How Will AI Impact the Geothermal Industry?

Moderator: Brian Zimmerly / Brightcore Energy

Panel: Erich Ryan / *Jouler*

Declan Ivers / *Aztech Geothermal*

John Rathbone / *Rathco ENG*

Greg Shapiro / *Hickory AI*

Brad Steer / *Concurrent Build AI*

Thomas Yeh / *NYSERDA*

How Will AI Impact the Geothermal Industry?

Proprietary & Confidential

Brightcore
BUILDING ENERGY PERFORMANCE™

BRIAN ZIMMERLY

VP OF INNOVATION

At **Brightcore Energy**, we are leveraging leading-edge technology and installation techniques to deliver clean energy solutions to **commercial, institutional, and government clients** through a unique, turn-key business model.

Proprietary & Confidential

Using AI to Create Targeted Customer Content

Problem	• As a new product developer, I need to customize presentations for prospective customers depending on their unique needs.
Platform	• I use ChatGPT to translate my product talking points into customer relevant presentation slides based on the information I provide about the customer.
Type of Inputs	• Take my existing product content and talking points • Enter anonymous, generalized information about the customer type I'm working with • List the key points I want to convey to my customer
Results	• Custom tailored presentation slides in seconds • Additional ideas or options for how to tailor my content that I didn't think of • Follow-up questions from ChatGPT helping me improve my overall messaging and outcome
Benefits	• Each presentation speaks specifically to the customer and improves my ability to communicate the value of my product

Proprietary & Confidential

Jouler

Data Infrastructure for Networked Geothermal

Jouler builds data infrastructure for networked geothermal systems. We structure and enrich operational and engineering data to support simulation, M&V, and economic analysis across utility-scale, networked geothermal deployments.

Erich Ryan

Founder & CEO – erich@jouler.net

Using AI to Track Geothermal Policy

The Problem: Geothermal policy is evolving fast, with new tax credits, state incentive programs, utility filings, legislative updates across federal, state, and local levels. Staying current on how these changes affect your business is time-consuming but critical.

The Platform: Claude (built by Anthropic: model names are different from the companies behind them, just like ChatGPT is built by OpenAI)

The Type of Inputs: Upload policy documents, such as IRS tax credit guidance, state incentive program rules, utility docket filings, legislative text and ask targeted questions at any scale.

Single document: "Where does this filing address federal tax credits and what are the key provisions?"
Cross-document: "What are the differences in incentive amounts across these five state programs?"

The Results: Digestible summaries with specific references back to the source — case numbers, appendix sections, specific provisions — so you can verify and cite the material in your own work.

e.g., "Case 22-M-0429, Appendix 2: utilities are required to collect hourly inlet and outlet temperatures at each heat exchanger on both the UDS and customer side (Technical Metrics, Framing Question 2)"

The Benefits: A fast, accessible way to understand and document how specific policy and regulatory changes could affect your business without needing to read every page

AI is a Data Problem

The models are impressive, but they're downstream of the data.

How LLMs Were Built

Large Language Models (LLMs) like ChatGPT, Claude, and Grok are AI systems trained to process and generate text.

Trained on 20+ years of internet text
Scraped, cleaned, and structured into training datasets before any model could learn from it.

The data came first. The models came second.

This is why LLMs excel at text-based tasks, and there are plenty of applications for the geothermal industry

LLMs Applied to Geo

Text-heavy tasks where LLMs accelerate geothermal work today:

Policy & regulatory analysis
Upload a 200-page rate case filing or legislative text and extract the provisions relevant to your project in minutes. The source material is text, which is exactly what LLMs are built for.

Writing code for data analysis
Describe what you need in plain English, get working analysis code back. Programming languages are text - another natural fit for LLMs.

Geo AI Needs Its Own Data

The geothermal industry doesn't have 20 years of structured data. We're starting from scratch.

An Operational Example

The Question

How do you balance heating and cooling across a network of buildings while minimizing energy costs in real time?

The Data It Requires

Loop thermal balance, building demand profiles, time-of-use energy pricing, heat pump dispatch sequencing, weather predictions

What AI Could Unlock

Real-time operational optimization. Not a text problem, but a data problem. Solvable, but only with structured operational data at scale.

What Has to Come First

Standardized data collection
Consistent schemas across pilots and deployments

Physics-based enrichment
Turning raw meter data into engineering-grade datasets

Cross-deployment aggregation
One pilot isn't a training set — the industry needs data infrastructure that compounds

That’s the work ahead.

AI for Technicians

Using AI to bridge the gap between experience & execution

Aztech Geothermal

NY-GEO

Declan Ivers
Maintenance Specialist
Aztech Geothermal, LLC
(518) 309-2000
divers@aztechgeo.com
www.aztechgeo.com

Outline

1. **Scheduling Maintenance & Service Calls**
   - → **Streamlining scheduling** to reduce mental load and improve efficiency
2. **Field Diagnostics & Troubleshooting**
   - → **Quickly identifying probable causes** from basic field information
3. **Improving Reports & Documentation**
   - → **Turning field notes** into clear, professional reports

Scheduling Service & Maintenance Calls

Problems

- Time spent determining schedule
- Inefficient routes cause more traveling time

Platform

- ChatGPT for Business

Inputs

- Customer, location & availability, time needed on site, technician availability & starting location
- Describe uploaded data

Outputs

- Optimized routes and timing

Usefulness

- Big time saver

Scheduling Service & Maintenance Calls: *Inputs*

Customer	Location	Availability	Time on Site
Emily Carter	142 Maple Ave, Saratoga Springs NY 12866	**Mon–Fri 8am–12pm**	1 hr 30 min
Sarah Donnelly	62 Main St, Greenwich NY 12834	**Tue or Fri afternoons**	2 hr
Michael Chen	19 Pine St, Albany NY 12207	**Mon–Thu mornings**	1 hr 15 min
Rachel Singh	92 Church St, Hudson NY 12534	**Mon or Tue 12pm–6pm**	2 hr 30 min

