

Scaling Up U.S. Data Center Heat Reuse

A Proposed Approach

January 2025

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Summary

- Proposes a Data Center Heat Reuse Project with multiple companies participating, collaborating, and sharing knowledge.
- Will deliver a pre-commercial Market Feasibility Study analysis of opportunity to scale up data center heat reuse with the U.S. food and beverage industry, a leading potential offtaker who seeks the zero and low-carbon low temperature heat data centers can provide.
- Project will position Project member companies to pursue potential heat reuse projects with leading food and beverage manufacturers and to scale up data center heat reuse projects in U.S.

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The Opportunity:

Data Centers as Climate Solution Providers

- Heat reuse can be scaled in warm and cold climates, rural and urban settings, and in buildings and in industrial sectors that use low temperature heat, such as food and beverage and pharmaceuticals.
- Doing so lowers AI-driven power demand.
- U.S. markets are nascent with only a handful of projects.
- Data centers should engage potential offtakers about how data center heat presents an opportunity to lower their carbon footprint.

Significant Potential to Decarbonize Industrial Heat

- Around 30% of the total U.S. industrial heat demand operates at temperatures below 100°C.
- Food and Beverage Industry – 97% of heat needs are less than 130 degrees C – so represent potential as an offtaker.
- Data centers produce low temperature heat through electrification.
- For those data centers powered with renewable electricity, they offer carbon-free heat to offtakers.
- Offtakers can reduce carbon emissions and possibly costs by substituting data center heat for current natural gas use.

U.S. Food and Beverage Needs Low-Temperature Clean Heat

- Many food manufacturing processes, including cooking, packaging, and cleaning, require hot water at 60C to 75C
- Pasteurization matches well with liquid-cooled data center heat as it typically uses lower temperatures compared to other industrial processes
- Data center heat is applicable to large, centralized fish, meat, and chicken processing as well as large breweries, high-volume greenhouses, and vegetable packing

