

Building a Northeast Ground Source Heat Pump Center of Excellence and Drill Rig Manufacturing Facility

Applicant: International Ground Source Heat Pump Association (IGSHPA)

An application submitted in response to the Funding Opportunity Announcement: Department of Energy Heat Pump Defense Production Program

May 19, 2023



PROJECT DESCRIPTION

Scope and Objectives: The International Ground Source Heat Pump Association (IGSHPA), HEET, the Geothermal Exchange Organization (GEO) the New York Geothermal Energy Organization (NY-GEO), and GTD are creating a Northeast Center of Excellence (CoE) to train drillers and expedite delivery of top-of-the-line drill rigs through leasing and financing options. Additionally, GTD, an innovative drill rig manufacturer looking to expand its presence in the U.S., will build a factory with the capacity to double its local delivery of drill rigs. Essential outcomes of the project include immediate increases in availability of drill rigs and drillers and a manufacturing facility that can increase production of geothermal drill rigs in the medium term. The CoE will engage with regional communities and community colleges, particularly in underserved communities, and organizations representing labor, veterans and people with disabilities, to recruit a local and diverse workforce. Finally, the CoE will develop strategic alliances with state actors, utilities, and other stakeholders throughout the Northeastern U.S. Our intent is to double deployment of GSHPs in the Northeast in the first two years of the project, and to prepare the industry and workforce to meet transformative increase in scale.

SHORT TERM GOAL: In the first 24 months, we will pursue the following:

Objective 1: Set up a drill rig leasing program to increase GSHP deployment. The CoE will purchase 40 drill rigs and make them available to regional drillers for rent, lease or purchase, immediately increasing regional capacity to support the larger-scale installations under development in the region. We will track the impact of the rigs on GSHP deployment. Income from the program will support the CoE training and research activities.

Objective 2: Pilot a driller training program at Hudson Valley Community College (HVCC). The National Ground Water Association (NGWA) will partner with us to adapt their online curriculum to help local community colleges train geothermal drillers (see Letters of Support from NGWA and HVCC). The program will involve community college coursework, NGWA online modules, and hands-on training with the CoE's drill rigs. Each year for two years, we will train a cohort of 30 driller apprentices of at least 40% underrepresented groups; place at least 10 graduates in Northeast GSHP-installer apprenticeships; and track their progress.

Objective 3: Establish the GSHP Center of Excellence (CoE). We will create the CoE structure, board and stakeholder network, and hire staff. GTD will engage with local partners, recruit construction teams and personnel from the local community. We will iterate, using data, on the leasing and training programs, and conduct outreach (especially to recruit and retain diverse drillers), as well as, design additional curricula with local community colleges.

OUTCOMES (2 years) Build an inventory of 40 drill rigs, train 60 driller apprentices and fill 20 driller positions, create a scalable training programs for GSHP borehole installers, provide data on market demand and projected needs, condition the factory and CoE, and develop a network of regional stakeholders in order to double GSHP installations in the region.

LONG TERM GOAL: Over the course of the 4-year project, we will ramp up manufacturing and support industry growth and transformation needed to meet projected regional GSHP demand:

Objective 4: Launch the GSHP CoE, including a training center; a manufacturing plant; and a research and development (R&D) facility to improve the technology. The CoE will maintain a fleet of 40 drill rigs for ongoing training and leasing programs.

Objective 5: Produce and ship U.S.-made drill rigs. GTD will oversee building of the plant and train manufacturing staff. Once built, they intend to increase output to 48 drill rigs per year. It will place at least 60% of those drill rigs in the hands of regional drillers through either direct sales, lease-to-own, or rental programs supported by the CoE.

Objective 6: Launch the education and workforce development program. The CoE onsite driller apprentice training program will supplement coursework at regional community colleges. We will recruit a starting class of 50 students from local trade schools and worker retraining programs such as the Department of Defense SkillBridge program. Education partners will create additional programming to train a workforce for utility-scale, networked geothermal projects. The program will grow to serve up to 100 students of diverse backgrounds per year.