Multiple Requests per Day | **Different Locations** | **Conflicting Availability Windows** | **Varying Hours**

Now scale this to 15-20 customers

Aztech GEOTHERMAL

www.aztechgeo.com

Scheduling Service & Maintenance Calls: *Outputs*

Tuesday - Saratoga → Greenwich (North Run)

9:00–10:30 Emily Carter (*Saratoga Springs*)

30 Min driving buffer

11:00–1:00 Jason Miller (*Schuylerville*)

Buffer

1:30–2:00 Lunch

Buffer

2:30–4:30 Sarah Donnelly (*Greenwich*)

Geographic grouping
reduces drive time

Built-in Buffer
Between Jobs

Strategic lunch
placement

Flexible gaps
For emails & phone calls

Aztech GEOTHERMAL

Field Diagnostics & Troubleshooting

Problems

Not seeing the bigger picture

Lack of specific knowledge & experience

Platform(s)

ChatGPT for Business

GROK

Inputs

Photos of equipment, model info, overall situation & issues for customer

Outputs

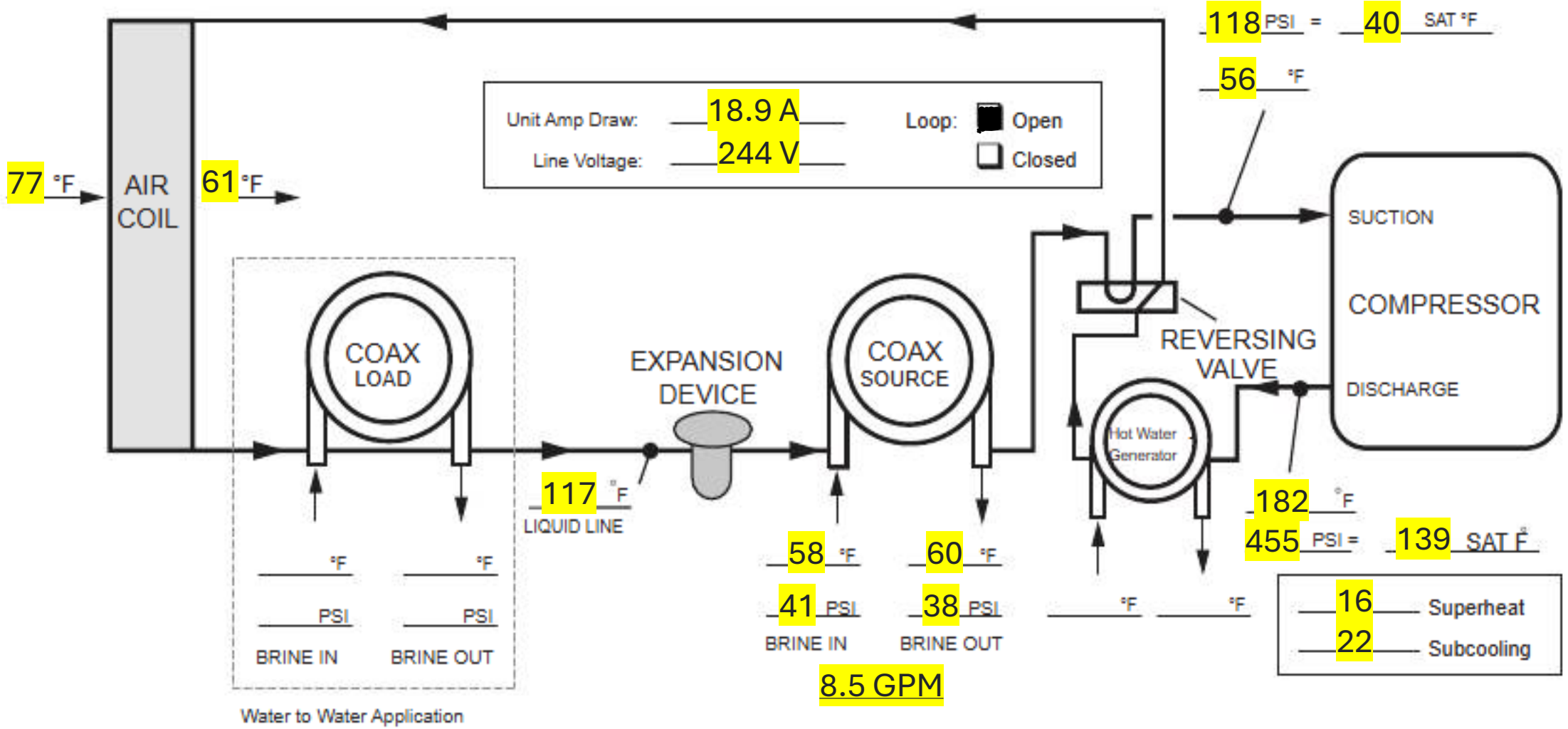
Brainstorms possible causes, provides first level diagnostic, tech support

Usefulness

Saves time for several team members, reduces mental load

Field Diagnostics & Troubleshooting:

Input



Aztech GEOTHERMAL

www.aztechgeo.com

Field Diagnostics & Troubleshooting: *Output*

Problem: poor heat rejection through the source coax

Probably causes:

Scaled / fouled source coax heat exchanger
Partial water-side restriction
Dirty strainer, valve not fully open, bad flow center, collapsed hose, air pocket
Flow measurement is misleading
Actual flow may be lower than 8.5 GPM
Overcharge
Possible, but with these numbers I'd check water-side heat transfer first before blaming charge

Bottom line

Likely a **source-side heat rejection problem**, with **a calcified condenser or reduced flow**
Causes abnormally high head pressure despite low entering water temperature

Improving Reports & Documentation

Problems

Professional verbiage

Time spent on polishing customer reports

Platform(s)

ChatGPT for Business

GROK

Inputs

Draft reports & notes, instructions to synthesize a professional, detailed document

Outputs

Word document or PDF incorporating all the information with new structure

Usefulness

Saves time & reduces mental load

Improving Reports & Documentation: *Benefits*

Creating Re-Usable Email Templates
→ *Quickly produce consistent, professional communication without prior writing experience.*

Generating Professional Work-Order Documents
→ *Transform basic field notes into structured, client-ready documentation.*

Creating PowerPoint Presentations
→ *Build clear, organized presentations without design or formatting expertise*

AI doesn't replace expertise—it accelerates learning and improves how we present our work

Presented by: John Rathbone

Rathco ENG

How Will AI Impact the Geothermal Industry?

