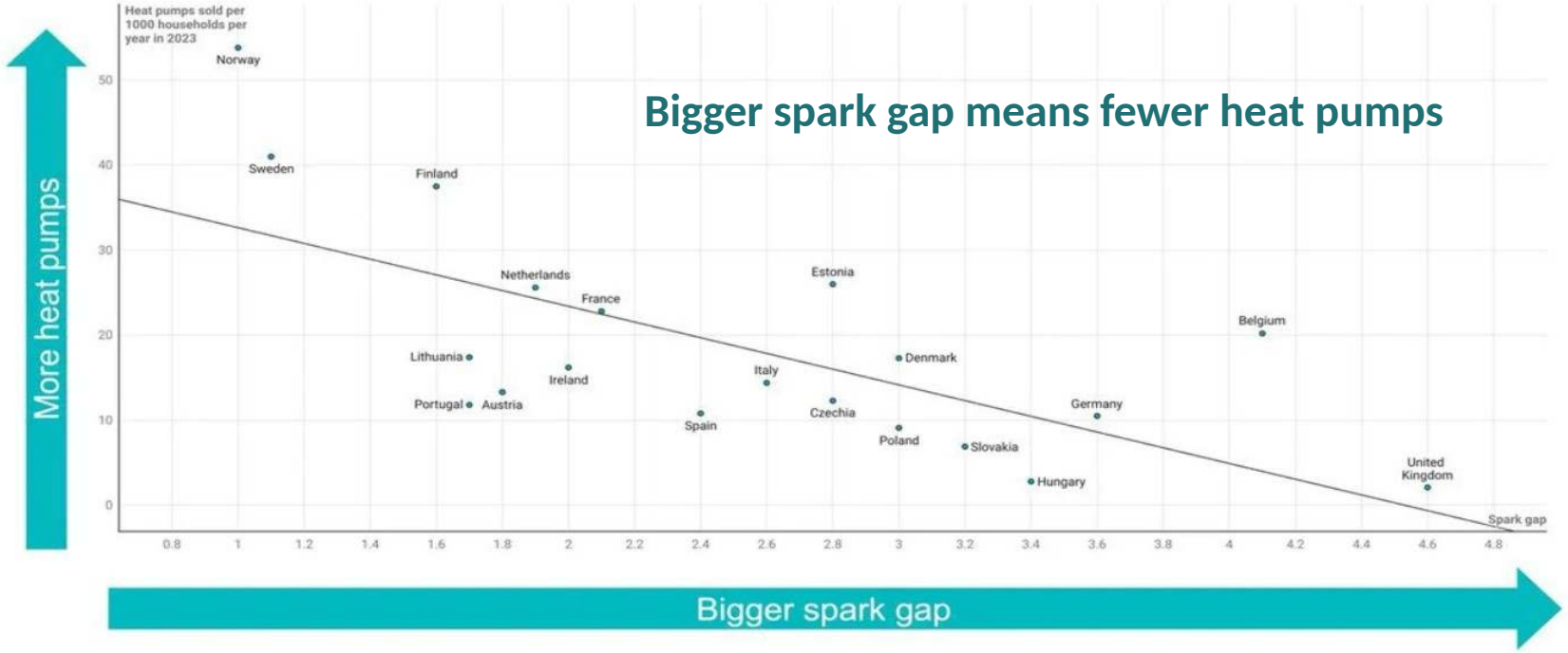
1. The Spark Gap
2. Which Buildings To Connect
3. Non-Pipeline Alternatives
4. Multi-Source Potential