Objective 7: Scale the industry. The CoE will- help harmonize certification and licensing for geothermal drillers across Northeastern states, work with labor to retrain workers displaced by shrinkage of the fossil fuel system, and develop workforce programs to support utilities installing networked geothermal systems.

OUTCOMES (48 months): A manufacturing plant that produces 48 drill rigs per year with potential to grow, a fleet of 40 drill rigs available for training and leasing, active R&D facilities, a training program graduating 100 drillers and associated tradespeople per year.

Project Location: IGSHPA, HEET and GTD are evaluating sites in New York, Massachusetts and Connecticut. Evaluation criteria include: Justice40 community in rural or semi-rural setting to allow for expansion, geological characteristics favorable for active drilling, construction and manufacturing workforce potential, proximity to community colleges (CC) and a willing local community. Potential sites include Troy (New York), adjacent to the Hudson Valley Community College; Framingham (Massachusetts) near the Eversource networked GSHP project and Framingham State University; and Worcester (Massachusetts) near Quinsigamond Community College and Worcester State University. Site selection will be finalized by application time.

Production Capacity: GTD aims to undertake a two-phase drill rig production initiative. Phase 1: GTD will help the CoE build an inventory of 40 versatile drill rigs and complementary equipment for the driller training. GTD's current production capacity is 4 drill rigs per month. As part of our cost share, GTD will provide the CoE with 8 integrated rigs that incorporate Mud rotary, Air Rotary, and Hammer drilling capabilities. The CoE will slowly establish an inventory of 40 rigs for short-term leasing or rent-to-own financing for drillers across the region.-

Phase 2: GTD will expand domestic manufacturing capabilities, doubling their current annual production capabilities. The goal is to double GSHP installations. R&D facilities will improve the technology, for instance by electrifying the drill rigs.

Market Overview: This project will address shortages in GSHP installation components. GSHPs in the U.S. exceed 1.7 million units; installations are currently at 70,000 per year and the industry keeps a 3 percent annual growth. As the nation moves to electrify, however, the GSHP market is expanding dramatically. Since GSHPs are more efficient in extreme weather conditions and can help flatten peak seasonal loads on the electrical grid, Northeastern states are providing strong GSHP incentives. In 2019, the GTO's GeoVision analysis conducted a global

study of market potential for GSHPs by evaluating trends in GSHP sales and other factors. They concluded that the US market would expand consistently through 2050, especially in the Northeast. Their most conservative estimate was a 4.3-5.4% compound annual growth rate. This analysis did not account for the fact that 9 Northeast gas utilities are now installing or proposing to install networked GSHPs as an alternative business model.

Real demand for GSHP is projected to be much higher. Massachusetts has set ambitious targets to electrify 1 million homes each by 2030, which translates to roughly 550 homes electrified per working day over the next 7 years. New York has set similar goals, and states like Connecticut have net zero goals. Assuming that GSHP installations remain at under 15% of heat pump totals, GSHP installations would need to double every year. Meeting these targets will not rely solely on individual customer-led transitions; Massachusetts utilities alone are conducting five networked GSHP projects that transition neighborhoods at once. The entry of large-scale players into the market will transform the market, fostering standardization and reducing costs throughout the supply chain.

Domestic Supply Chain: By bolstering the ground heat exchange supply line, the center's initiatives will increase domestic capacity to satisfy current and projected demand, reducing dependence on imported technologies and expertise.

1. The drill rig leasing program will double access to equipment essential for ground heat exchange installation. The availability of off-the-shelf floor models, fully serviced and maintained, will alleviate the financial burden associated with purchasing a drill rig outright, and rental options will allow for more flexible deployment to each project.
2. Onshoring a drill rig manufacturing plant will enhance domestic capacity, train a local manufacturing workforce, and reduce reliance on foreign suppliers. GTD plans to produce an additional 48 drill rigs for the US market in the first year of plant operation, and subsequently grow production to meet local demand. This production line will significantly bolster the availability of rigs in the Northeast market, addressing the current shortage and supporting the anticipated increase in demand for GSHP installations.
3. A research and development unit will help integrate technological advances in drill rig design, loop installation, and GSHP coupling.
4. A new driller training program focused on geothermal borehole installation, along with heavy recruitment of regional technical students with a green energy interest, will help bridge the existing workforce gap and ensure that there are enough qualified installers to meet the growing demand for GSHPs. CoE programs will train skilled workforce capable of managing and executing large-scale coordinated borefield and GSHP installation projects.