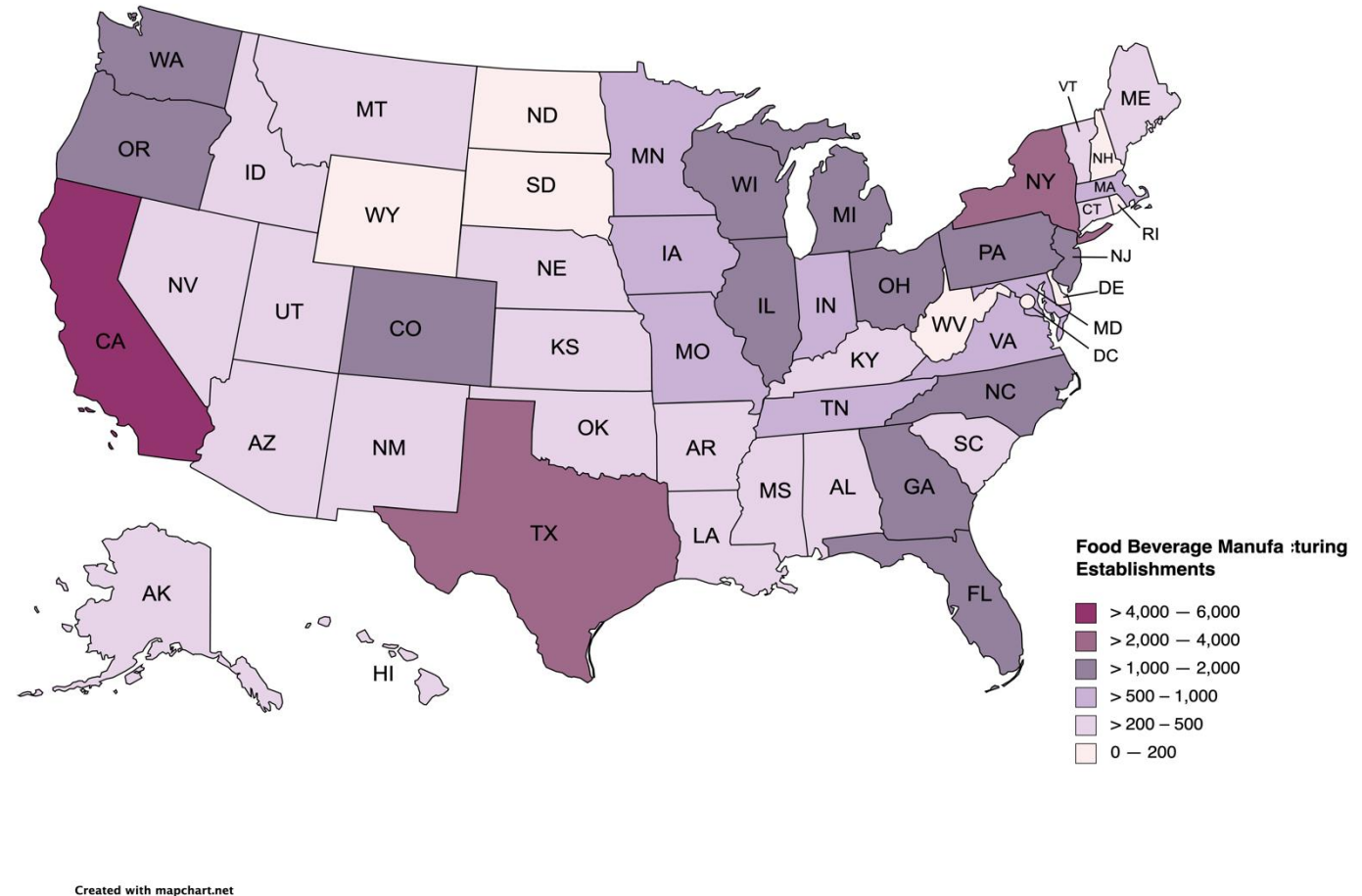


Figure 2: U.S. Food and Beverage Manufacturing

Source: U.S. Census Bureau, “County Business Patterns: 2020,” April 28, 2022, <https://www.census.gov/data/datasets/2020/econ/cbp/2020-cbp.html>.

Food and Beverage Sector Opportunities

Industrial Sector	Unit Operations	Temperature Range	
		Celsius	Fahrenheit
Food	Drying	30-90	90-210
	Washing	60-90	150-210
	Pasteurizing	60-80	150-190
	Boiling	95-105	220-140
	Sterilizing	110-120	250-270
	Heat Treatment	40-60	110-150
Beverages	Washing	60-80	150-190
	Sterilizing	60-90	150-210
	Pasteurizing	60-70	150-170

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Data Center Heat Reuse Project

- Project will deliver a Market Feasibility Study for data center heat reuse with U.S. the food and beverage industry, a leading potential offtaker which seeks the zero and low-carbon low temperature heat data centers can provide.
- Project will position data center companies to pursue potential heat reuse projects with leading food and beverage manufacturers and to lower their power demand.
- Can be expanded to include other sectors such as pharmaceuticals or commercial buildings.

Project will Deliver a Market Feasibility Study

- Business case with economic analysis for data center heat reuse for the food and beverage industry with a focus on larger offtaker opportunities.
- Identify key offtaker needs and potential barriers to project execution based on interviews with energy managers from leading food and beverage producers such as Cargill, Campbells, Keurig Dr Pepper, KraftHeinz, Lactalis, Mars, Nestle, New Belgium, Oatly, Pepsico, Savencia, and Unilever.
- A database of U.S. food and beverage facilities and assessment of their proximity to existing or proposed data centers.

What This Project Will Not Do

- Conduct or develop specific data center heat reuse projects or facilitate conversations specific projects beyond the scope of the market feasibility study. It will focus on pre-commercial market analysis and will operate in strict compliance with anti-trust law. Participants will include companies who own and operate data centers, develop projects, deliver heat reuse technology or services, but any commercial arrangements will happen separately from this project.
- Favor any specific heating, cooling, or heat reuse technologies, but will remain technology neutral.