RATHCO ENG

RATHCO ENG

CRADLE TO CRADLE ENGINEERING

FREE

FEASIBILITY LEVEL 0

A quick calculation that gets you in the ballpark of what's possible.

$1,999

FEASIBILITY LEVEL 1

A professional analysis with a brief report that eliminates technologies not suitable and highlights technologies that can achieve your goals. Class 5 accuracy.

$19,999

FEASIBILITY LEVEL 2

A professional, detailed analysis of viable technologies. Provides Levelized Cost of Energy, capital cost breakdowns, operating cost breakdowns, detailed report, and concept designs. Class 4/D accuracy, investment grade.

CUSTOM

FEASIBILITY LEVEL 3

The most comprehensive, detailed analysis of viable technologies. Includes everything in a Level 2, plus 30% detailed design documents and business model. Class 3/C accuracy, lowest risk.

CUSTOM

DETAILED DESIGN

Drawings, specifications, design briefs, and other deliverables necessary for coordination, permitting, tendering, and construction.

CUSTOM

OPERATIONS

We augment your operations teams and technology providing professional engineering level monitoring services, analysis, and guidance on how to safeguard both your valuable assets as well as your business model.

MORE SPECIALIZED SERVICES

- PEER REVIEWS
- OWNERS ENGINEER
- ENGINEER OF RECORD
- EXECUTIVE TRAINING & EDUCATION

RATHCO ENG

TECHNOLOGY EXPERTS

Air-Source Heat Pumps

High Efficiency
Cold Climate

Geothermal

Geo-Exchange
Open Loop
Surface Water

District Energy TENS

2nd, 3rd, 4th, and
5th Generations

Biomass

Waste Wood
Pellets
Chips

Waste Heat Capture

Data Centers
Industry
Refrigeration

Wastewater Energy

Effluent
Raw Sewage

Solar

Solar PV
Solar Thermal

Energy From Waste

Combined Heat & Power (CHP)

RNG

Renewable Natural Gas

AI Will Impact Everything

- The question is not “if”, but “what” and “how”.
- When? It’s already started. If you’re not ahead, you’re behind.
- Most important is “why”. Resist the urge to be seduced by shiny new things.

Problem - First Principles

- Professional Engineering requires licensing and insurance.
- Understanding first principles is, and is always, the most important.
  - Thermodynamics, math, geometry, are superior to large language models (LLM's)
- Transparency, traceability, accountability are still cornerstones of Professional Engineering.
- The foundation of being a hirable engineer is the relationships we have with our clients and the trust that we earn with them.

Platforms

- Claude, Claude For Excel
  - Make your own tools
  - Make your existing tools better
- Gemini, Nana Banana
  - Research
  - Content Creation
- Copilot
  - Walled Data Garden
  - Everyone can write better deliverables

Inputs & Results

- Claude, Claude For Excel
  - Provide your excel model (e.g. pump head)
  - It recommends and builds a 5x better one
- Gemini, Nana Banana
  - Provide your marketing needs
  - It provides a marketing strategy with graphics
- Copilot
  - Provide it with the core message
  - It provides a well written deliverable

Benefits - Everything Else Is Changing

- Sales
- Marketing
- Administration
- Project Management
- Bookkeeping
- Communication
- Coordination
- Research & Development
- Data Security

Engineering Meets Software Automation

LESS COST

DEMOCRATIZED PRICING

20% to 40% less costs.

Democratizes access to decarbonizing the built.

LESS TIME

SPEED & SCALE THROUGH SOFTWARE

70% to 90% less time.

Enables quicker decisions and increased capacity.

MORE DATA

DYNAMIC UPDATES

Project & business agility through quarterly updates.

Gone are reports that sit on shelves.

THE SOLUTION: FASTER, MORE COST EFFECTIVE, SAFER, & EASIER

IMPACT ON PROJECT DELIVERY ILLUSTRATED

PROJECT DURATION (ENG SERVICES)

BUSINESS-AS-USUAL	9-12 MONTHS
OVR-VU	9-12 WEEKS

PROJECT COSTS (ENG SERVICES)

BUSINESS-AS-USUAL	100'S OF THOUSANDS
OVR-VU	10'S OF THOUSANDS

OVR-VU
powered by RATHCO

Thank you.

Contact:

John Rathbone, CEO & Co-founder

Email:

john@ovrvu.com

LinkedIn:

https://www.linkedin.com/in/john-rathbone/

HICKORY

How Hickory is using AI Across Our GSHP and ASHP Business

Greg Shapiro, COO

greg@hickory.ai | hickory.ai | linkedin.com/gregshap

Who We Are

HICKORY

High-touch residential & light commercial HVAC design, install, service — NYC, Hudson Valley, Long Island, Connecticut

GSHP: Mainly closed loop geothermal for single-family homes.

ASHP: Thousands installed, 10’s of Thousands serviced each year

Locally owned, values based alternative to national private equity model.