the GreyEdge group

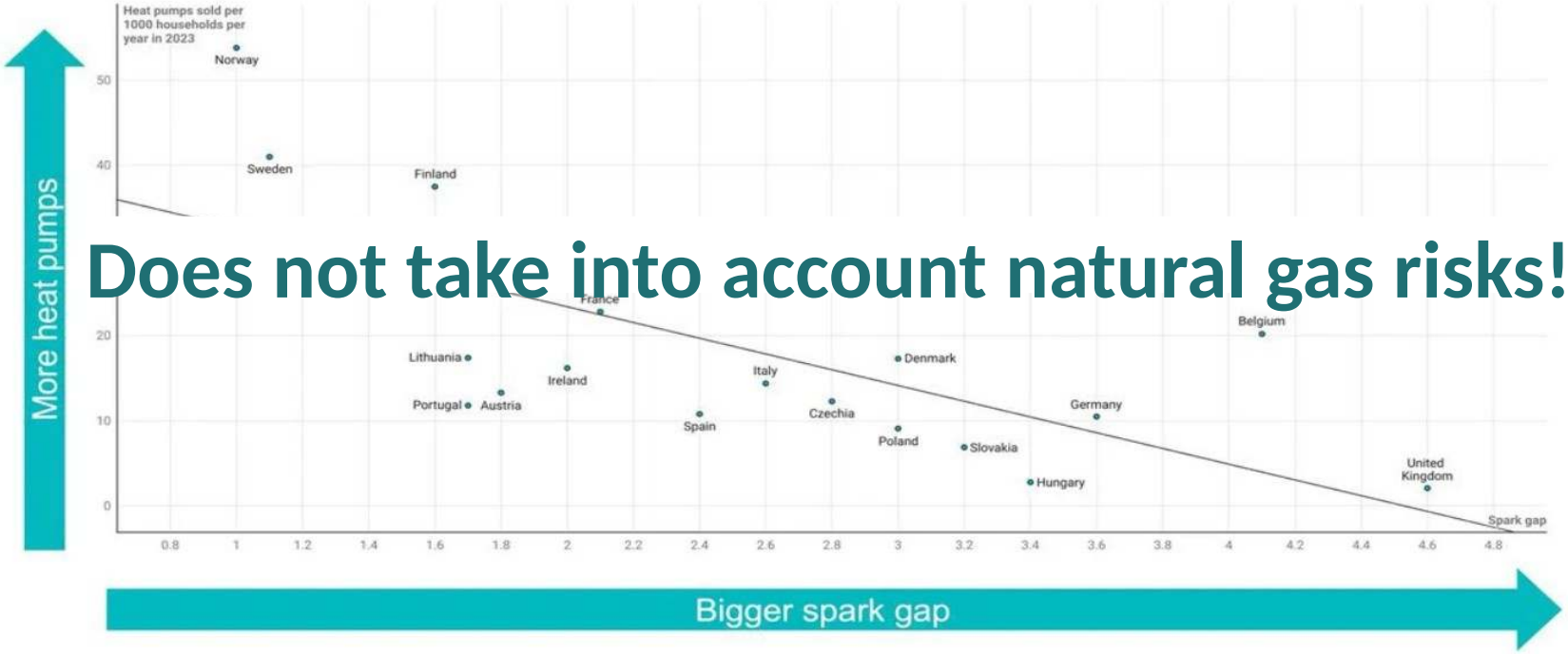
1. Competing Energy - The Spark Gap

⚡ **Spark Gap** ⚡ **=** (cost of electric BTU) / (cost of natural gas BTU)



1. Competing Energy - The Spark Gap

⚡ **Spark Gap** ⚡ **=** (cost of electric BTU) / (cost of natural gas BTU)



Does not take into account natural gas risks!

Balancing Value vs First Cost

Reducing First Costs

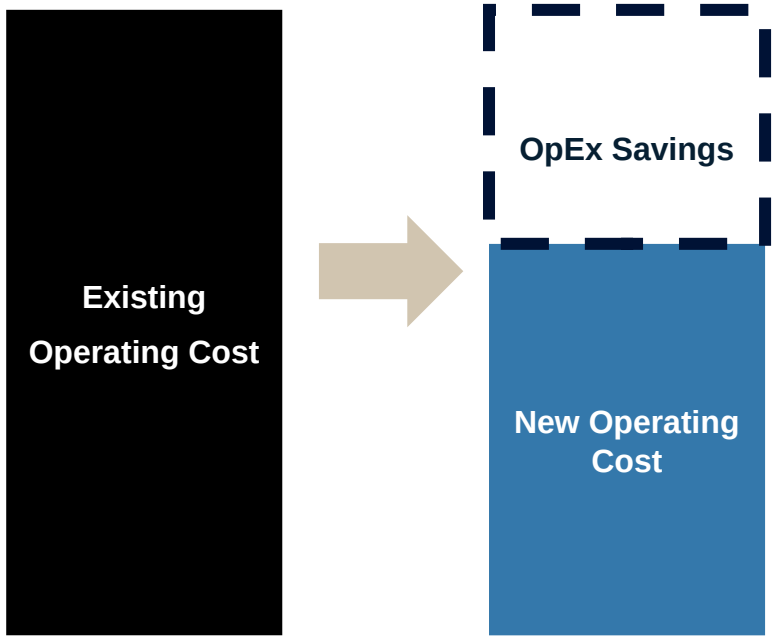
1. Federal Tax Incentives
2. State Grants and Credits
3. Utility Incentives
4. Least Cost Path to Design



Balancing Value vs First Cost

Recognizing Value

- Reduced utility and maintenance costs
- Added cooling
- Alignment with emissions reductions targets
- Reduced demand on electric infrastructure
- Avoided gas infrastructure
- Improved air quality
- Rapid, equitable transition to clean energy
- Local energy resilience
- Avoided risk from natural gas death spiral



2. Which Buildings to Connect?

Building Load Density

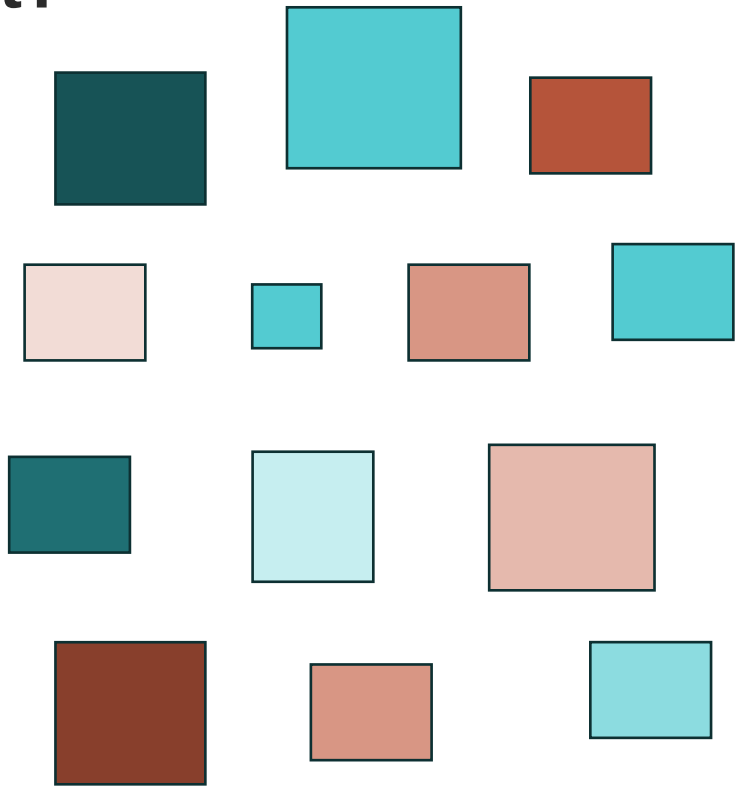
Having substantial building loads close together