Onshoring manufacturing of high-performance drill rigs and investing in workforce training will enhance national security and resilience. By reducing reliance on foreign suppliers, the CoE will mitigate the risk of supply chain disruptions and safeguard the availability of critical equipment. The effort will enhance economic competitiveness by creating job opportunities, stimulating local industries, and fostering cooperation and innovation.

Community Benefits: We have designed a program to benefit the community at several levels: (1) the CoE and facility will provide jobs to the local community; (2) the training program will

prepare regional graduates for jobs in their communities through hands on training, classroom knowledge, job counseling and addressing soft skills; (3) the CoE will work with potential stakeholder communities (veterans, people with disabilities, fossil fuel workers who may be displaced by net zero goals) to develop workforce continuity and inclusion programming.

The CoE and manufacturing facility will provide 10 jobs in the first couple of years, and up to 30 as manufacturing scales. We are working with communities to understand the local market and ensure we can be responsible employers in the region.

Outreach to community colleges (CC) is a central part of our training program. The pilot driller training program will take place at Hudson Valley CC, but will include organizations such as the Massachusetts Association of Community Colleges, which is refining a statewide clean energy training program; institutions located in Justice 40 areas and areas identified by Massachusetts as Environmental Justice communities with high minority populations ((see Letters of Support)); and technical schools such as the Minuteman High School and Quinsigamond CC who offer heating and ventilation certificates.

To support DEIA, the CoE is planning comprehensive worker development programs. We will solicit feedback from underrepresented students in our pilot training program; conduct outreach to colleges and technical schools in underrepresented communities; actively recruit students from different stakeholder communities (see Letter of Support from SkillBridge and The Crosby Group), and design training and workplace support for participants from diverse groups. Worker development programs will include education, apprenticeship, advocacy, research and financial assistance.

Labor is another key stakeholder for the CoE. Networked geothermal systems provide an exciting opportunity for fossil fuel workers to transition to jobs in the green economy. We are engaging with the Building Decarbonization Coalition, labor unions (see Letters of Support from BDC and NEGWA), and groups such as the Social Enterprise And Training center (SEAT) to design transition and employment support.

Project Impacts: The Northeast will benefit by the increase in resources to transition to non-fossil fuel heating and cooling. This will help mitigate climate change, improve the public health and provide a safe, secure and healthy source of heating and cooling. GSHP installations cannot reach necessary projected growth without the drilling capability being greatly increased. Onshoring the manufacturing of high-performance drill rigs and investing in a leasing program will double the regional availability of drill rigs. The workforce training and worker development programs program will provide a steady flow of apprentices, growing the workforce. By addressing the shortage of drill rigs and drillers, this project will enable market expansion and foster deployment of GSHP's in the northeastern US.

Impact of DOE funding: GSHPs are a critical component to reaching the nation's climate and energy security goals. This funding will help transition states in the Northeast away from reliance on foreign fossil fuels. By onshoring a drill rig plant, it will build domestic manufacturing capacity and mitigate the risk of supply chain disruptions in GSHP deployment. This funding will therefore help states in the Northeast decarbonize space heating, cut energy use and costs, reduce climate risks, and create local high-skill jobs while increasing national security and decreasing our dependence on foreign fuels and supplies.

ADDENDUM

Team qualifications

IGSHPA and GTD letters are appended. Letters of Participation and Support from the other participants are also attached.

GTD is a global manufacturer of shallow geothermal drill rigs and equipment. Our exclusive focus on Ground Source Heat Pump (GSHP) drilling equipment simplifies operations, increase productivity, safety, and enhances training accessibility. Collaborating with partners, including Venture Drilling Supply (VDS), we provide sales and after-sales support in the U.S. market.