Investing in people, practices, and technology to deliver better outcomes

Where AI Lives Today

HICKORY

Hiring

Job descriptions, interview structure

Marketing

Long tail web content, ad copy, channel attribution

Permits

Jurisdiction mapping, document upload

Sales

Coaching, escalation monitoring, proposal review, lead center

Finance

NETSUITE

Bill OCR, Cost coding, Reconciliation, anomaly detection

Contract & Legal

Insurance captive, geothermal TPO, vendor & partner contracts

Automation

Scheduling & booking

Employee Portal

EOS, Win the Day

Lead & Phone Insights

Transcription, coaching, command center

Code/Infrastructure

Powers all of the above

HICKORY

“Hickory OS"

Cultural Values, Entrepreneurial Operating System, & Win the Day

Hickory OS: EOS & Win the Day

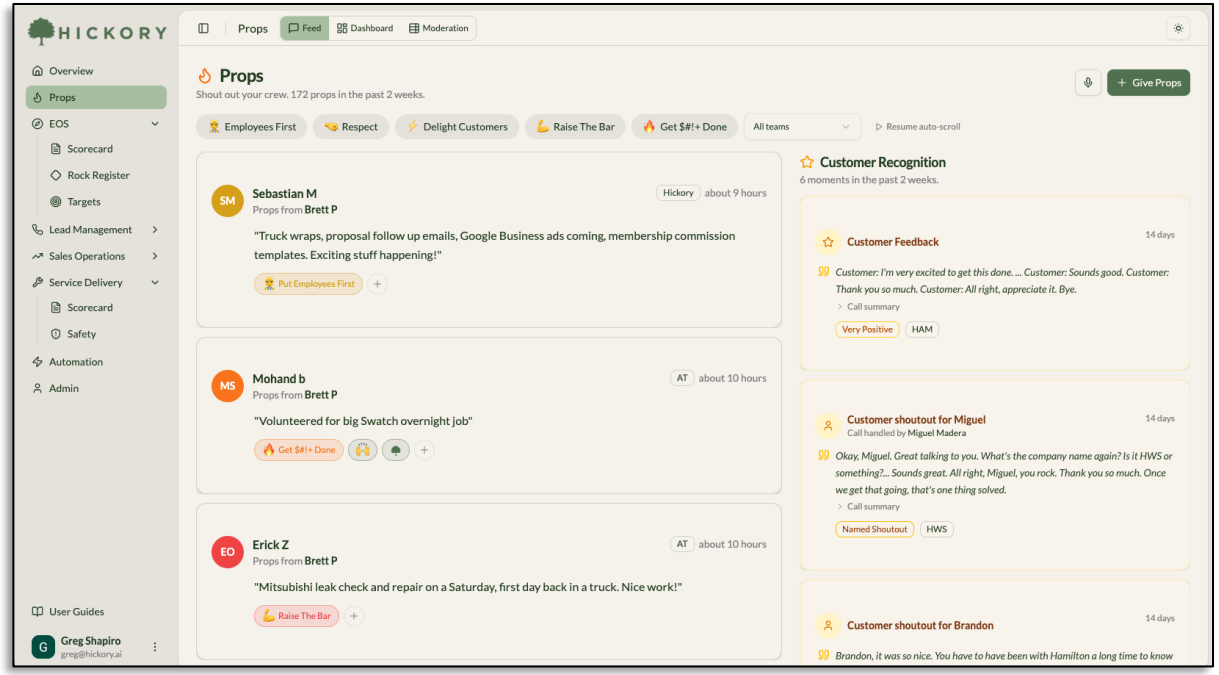
Hickory OS

Implementing EOS (Entrepreneurial Operating System — a framework for running and aligning teams) across Hickory

Started with specialized EOS software — moved to building our own

Custom build = direct linkage to our actual business data

Lesson: building employee software without a defined org chart will expose that gap fast



Win the Day

Clear KPIs and goals throughout the org

Emphasize the most important next action for each person or team each day

AI surfaces what matters — not just dashboards, but daily direction

HICKORY

Lead & Phone Insights

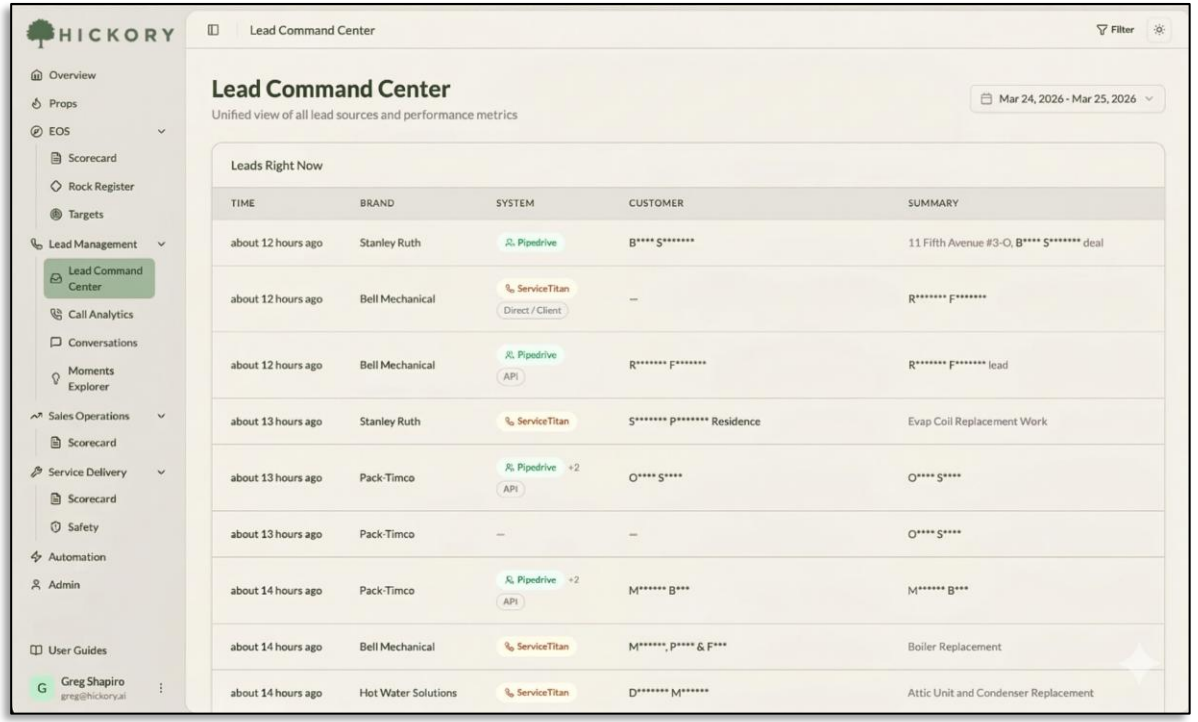
Tens of thousands of calls and service visits/year

Without AI, managers don't have the capacity to give specific, actionable coaching feedback to every team member to close that gap.