Proposed Timeline

- Q1 2025 – Recruit Project Participants.
- Q2 2025 – Launch Project.
- Q3 2025 – Deliver database and analysis of data centers and food and beverage manufacturers.
- Q4 – Deliver business case analysis and food and beverage industry interview summary. Complete First Heat Reuse Feasibility Analysis.
- Q1 2026 – Consider potential for other feasibility analyses and need for other measures to scale up heat reuse projects in the U.S, such as broader education or policy.

Year One – Three-Phase Plan

- Phase 1 – Convene initial Project Supporters to share resources and knowledge and align on Project scope. Identify clear champions and thought leaders in this space and give them a platform/voice/visibility.
- Phase 2 – DGA team to conduct research and prepare Market Feasibility Study.
- Phase 3 – Reconvene Project Supporters to share the Market Feasibility Study and its key findings and again to discuss next steps.

Positions a Company for Potential Projects with Food and Beverage Industry

- Defines the business case for potential projects.
- Delivers proximity analysis to identify where the best opportunities exist for co-locating data centers with food and beverage factories.
- Identifies key needs and barriers which food and beverage industry leaders see.

How to Participate in Project

- Companies with annual gross revenues greater than \$5 billion participate for \$25,000.
- Companies with annual gross revenues less than \$5 billion participate for \$10,000.
- Participating companies receive exclusive access to all elements of the Market Feasibility Study and its underlying analysis.
- Participating companies also join quarterly meetings to discuss and shape project, as well as the findings from the Study.
- For more information, please contact David Gardiner at David@dgardiner.com.

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DGA Team Qualifications

- Extensive experience analyzing data center heat and potential reuse and working in the data center industry.
- Connected to potential offtakers through its management of the Renewable Thermal Collaborative.
- Long and successful background scaling up climate solutions with corporate projects.

DGA Team Includes Top Data Center and Climate Experts

- David Gardiner – President, David Gardiner and Associates, a leading climate and clean energy strategy firm. Former Executive Director, White House Climate Change Task Force, and Assistant Administrator for Policy at US EPA.
- Dr. Priscilla Johnson – Principal Managing Partner, Priska Consulting. Former Director of Water Strategy for Microsoft Cloud; Expert Strategy Analyst, Energy Efficiency at Pacific Gas and Electric Company; Adjunct Professor James Madison University, Networking and Cybersecurity.
- Dr. Petter Terenius – University Lecturer in Informatics since 2011, now at Uppsala university, Sweden. Ten years in the IT industry; PhD thesis on datacenter waste heat uses; represents the OCP in a collaborative initiative with EU's EuroHeat & Power and the European Data Centre Association.