Venture Drilling supply has partnered with GTD to become the national dealer of geothermal drilling equipment. To ensure our customers succeed with their new equipment, our trained technicians perform a pre-delivery inspection, field commissioning, and timely support with parts and service. VGS is committed to establishing a physical presence to support the drilling equipment at the COE with parts and service. Beyond the impact of the COE, we will continually sell and maintain support for all applicable drilling operations in the Northeast as the demand for drilling grows.

HEET is a nonprofit climate solutions incubator that innovated the gas-to-geothermal network transition in Massachusetts that is conducting a research study of the first utility-scale geothermal network installations in the state. We will collect data from the CoE to help inform market analysis. We will also use our stakeholder engagement approach to support the CoE's efforts to recruit geothermal drillers and GSHP installers, interface with utility-led projects, and help partners develop curricula that addresses market demand.

New York Geothermal Energy Organization (NY-GEO), a not-for-profit trade association, founded in 2014 and representing the geothermal heat pump (GHP) industry in New York State, is dedicated to promoting geothermal heating and cooling. Our 70 founding members include geothermal system designers, installers, drillers, general contractors, engineers, manufacturers, distributors, renewable energy consultants and industry stakeholders who install and advocate for the use of ground-source heat pumps to heat and cool buildings throughout New York State.

The Geothermal Exchange Organization is a nonprofit trade group focused on public policy and consumer awareness on behalf of the geothermal heat pump (GHP) industry. Our mission is to increase awareness, support, and adoption of GHPs, the cleanest, most efficient heating and cooling systems in existence.

Cost share: The bulk of cost share will be provided by GTD, who have committed \$4.6 million for at-cost equipment for the training program, and \$20 million in in-kind and other cost share for the leasing program and construction phase. This application represents an informal coalition of nonprofit organizations, drillers, GSHP and drill rig manufacturers, community colleges and other stakeholder organizations. We are providing letters of participation from engaged parties who will be providing in kind or cash contributions. IGSHPA and [partner](#)

organizations are committing \$5 million of in-kind donations and fundraising from state and private sources. Massachusetts, Connecticut and other states offer generous energy, workforce and economic development funding, but these additional assets cannot be secured until the DOE funding is approved.

Risk mitigation plans

The applicant must identify risks and challenges of the project, as well as strategies for mitigating and managing those risks.

1. Supply Chain Risks: Shortage of components for drill rigs. Mitigation: GTD has a strong relationship with Venture Drilling, a national drill rig distributor. We will establish similar partnerships with drill rig component suppliers and manufacturers to diversify the supply chain and ensure a steady flow of materials.
2. Driller Apprentice Recruitment Risk. Mitigation: Recruit more broadly to upskill existing workforce and attract new talent. Collaborate with educational institutions and vocational training centers. Offer high school internships to create a pipeline of interested students. Strengthen industry collaborations to address skill gaps and share best practices.
3. Financial Risks: a. Cost overruns and budgetary constraints during construction and operation. Mitigation: Conduct a thorough financial feasibility study to accurately estimate costs and develop a robust budget. Implement effective project management practices to monitor expenses and control costs. Establish contingency funds to address unforeseen circumstances.

b. Market volatility and fluctuating demand for GSHPs. Mitigation: Continuously monitor market trends and demand patterns (including through our leasing program) to anticipate shifts in the industry. Develop strategic partnerships with government agencies, gas utilities, and other stakeholders to secure long-term contracts and incentives. Invest in research and development to innovate and stay ahead of market demands.

International Ground Source Heat Pump Association

Partner Organization Contribution

The International Ground Source Heat Pump Association (IGSHPA) is a 501(C)(6) non-profit, member-driven organization established in 1987 to advance ground source heat pump (GSHP) technology on local, state, national and international levels. With its access to the most current advancements in the ground source/geothermal heat pump industry via its diverse membership base and its industry alliances, IGSHPA is the ideal bridge between the latest technology and the people/organizations who benefit from these developments.