Building Load Diversity

Having a mix of heating and cooling loads across buildings typologies

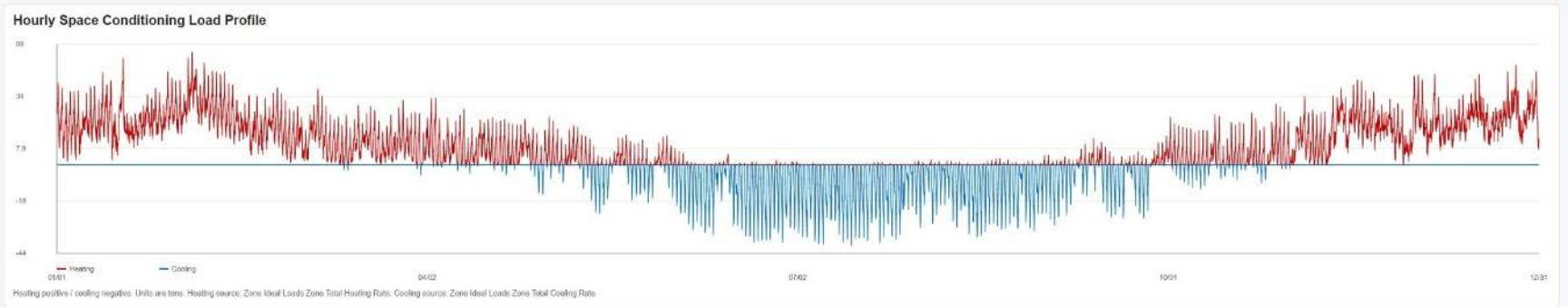
Existing HVAC Systems

Water based heating and cooling systems can be simply connected with a TEN. Other retrofits are possible, but may be expensive

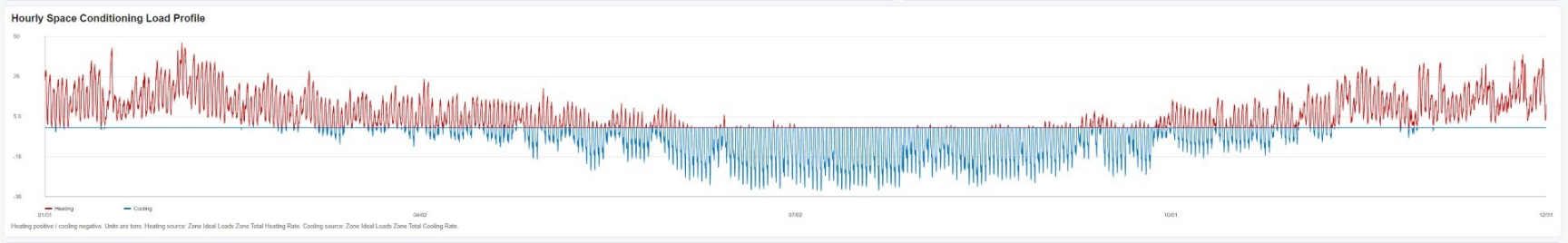


Load Diversity — The First Resource in Every TEN

Multi-use



Restaurant



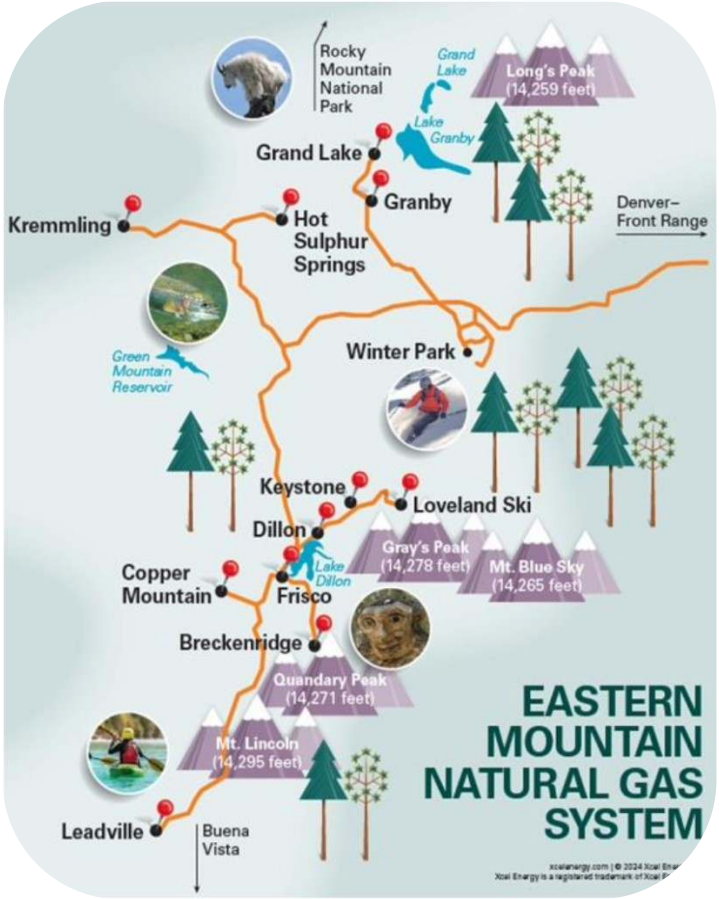
3. Non-Pipeline Alternatives

These Colorado mountain towns are battling 'severe gas capacity constraints.' Here's Xcel Energy's plan.

Communities in Summit, Grand, Lake and Eagle counties are the target of a newly proposed initiative that looks to diversify energy streams

News News | Feb 23, 2025

- 65,000 customers and spanning 975 miles of transmission pipeline
- Summit County residents had rolling power outages in Feb 2019, affecting 17,600 customers



the GreyEdge group

4. Multi-Source Potential

- Unique local resource availability — Mountain Towns are full of these including:
  - Geoexchange
  - Lake Heat Exchangers (HX)
  - Mine Water
  - Open Loop HX
  - Breweries
  - Ice Arenas
  - Snowmaking lines
  - Wastewater HX
  - Potable Water Lines
- **Find the least cost energy path!**



04

How does a community get started?