DGA Analysis of Data Center Heat Reuse

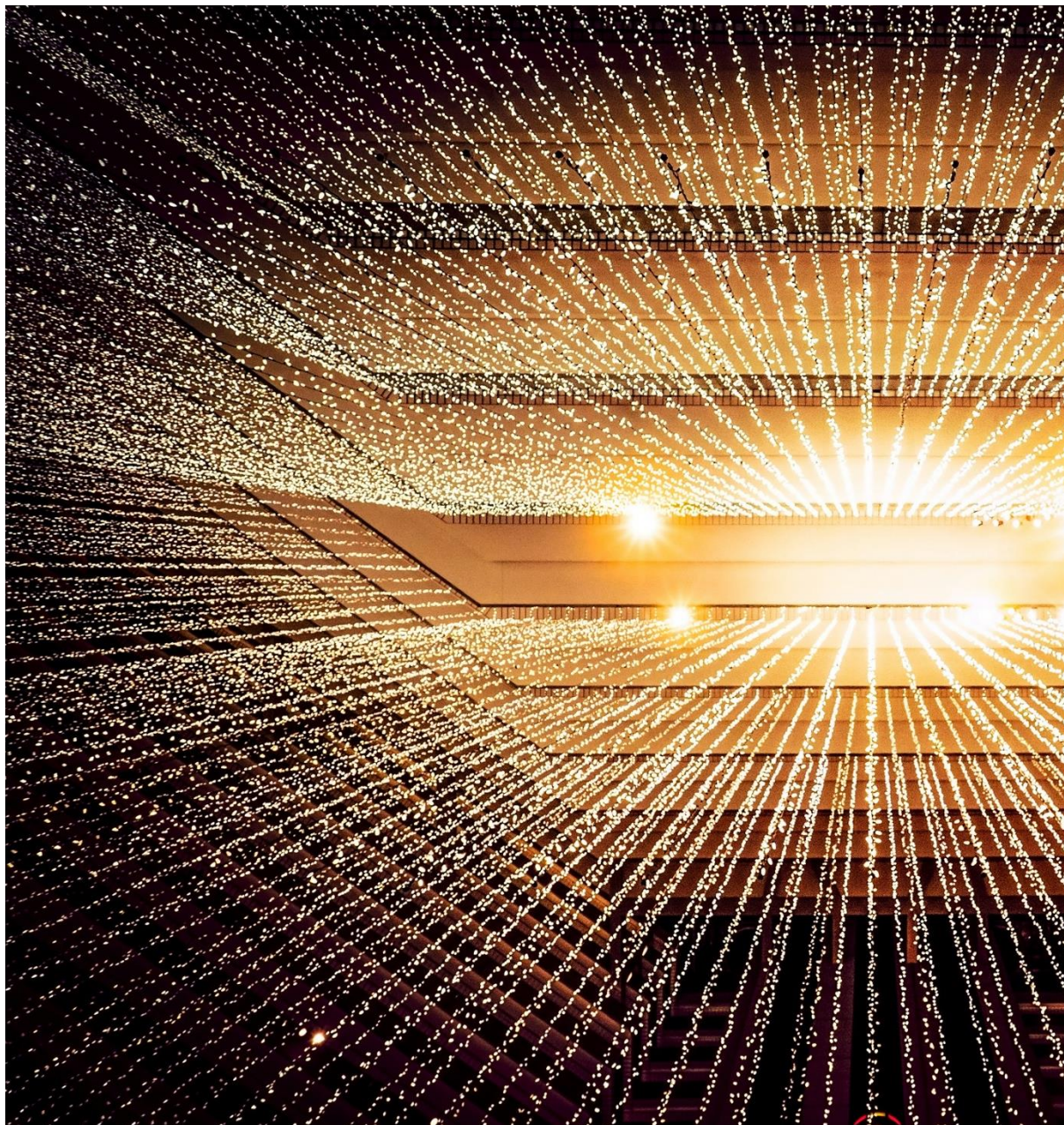
- Analysis for Intel identified food and beverage, pharmaceuticals and medical manufacture, commercial process cooling and refrigeration, and hot water pre-heat as U.S. opportunities.
- Policy paper for Open Compute Project identifies representative data center heat reuse policies in EU and North America.
- Co-design of a patented waterless data center and co-development of Microsoft's net-zero water strategy and carbon reduction goals.
- Data center heat reuse cost-benefit analysis (TCO+earnings) for Open Compute Project, including baseline costs for heat reuse projects, variables and parameters of influence, and potential earnings

Renewable Thermal Collaborative

- DGA manages the Collaborative – the leading Project for organizations that are committed to scaling up renewable heating and cooling at their facilities and dramatically cutting carbon emissions.
- RTC Members recognize the growing demand and necessity for renewable heating and cooling and the urgent need to meet this demand in a manner that delivers sustainable, cost-competitive options at scale.
- RTC Members include leading companies in the food and beverage and pharmaceutical industries, among others.

DGA Team Scales up Solutions with Collaboration

- DGA Manages [Renewable Thermal Collaborative](#) to scale renewable solutions for heating and cooling in the manufacturing and buildings sectors.
- DGA helped create [Americans for a Clean Energy Grid](#) – a leading non-profit focused on how to build out the grid to connect low-cost renewable electricity in remote rural regions to load centers in urban and suburban areas.
- DGA manages the [Combined Heat and Power Alliance](#), the leading national voice for the deployment of Combined Heat and Power (CHP) and Waste Heat to Power (WHP).
- Dr. Johnson led [Upstream Solutions](#), promoting reuse for Corporate Sustainability Officers at leading B2B brands with emphasis on food and beverage and leading reuse initiatives across global markets.



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