As a participant of this FOA, IGSHPA will be applying for the funding. In coordination with the other partner organizations listed in this concept paper and IGSHPA members, IGSHPA is in an excellent position with knowledge from the overall geothermal heat pump industry to determine the best way to utilize funding to accomplish the goals of a significant increase in adoption of geothermal heat pump technology, which can accelerate beneficial electrification of heating and cooling systems. By nature of the operation of the technology, a substantial reduction in peak demand vs. other electric heating and cooling technologies is possible, greatly reducing the impact on the grid. However, without adequate drilling capacity, it will be difficult to accelerate adoption.

IGSHPA's ability to leverage its access to geothermal heat pump industry stakeholders will allow the funding to be directed in the appropriate areas to increase drilling capacity and create jobs through workforce development programs. As the applicant for the funding, IGSHPA will act as a neutral third party, distributing the funding based upon feedback from stakeholders.

IGSHPA is in the process of updating all of its training courses (modularizing to better address workforce development) and will be hiring staff and outsourcing resources. These expenses are considered part of the cost share, since these expenses will be part of the new curriculum that can be used for the CoE. We are estimating expenditures of \$500k to \$1M per year to develop accredited courses for individual certifications over the next 2-1/2 years.

GTD Group Ltd
www.gtd-drilling.com

GTD, headquartered in Kent, UK, with global manufacturing facilities and supply partners, is the fastest-growing international manufacturer of specialist shallow ground source geothermal drill rigs, drilling equipment, and a comprehensive ecosystem of supplies. With an exclusive focus on Ground Source Heat Pump (GSHP) drilling equipment, we provide not just the drill rigs but also all supporting machinery for safe, efficient, and consistent drilling.

GTD's drill rigs and equipment are globally renowned for their productivity, enhanced safety features, and ease of use, specifically designed for efficient GSHP borehole drilling. Our user-friendly equipment simplifies every aspect of running a GSHP drilling operation, from learning and operating to maintaining and repairing, making workforce training more accessible.

GTD is working in collaboration with all the other partners, specifically bringing manufacturing expertise, supply chain development, and the necessary equipment to facilitate workforce development and expand drilling capability. Our contributions to this project include both "in kind" and direct resources, equipment, and investments in domestic US facilities.

Recognizing the significance of strategic alliances and domestic infrastructure, GTD has already fostered a partnership with Venture Drilling Supply (VDS), a homegrown U.S. company with over four decades of industry experience. This collaboration provides sales and after-sales support for GTD equipment within the U.S. market.

GTD will provide training equipment at factory cost (Drill rigs and supporting machinery, tooling and supplies) directly supporting workforce training development with consultative contributions and practical participation of highly experienced operators and mechanics with expert knowledge and experience to accelerate the programme development and deployment. Furthermore, we would expand our manufacturer facilities to the USA, in conjunction with the proposed Center of Excellence, a key part of growing drilling capacity and capability.



To Whom It May Concern,

We are writing on behalf of Venture Drilling Supply to express our full support for this Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. We are thrilled that the International Ground Source Heat Pump Association (IGSHPA) is helping increase the production of drill rigs and the training of geothermal drillers in the Northeast. This Center will be a key catalyst for our industry, and will overcome the bottlenecks that are stifling growth of the GSHP market in the U.S.

We firmly believe in the importance of GSHPs in achieving our country's climate and energy security goals. By operating on electricity, GSHPs reduce our reliance on oil and gas from adversarial nations. Their lower operating costs and wider operating ranges make them an ideal solution for regions like the Northeast that experience extreme weather conditions. Furthermore, to help scale more quickly, some states and utilities are developing district heating systems incorporating GSHP networks to meet their climate goals more quickly and equitably. We understand our critical importance to achieving a clean energy future and meeting the region's climate and energy independence goals.

However, we face a critical challenge in bridging the gap between GSHP production capacity and installation rates. Unlike air source heat pumps, GSHPs consist of two components: the heat pump itself and the ground heat exchanger. Our capacity to manufacture heat pumps currently outstrips the 70,000 units we ship per year, and we have plans to scale over the next four year. However, as outlined in the proposal, the lengthy delivery time for new drill rigs and the shortage of skilled workers specialized in ground heat exchanger installations present significant hurdles in deploying GSHPs. Our ability to produce GSHPs surpasses the installation capacity of drillers.