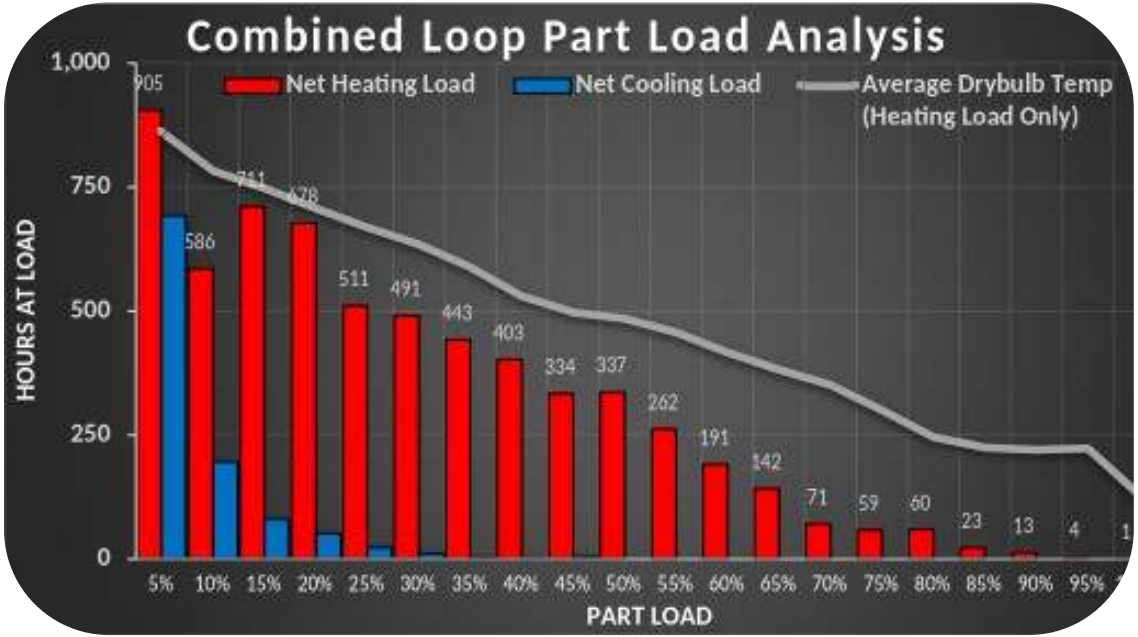
the GreyEdge group

How does a community get started?

1. **Governance First!**
   (we'll circle back to this)
2. **Evaluation**
3. **Design**
4. **Construction**

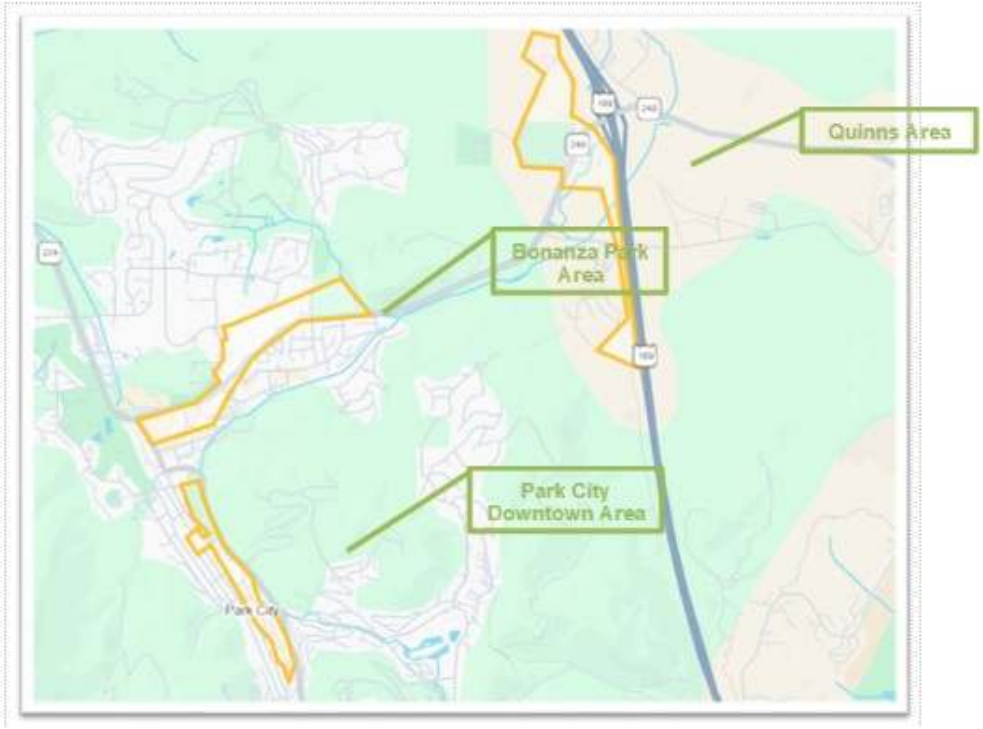
Evaluation Best Practices

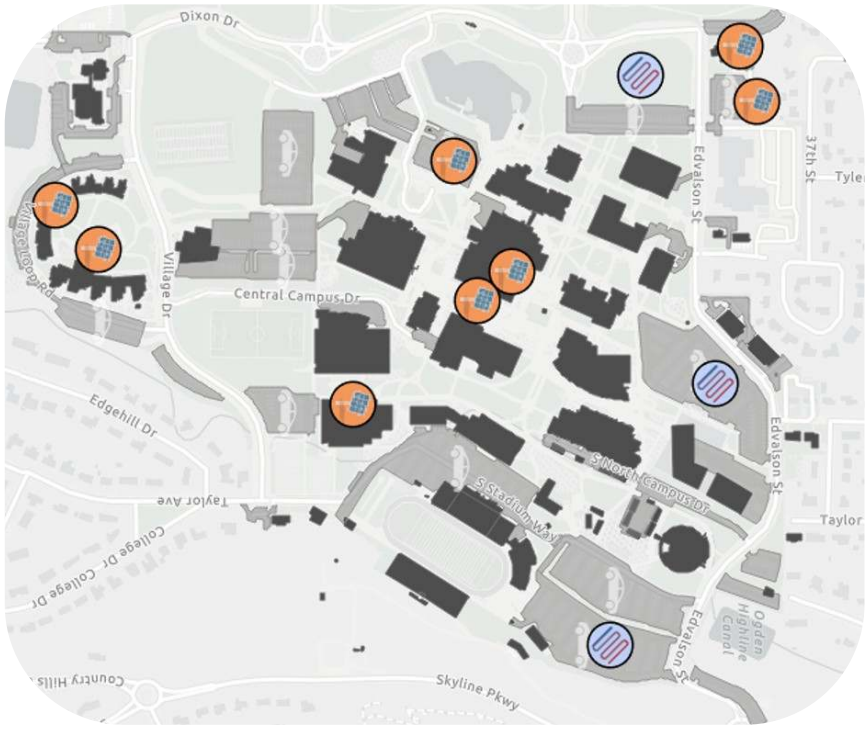
1. **Analyze thermal assets and loads**
2. **Conduct a hydrogeology study**
3. **Drill a test borehole**