HICKORY

What We See Now That We Couldn't Before

- Transcribes every call
- Infers key features: follow-up commitments, upsell opportunities, leak mentions
- Summarizes each call automatically
- Customer journey view for fast escalation handling
- Combined with other channels into a Lead Command Center



The Coaching Unlock

Membership Attachment Rate (service calls → ongoing maintenance memberships)

2% vs 28%

Newest location vs. Top location (2025)

HICKORY

Code

The engine behind everything else

Code: Learnings & Best Practices

HICKORY

How We Work

- AI-assisted development (we use Claude Code)
- 1-2 engineers doing what used to take 3-5
- CTO does hands-on development for high-context work
- Coding is a leading indicator for AI adoption in other areas
- Claude Code > chat-based workflows for many non-coding tasks

Key Takeaways

- Right people and alignment are CRITICAL
- Each person moves so much faster — human managers can't keep up reviewing all AI-enabled output
- Use AI to review AI work. Team members must bring their own attention to detail.

6 months ago:

VP of Engineering: "My job is just to code review AI slop."

Today:

Automated most review with Greptile. Realigned the team. Building faster than ever.

HICKORY

Empower leaders, drive ownership for Juniors
Don’t let your experts and leaders become full time AI Output reviewers.

Negotiate hard with the funded AI service companies
They’ll discount hard to show growth.
Configuration/iteration is where most of the value will live.
Are you buying their intelligent configuration or bringing yours?

Right people, right seats
More important, not less. Everything goes faster.

AGENTIC AI

workflows for the built world

ConcurrentAI

ConcurrentAI

EXECUTIVE SUMMARY

THE PROBLEM

The built world suffers from fragmented workflows, disconnected systems, and decades of flat productivity that generic AI cannot solve.

THE PLATFORM

ConcurrentAI is a multi-agent orchestration system — the "Agent OS for the Built World" — combining Goal, Utility & Learning Agents powered by synthesized knowledge bases and built-world LLMs.

THE INPUTS

Authoritative standards, Location, proprietary project data, and site-specific parameters are ingested to fuel intelligent, context-aware reasoning.

THE RESULTS

50-84% reductions in preconstruction timelines and costs, with $1.85M in recovered savings demonstrated in real-world deployments.(St.Vincents example)

https://www.rachelcollet.com/Galleries/NYGEO-2026/n-zNB6jT

THE BENEFITS

Automated permitting, regulatory compliance with Tech enabled expert-level early-stage insight, and continuously learning agents deliver faster, smarter, source-cited decisions at scale.

Workflows in the built world are fragmented, manual, and slow

Owner/operators, regulators, designers, contractors and suppliers work across **disconnected systems**

Fragmented information across **standards, regulations, research, specs, and tools** leads to slow, error-prone decisions

Why Now

Productivity in the built world has flatlined for decades. Margins are tight. Complexity is rising. Old workflows no longer scale*

Generic AI doesn't solve it

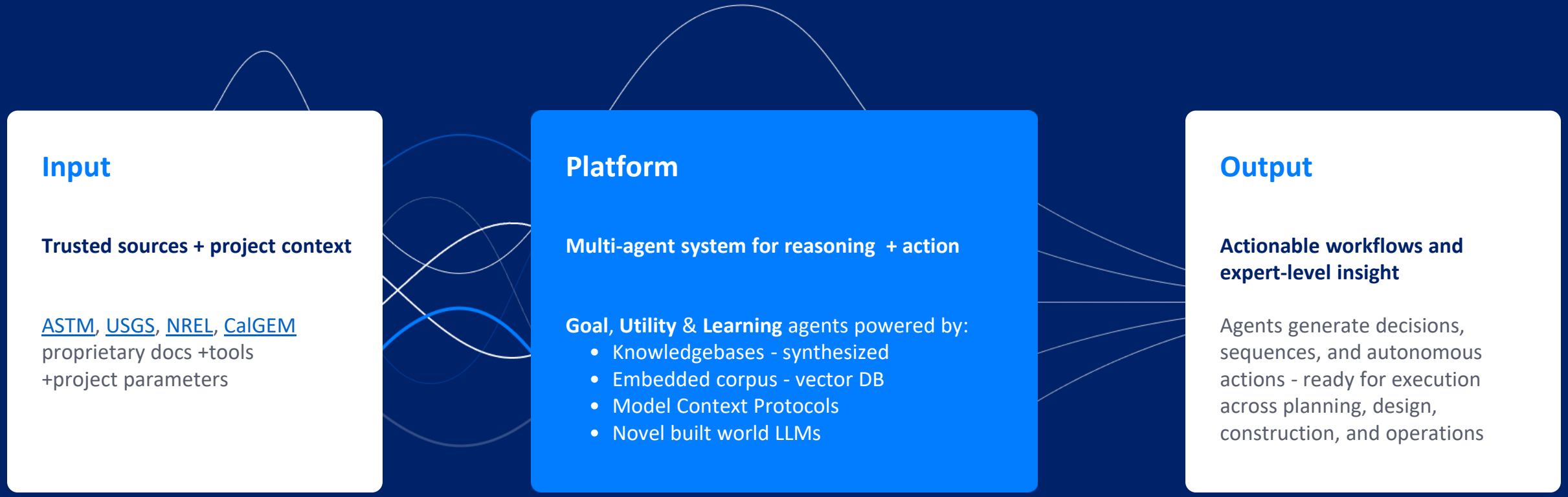
Prompts can answer questions, but struggle to reason across the disparate data sets utilized in the built world.