To overcome this supply chain bottleneck, IGSHPA is proposing to enhance regional drill rig availability by nearly 50 rigs per year, and establish a core of locally trained geothermal drillers specializing in GSHP installations. We wholeheartedly support the drill rig leasing program, recognizing its potential to enable local drillers to promptly respond to large project requests. Additionally, we applaud the region-wide efforts to recruit and train drillers and other GSHP-related professionals, underscoring IGSHPA's forward-thinking approach in meeting the immense growth potential of GSHPs in the Northeast.

In conclusion, we firmly believe that IGSHPA's Center of Excellence will effectively scale up our capacity to install GSHPs in line with the projected demand in the Northeast. By addressing the challenges of drill rig availability and trained workforce shortages for ground heat exchangers, this initiative will alleviate the burdens hindering our industry's growth. We wholeheartedly urge your support for this transformative initiative, which has the potential to deliver significant economic, environmental, and security benefits to the United States.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Colt McCarthy', is written over a horizontal line.

Colt McCarthy
President
Venture Drilling Supply



ROGER A. RAMSAMMY, PH.D.
PRESIDENT

May 2023

RE: DE-FOA-0002987, International Ground Source Heat Pump Association Concept Proposal

To Whom It May Concern,

On behalf of Hudson Valley Community College, I am writing to express my enthusiasm for the International Ground Source Heat Pump Association's (IGSHPA) Concept Proposal to create a Center of Excellence (CoE) for ground source heat pumps (GSHPs) in the Northeastern United States. Key components of this proposal are delivering a fleet of drill rigs for regional deployment and training, building a manufacturing and development facility, and creating a workforce training and advocacy program for drillers. This will be accomplished in collaboration with GeoExchange and a coalition of drill rig and heat pump manufacturers, drillers and ground heat exchange installers, and other key stakeholders.

GSHPs are a critical component of our energy supply chain with regard to energy security. They run on electricity, which will decrease the US dependence on foreign oil and gas. They have a lower operating cost than air source heat pumps and a wider operating range. Finally, interconnected GSHPs show dramatic increases in efficiency and can ameliorate peak electrical loads, relieving the electrical grid of the projected crippling effect of building heating electrification, which is a critical security issue.

However, in spite of their central importance, domestic production of GSHPs is not increasing at the rate and volume necessary to meet New York and Massachusetts net zero transition goals of electrifying 1 million homes by 2030. The proposed CoE will address this critical gap in production of ground heat exchangers by increasing regional drill rig production capacity, helping to establish utility-scale networked GSHP systems, and training a local workforce.

HVCC would support the CoE's efforts by leveraging state-of-the-art facilities including the college's Gene F. Haas Center for Advanced Manufacturing Skills, apprenticeship programs, and existing "train-the trainer" modules which are centered on energy efficiency and the training of photovoltaic solar instructors. Currently, HVCC is engaged with NYSERDA (New York State Energy Research and Development Authority) on two robust grant initiatives to prepare a highly-skilled, diverse workforce to meet the needs of off-shore wind manufacturers and associated employers.

In conclusion, the IGSHPA Center of Excellence for GSHPs will be an important asset to help Northeastern states meet climate goals, achieve energy security, and grow a strong, local green job workforce. Therefore, I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Ramsammy", enclosed within a circular stamp or seal.