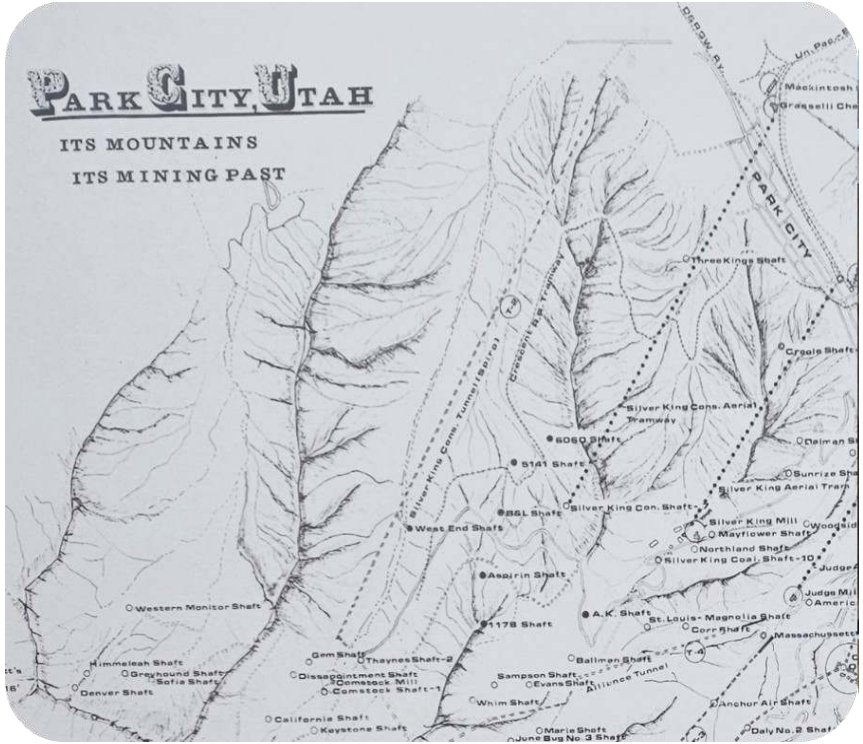
the GreyEdge group

Loads - What are you going to connect to?



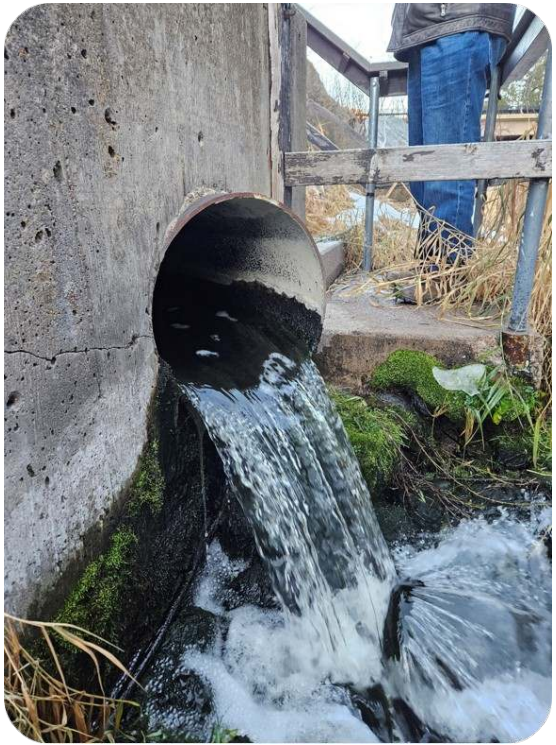


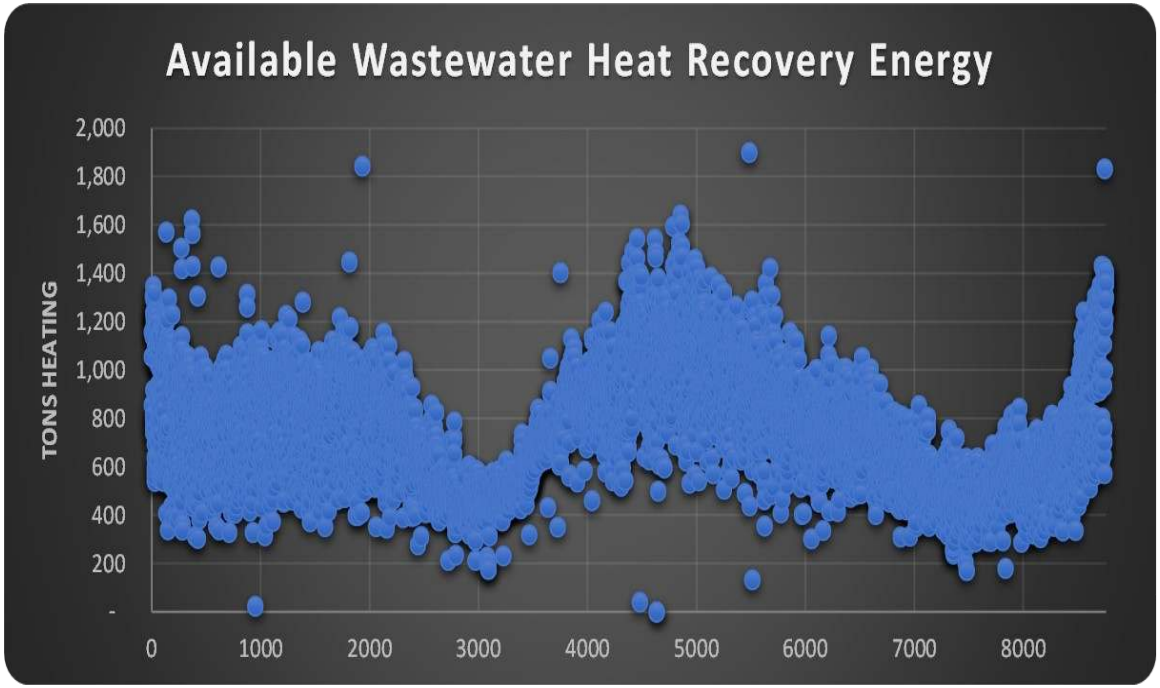
Resources - Where are you going to get the energy?