Agentic AI is finally viable

We can now build agents that reason, cite sources, and execute autonomous workflows across planning, design, construction, and operations

* "Delivering on construction productivity is no longer optional." — McKinsey, 2024

How it works



Input

Trusted sources + project context

ASTM, USGS, NREL, CalGEM
proprietary docs +tools
+project parameters

Platform

Multi-agent system for reasoning + action

Goal, **Utility** & **Learning** agents powered by:

- Knowledgebases - synthesized
- Embedded corpus - vector DB
- Model Context Protocols
- Novel built world LLMs

Output

Actionable workflows and expert-level insight

Agents generate decisions, sequences, and autonomous actions - ready for execution across planning, design, construction, and operations

Technical advantage: multi-agent orchestration

Orchestration manages multiple AI agents, automating tasks, tracking progress, and managing resources - enabling numerous agents to work together effectively, solving intricate problems beyond a single agent's capacity

Goal Agent

Imbued with **Objectives**, and can reason about steps required to achieve them

Utility Agent

Defined by their decision-making process (**Utility Function**), weighs competing processes, and handles uncertainty considering the probability of different outcomes

Learning Agent

Learning agents have real-time adaptability to new information, and changing conditions, that enable continuous improvement to refine their strategies and knowledge

ConcurrentAI automates expert workflows in the built world using Agentic AI

Knowledge synthesis

Concurrent agents ingest and synthesize fragmented data - standards, specs, codes, and scientific research into structured, actionable knowledge sets

Workflow automation

We use these knowledge sets to power autonomous agents that execute domain-specific tasks - from permitting to compliance

Building the Agent OS for the built world

Intelligent collaboration

Agents reason, learn, and work in orchestrated, parallel processes workflows accelerating decisions and creating efficiencies

Use case

geothermal electric power plant- preconstruction

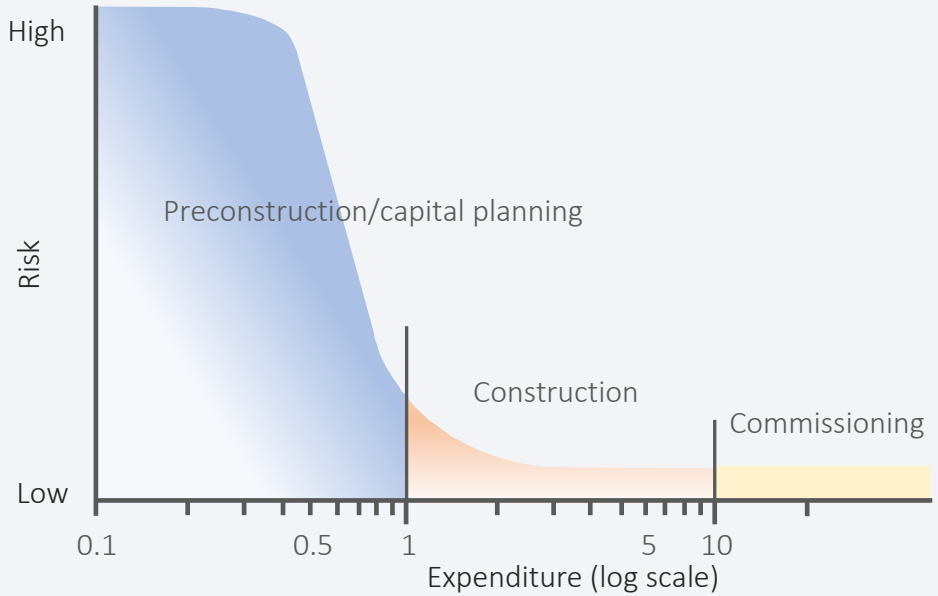
Conventional preconstruction process

Time **2 - 4 years**
Costs **$6mm - $24mm**

+Permitting & regulations
+Technology Readiness Level – development status
+Seismic analysis
+Power Purchase Agreements (PPA)

Geothermal projects face technical, financial, environmental, and regulatory risks - affecting viability, profits, and timelines

Highest risk - early stage



Quantifying Risk in Geothermal Development. Miklos Antics and Pierre Ungemach, GPC IP, Paris Nord 2, Business Park, 165, rue de la Belle Etoile, B.P. 55030, 95946 ROISSY CDG CEDEX June 15, 2025

Agentic preconstruction

Reduction

Time - 50 to 60%

Costs - 70 to 84%

OMV Energy (Austria), Stanford Paper

AI-centric outperforms conventional geothermal project costs by 27% and reduces data acquisition by 35%.*

* Clemens, T.; Chiotoroiu, M.-M.; Corso, A.; Zechner, M.; Kochenderfer, M.J. Artificial Intelligence-Centric Low-Enthalpy Geothermal Field Development Planning. Energies 2024, 17, 1887. https://doi.org/10.3390/en17081887