Roger A. Ramsammy, Ph.D., President
Hudson Valley Community College

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Commissioner

May 19, 2023

Department of Energy (DOE)'s Office of Manufacturing
and Energy Supply Chains
United States Department of Energy
Washington, DC 20585

RE: Letter of Support for Home Energy Efficiency Team (HEET) regarding the Heat Pump Defense
Production Act Program

The Massachusetts Department of Energy Resources (DOER) is pleased to provide this Letter of Support to Home Energy Efficiency Team (HEET) as it pursues funding under the Heat Pump Defense Production Act Program provided by the Office of Manufacturing and Energy Supply Chains. HEET's proposal addresses a critical barrier in the increased deployment of GSHPs by establishing a drill rig manufacturing facility and a ground source heat pump (GSHP) Center of Excellence. This project will train drillers and other skilled workers in the GSHP industry and increase the domestic availability of drill rigs through increased production and establishing a leasing program. Supported by a coalition of industry stakeholders, this initiative aims to enhance the capacity for GSHP deployment in the Northeast, ensuring the industry can rapidly scale to meet the region's climate objectives, improve energy independence, and strengthen U.S. security.

DOER is an agency of the Executive Office of Energy and Environmental Affairs. DOER's mission is to create a clean, affordable, equitable and resilient energy future for all residents, including low-income and Environmental Justice populations, businesses, communities, and institutions in the Commonwealth. To meet these objectives, DOER develops and implements policies and programs to ensure the adequacy, security, diversity, and cost-effectiveness of the Commonwealth's energy supply. DOER is committed to working to promote energy programs and policies that are developed and implemented to ensure environmental justice among all the Commonwealth's citizens, communities, businesses, and institutions. DOER provides letters of support to projects that achieve the energy goals of the Commonwealth.¹

For federal funding opportunities where DOER is not an applicant or a partner to an applicant, DOER welcomed applicants to submit a Request for a Letter of Support about how the proposed project meets DOER and Commonwealth of Massachusetts energy goals. DOER has reviewed the proposed project, as submitted to DOER on May 18, 2023, and DOER has determined that HEET has considered and

¹ Please note this Letter of Support does not commit DOER to the proposed project, nor does it imply any commitments of state funding or project management.

demonstrated that their proposal considers clean energy goals for the Commonwealth of Massachusetts. This demonstration is the basis for DOER providing this Letter of Support.

- **Clean Energy and Emission Reduction:** States in the Northeast, including the Commonwealth, have considered networked GSHPs (“thermal networks”) as one strategy to decarbonizing existing fossil-fuel based heating needs and to meet net zero goals. Supporting the growth of GSHPs is therefore one critical step to meeting the region’s climate and energy security goals, and the industry would need to scale quickly to contribute to the projected demand for clean heating.
- **Energy Reliability and Resilience:** Creating a Center of Excellence for manufacturing of high-performance drill rigs here in the Northeast and investing in local workforce training would enhance national security and resilience. The Center would mitigate the risk of supply chain disruptions and safeguard the availability of critical equipment for this resilient technology. Interconnected GSHPs or networked geothermal systems can mitigate the impact that building heating electrification will have on the electrical grid at seasonal peak times, increasing energy reliability and resilience. Additionally, GSHP can provide safe, secure, and healthy source of heating and cooling to Commonwealth residents.
- **Energy Equity:** HEET is proposing consideration of Justice40 both in their site selection for the Center and in outreach to colleges and technical schools for potential trainees in or from underrepresented communities. This will extend to consideration of communities identified by Massachusetts as Environmental Justice communities.
- **Workforce and Economic Development:** The key objective of the HEET proposal focuses on developing a trained workforce to tackle our clean energy challenges. The Center will train drillers and expedite delivery of top-of-the-line drill rigs through leasing and financing options in an effort to create projects and thus a job pipeline for trainees. Additionally, GTD, an innovative drill rig manufacturer looking to expand its U.S. presence, will build a factory with the capacity to double its U.S. delivery of drill rigs. This Center would have an economic impact on the Commonwealth through an increase in GSHP skilled labor and the availability of the very equipment that labor is trained on.

We are excited to see this concept developed by HEET and look forward to further discussions on the project. Should the proposal receive encouragement to pursue a full application, DOER would work with the HEET project team on their application design to support the integration of all our state energy policy objectives, including energy affordability, mitigating environmental impacts, and the benefits described above. Thank you for your consideration of this concept paper and letter of support.