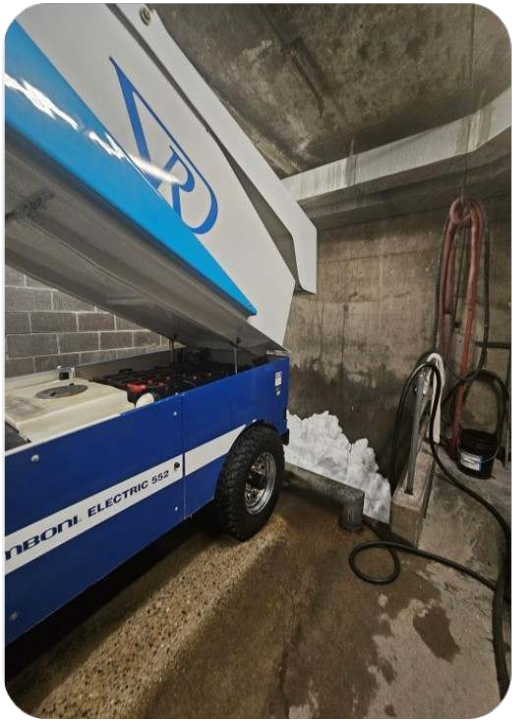
A Multi-Source Approach - Vail, Colorado





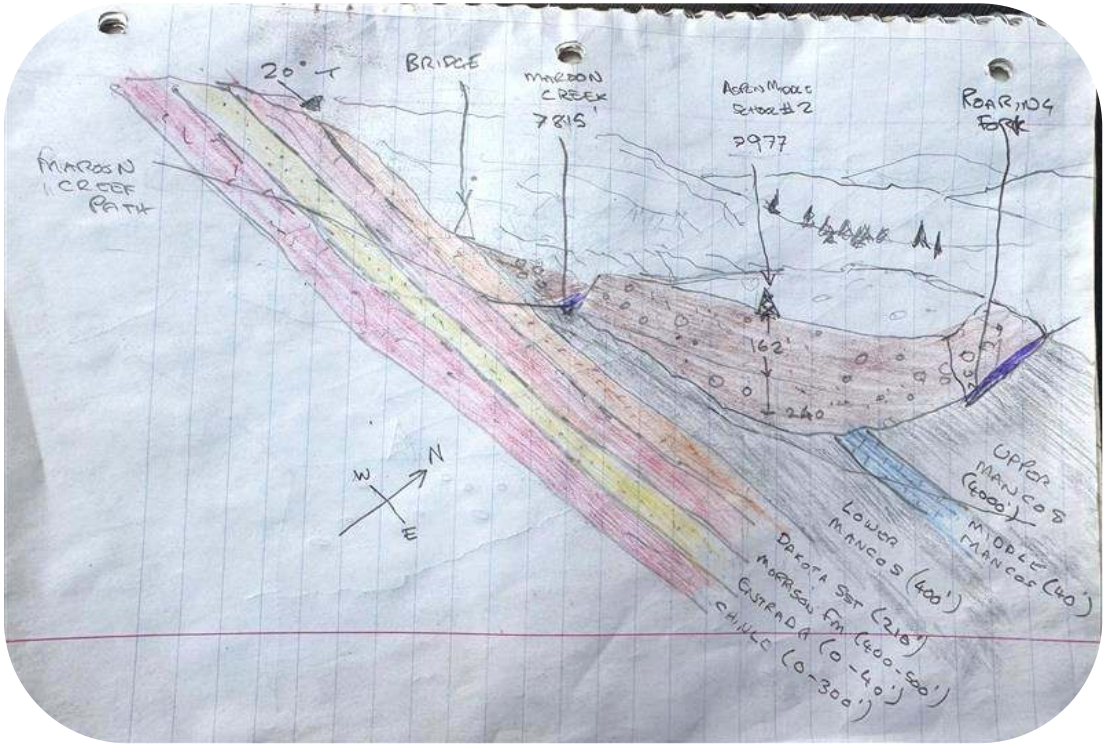
A Multi-Source Approach - Vail, Colorado