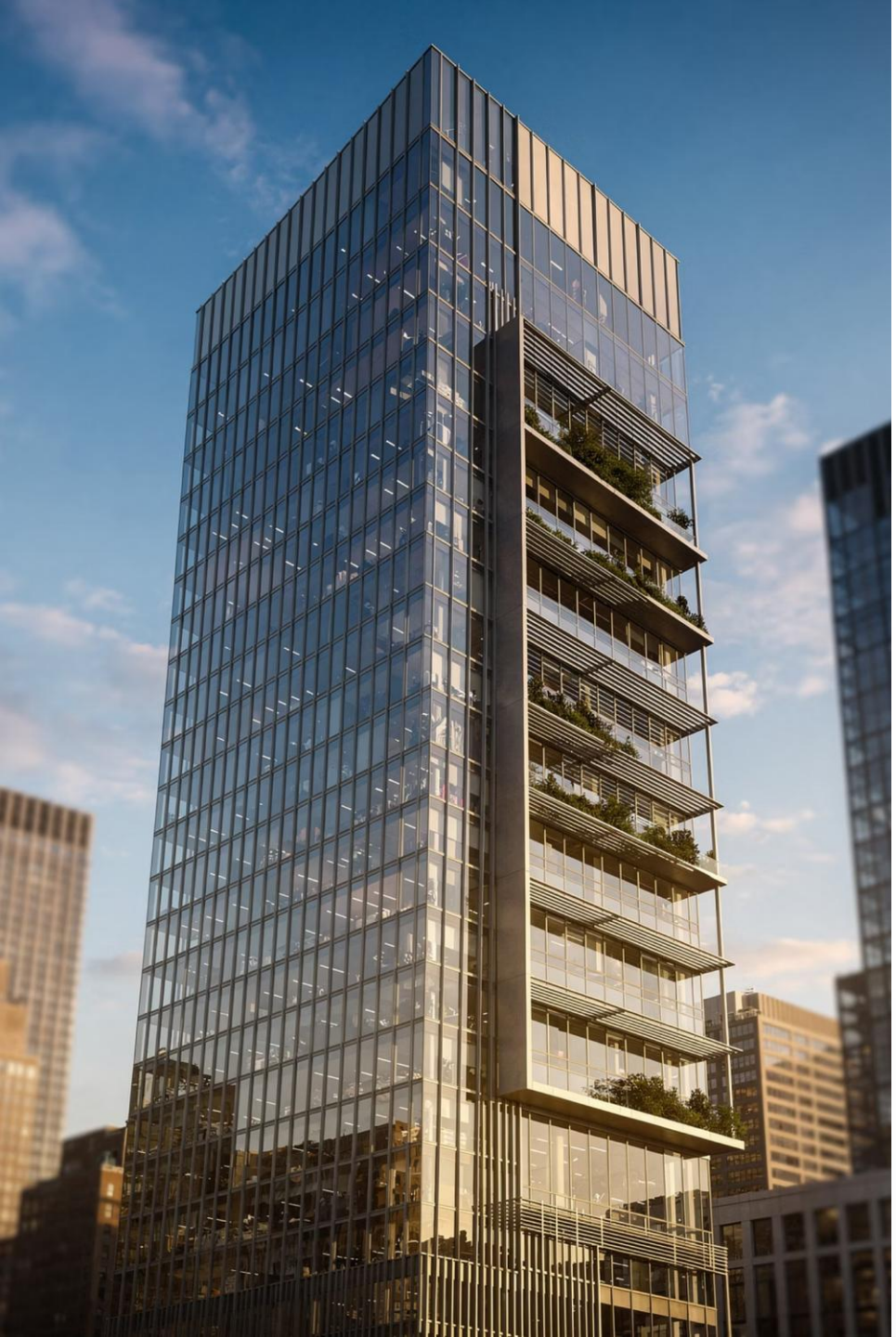
Agentic methods

Time **1 - 2 years**
Cost **$950k - $3.8mm**

Methods
+automated regulatory compliance (orchestration)
+autonomous scenario modelling
+levelized cost of energy analysis

Scan Me:


Agentic AEC
Reimagining and optimizing complex, end-to-end business processes for the built world
ConcurrentAI
Concurrent Build, Inc. Proprietary and Confidential, 2025



2026 NY-GEO CONFERENCE

AI IN GEOTHERMAL

Generative AI & Decarbonization in Commercial Real Estate

Insights from the NYC GenAI Working Groups

Presenter: Thomas Yeh, NYSERDA

NYSERDA GenAI for NYC CRE Initiative

NYSERDA convened two working groups of volunteers to explore how **Generative AI accelerates decarbonization and electrification workflows** in NYC commercial real estate.

Owners & Operators:

Portfolio & Asset Managers, Real Estate Developers, Facility Facility Operators

Engineers & Consultants:

MEP Engineers, Designers, Consultants

Working Group Cadence

Kickoff & Scope

Use Case Discovery

Issue Mapping

Prioritization

Validation

Final Report

OCT 2025 → FEB 2026

Final Report: Use Case Guide is currently under review for publication.

Where Practitioners See Immediate Value

Participants identified high-priority use cases for portfolio intelligence, technical analysis, and documentation efficiency.

Owners & Operators

Portfolio strategy and operational decisions

- → **Drawing Interpretation**
  Reviewing architectural drawings for early code compliance.
- → **Portfolio Diagnostics**
  Benchmarking to identify building performance variations.
- → **Energy Data Analysis**
  Automated parsing of utility and system data.
- → **Acquisition Underwriting**
  Tools for evaluating climate risk and decarbonization.

Key Theme: GenAI extracts actionable insights from insights from unstructured building information. information.

Engineers & Consultants

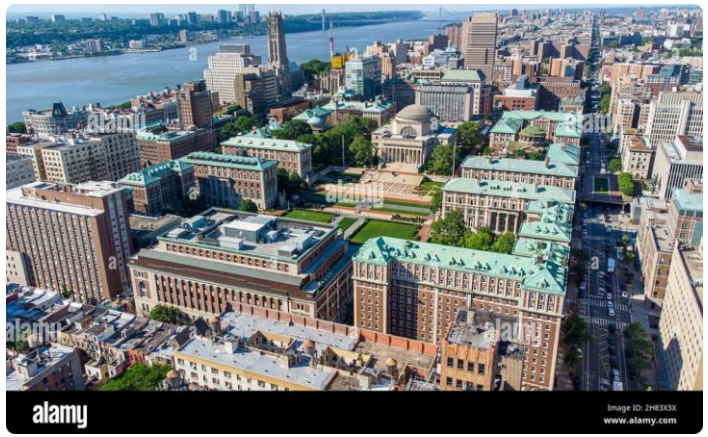
Technical analysis and engineering workflows

- → **Code Compliance Copilots**
  Automated review of building codes and standards.
- → **Report Generation**
  AI-assisted drafting for engineering reports and schedules.
- → **Legacy Drawing Interpretation**
  Extracting usable data from outdated or as-built drawings.
- → **Continuous Energy Auditing**
  Automated performance assessments and fault detection.