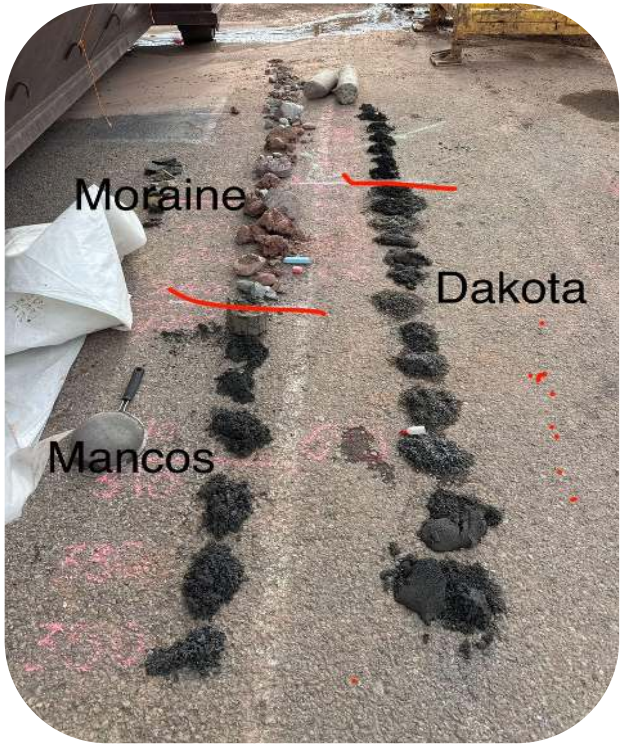






Hydrogeological Studies





Test Boreholes and Thermal Response Tests



Figure 1 - Average Deep Earth Ground Temperature Analysis

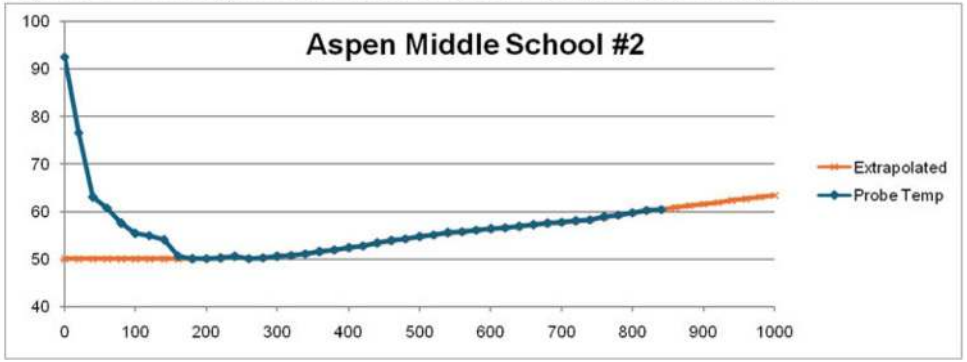
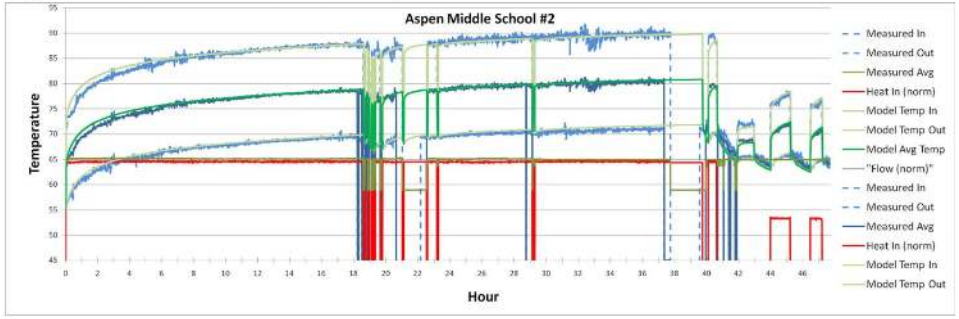


Figure 3a – Advanced TRT Analysis



the GreyEdge group

Understand Retrofit Implications

- RetroCommission first!
- Hydronic (water based heating and cooling) systems are compatible with Heat Pumps
- Heating system supply temperature is a major cost driver
- How much electrical capacity is available?
- What planned capital expenses can be leveraged?



05

Design Best Practices

the GreyEdge group

Design Best Practices

- Design for the least cost path
- Large, dense systems make the most sense. 300 tons is often the inflection point
- Hybrid systems get the most bang for your buck
- Pump Power has a cubic relationship to speed, **50% speed is 12.5% power!** Design accordingly
- “We’ve can do Geo” is not the same as “We specialize in Geo”! Hire a Certified GeoExchange Designer

CSA GROUP

CSA/ANSI/IGSHPA C448 Series:25
National Standard of Canada
American National Standard

Design and installation of ground source heat pump systems for commercial and residential buildings



ANSI

SCC CCN

06

Construction Best Practices

Construction Best Practices

- A good Civil is worth their weight in gold
- Understand the implication of value engineering decisions
- Require accurate locates on as-builts
- Driller experience matters in the mountains
- Mountain Towns have very clear drilling windows, plan accordingly
- Hire a Certified Geo Inspector



07

Governance

Governance First!

$2.4B+

invested in thermal energy network feasibility studies for projects that never reached execution

140+

thermal energy network developments across North America frozen before they could be executed

12 yrs

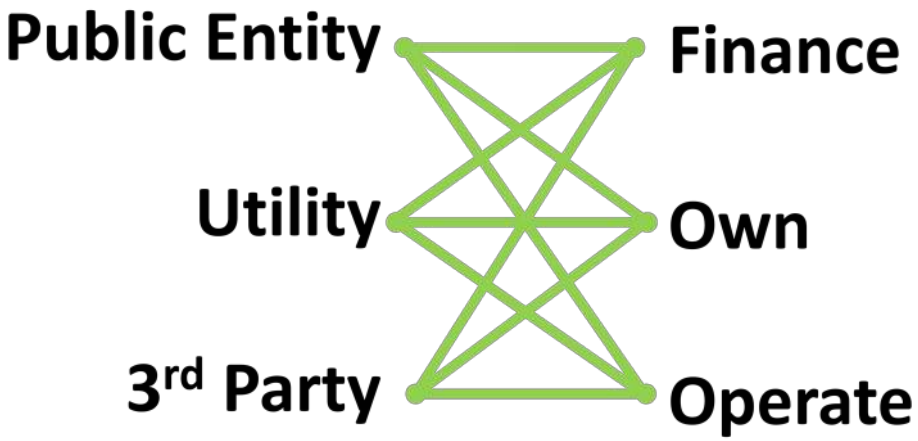
average delay from concept to shovel-ready project

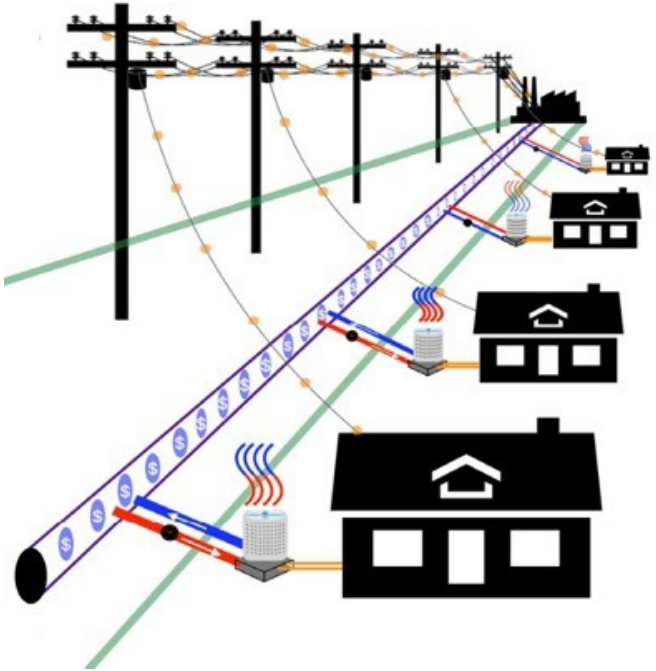
70%+

of evaluated projects never advance to construction

Source: Cairn Global

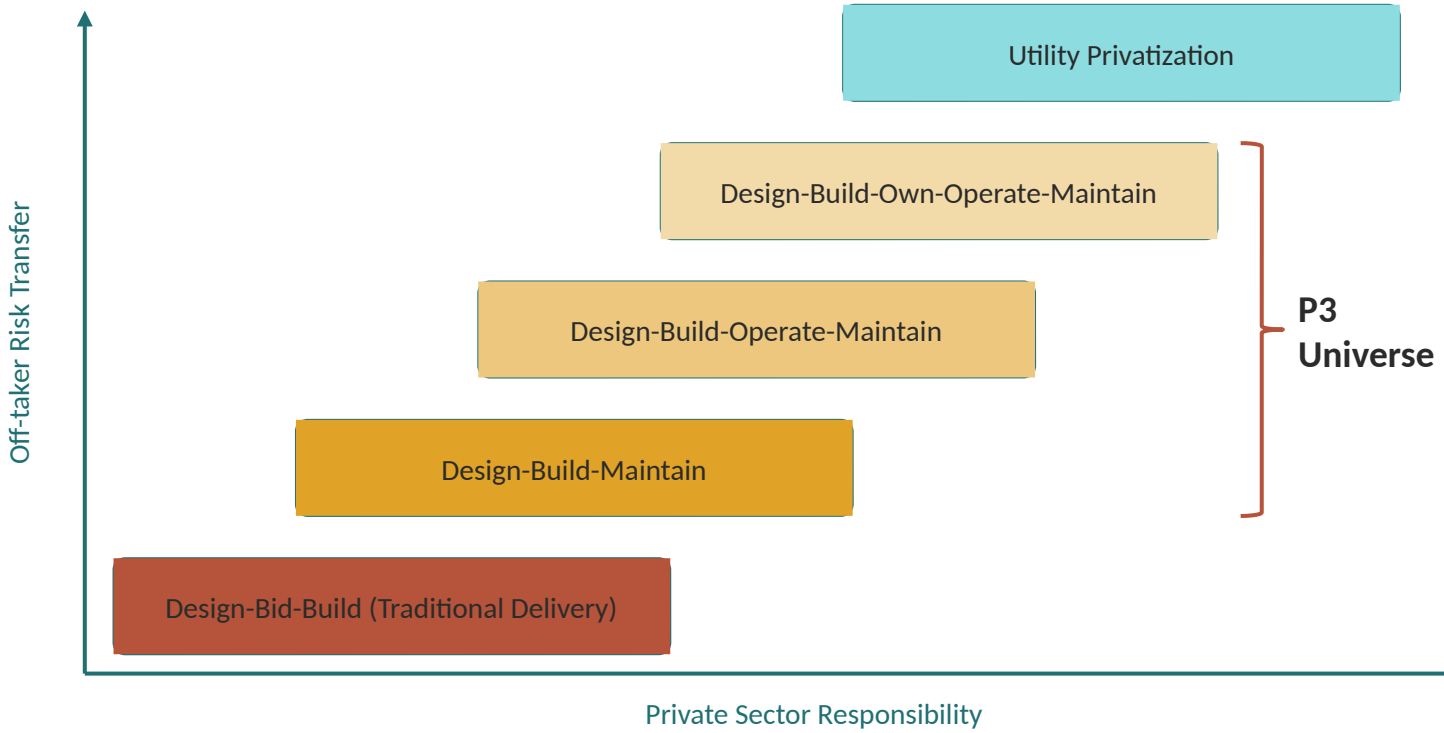
What does governance mean?





© Copyright Ewbank Geo Testing, LLC; NexTemp Solutions Inc.; GreyEdge Group, LLC 2024

Managing Risk and Responsibility



Governance Examples

ENR East

Massachusetts Utility Launches Geothermal Network Claimed to Set a US First

Pioneering utility-led thermal energy pilot links residential and commercial buildings in Framingham to provide heating and cooling

By Justin Rice, Johanna Knapschaefer

CANARY MEDIA

Clean energy journalism for a cooler tomorrow

Why this Colorado coal town is digging geothermal

Hayden is tapping renewable thermal energy to affordably heat and cool its new business park — and entice companies looking to reduce energy costs.

By **Alison F. Takemura**
15 December 2025

Aspen PUBLICRADIO

Aspen School District taps into geothermal possibilities

Aspen Public Radio | By Michael Fanelli

Published January 8, 2026 at 4:50 PM MST

Framingham, MA (ENR) · Hayden, CO (Canary Media) · Aspen, CO (Aspen Public Radio)

WRAP UP: YOUR FIRST NEXT STEP

Mountain Towns are at the forefront of climate change impacts, they also need to be at the forefront of the solutions!

- Process matters, don't leave value on the table
- Discuss roles early, governance first ensures the project will advance.
- TENs are a tool for Mountain Towns to meet multiple goals in one move

the GreyEdge group

Thank you!

Questions, thoughts, ideas? Reach out — let's talk geo.



Matt Garlick, CCP, CEM, BEMP

CEO

mgarlick@greyedgegroup.com

801-907-5654



Megan Lim

Education and Business Development

mlim@greyedgegroup.com

713-517-9402

ACKNOWLEDGEMENTS

Cairn Global

Vermont Community Thermal Networks