Key Theme: GenAI reduces engineering iteration iteration cycles and documentation burden.

GenAI Experiments & "Try-It" Tools

Two teams of NYC-based Academic Advisors developed working demonstrations using NYC datasets to test reliability architectures for compliance-sensitive engineering.

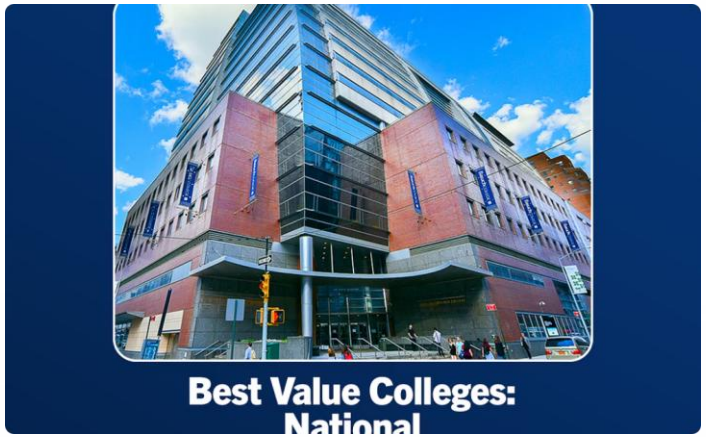


Columbia University — Building Energy Research Lab

Focus: Translating owner use cases into NYC-based prototypes

- Decarbonization data chatbot
- Building risk assessment tool
- Compliance verification assistant

LL84 BENCHMARKING | NYC MAPPLUTO



City University of New York — Computer Science Dept.

Focus: Reliability and agent-based AI engineering workflows

- Permit classification system
- Compliance checking copilot
- Electrification risk analysis

ENGINEER AGENT | VERIFIER AGENT

Key Takeaway: GenAI can operate reliably in compliance-sensitive engineering contexts, provided that validation is deliberately designed into the system architecture rather than added as an afterthought. Academic prototypes demonstrated that multi-agent approaches—such as pairing an Engineer Agent with a Verifier Agent—effectively catch errors and improve overall output quality. Practitioners should therefore treat validation architecture as a first-class design requirement for AI systems, rather than an optional layer.

What Determines Whether GenAI Pilots Work

Layer 1: Data Foundation

NYC's regulatory environment produces **unusually rich, high-value datasets** that form the critical base for reliable AI.

Layer 2: Governance & Trust

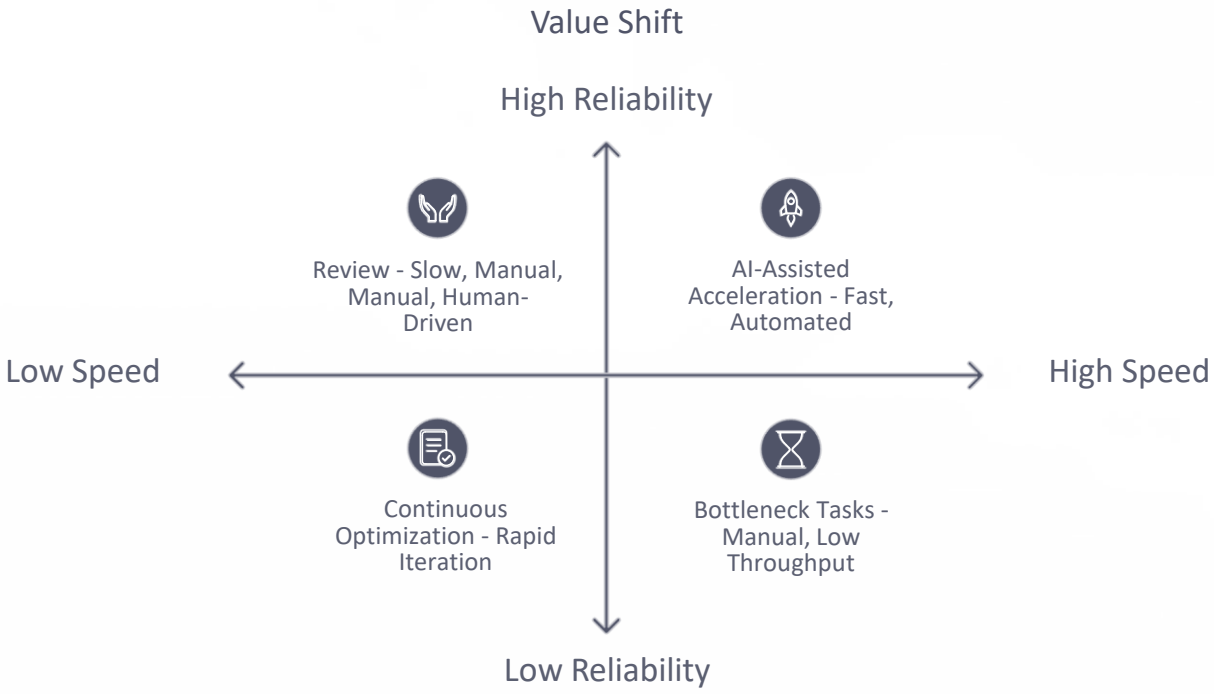
Without clear authority and approval frameworks, teams either over-trust or reject AI outputs.

Layer 3: ROI Measurement

Success is defined by tangible, measurable outcomes such as faster decision-making and fewer review iterations.

Layer 4: Workflow Integration

AI must support existing tools so that they do not operate as a disconnected, standalone chatbot.



> GenAI's near-term value in the built environment is **accelerating decisions**, **decisions**, not replacing them with automation.

How Will AI Impact the Geothermal Industry?

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Panel: Erich Ryan / *Jouler*

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