Sincerely,



Elizabeth Mahony
Commissioner
Department of Energy Resources



To Whom It May Concern -

May 19, 2023

I am writing to express my strong support for International Ground Source Heat Pump Association's (IGSHPA) Concept Proposal to the Heat Pump Defense Production Act, entitled: *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant*. The proposed project will help us deploy ground source heat pumps (GSHPs) at the rate and volume needed to meet our climate goals, achieve energy security and resilience, and grow a strong, local green job workforce.

HEET is the nonprofit climate-solutions incubator that first designed the gas-to-networked GSHP pathway by which gas utilities can provide community heating and cooling through shared infrastructure in the street. Networked GSHPs are a promising method for gas utilities to provide affordable and safe thermal energy to all in an equitable manner. Networked GSHPs can also reduce the strain on the electric grid from building electrification and can be installed almost anywhere.

Last year the Schramm drill manufacturing company, a family-run business founded in 1900, announced that it would be shutting down its Pennsylvania plant. This decision was surprising given the increasing demand for GSHPs in the United States. Schramm was known for producing high-quality drill rigs used in a variety of applications, from oil and gas exploration to water well drilling.

Schramm's closure is badly timed. Massachusetts' utilities are installing five networked GSHP systems, and HEET is leading a research study of these projects. We have seen how stretched and overworked the local driller community is. There are not enough drill rigs or drillers in Massachusetts available to install the borefields required for these projects. Six other gas utilities in the Northeast are also planning to install networked GSHPs. The rate-limiting step is the drilling –there are too few drill rigs and drillers.

Drill rigs are expensive, and are typically owned by small drilling companies that specialize in drilling water wells. These companies were not set up to handle the ground heat exchange market, and as a result, the supply of drill rigs remained constrained. The drill rigs market inefficiency was not only a missed opportunity for Schramm, but also a significant barrier to the growth of the GSHP industry as a whole.

GSHPs are a critical component of our energy supply chain with regard to energy security. They run on electricity, which will decrease the US dependence on foreign



oil and gas. They have a lower operating cost than air source heat pumps and a wider operating range - areas like New England with extreme temperatures must rely on GSHPs to meet their heating and cooling needs. Finally, interconnected GSHPs show dramatic increases in efficiency and can ameliorate peak electrical loads. Networked GSHPs can therefore relieve the electrical grid of the projected crippling effect of building heating electrification, which is a critical security issue. For these reasons, states like Massachusetts and New York have centered networked GSHP systems (also called Thermal Energy Networks) in their net zero transition planning. Utility-scale networked GSHP systems would have a dramatic impact on market growth in the region. GSHPs are therefore a key component to achieving a clean energy future and meeting U.S. security goals.

In spite of their central importance, domestic production of GSHPs is not increasing at the rate and volume necessary to meet the region's climate goals. Massachusetts has set a goal of electrifying 1 million homes by 2030, New York is proposing 2 million; if only 20% of those homes transitioned using GSHP, it would represent over 250 installations per working day over the next 7 years. For comparison, only 14,000 heat pumps (both air source and ground source heat pumps) were installed in all of Massachusetts in 2022 (an almost 50% increase from the previous year but still under target). Despite generous rebate programs and high customer demand, GSHPs represented a small fraction of those installations. We don't have enough drillers to meet the demand for GSHPs, and these drillers must wait 6 months to a year to receive a new drill rig. We cannot move forward at the speed and scale needed.

The proposed Center of Excellence (CoE) and manufacturing plant would address this critical gap in production. Unlike air source heat pumps, GSHPs have two components: a heat pump and a ground heat exchanger. As described in this proposal, the local availability of drill rigs and the skilled workers needed to create the ground heat exchanger is the major rate-limiting step for deploying GSHPs in the region. IGSHPA is proposing to relieve the bottleneck in the production of ground heat exchangers by increasing regional drill rig production and training a local workforce. The proposed CoE and manufacturing plant would help the region deploy GSHP solutions at the speed and scale needed to decarbonize

In addition to improving production capacity for ground heat exchangers, the CoE will support local job growth. We are particularly excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. This will help to promote economic growth while supporting a just and equitable transition to a cleaner energy system.



In conclusion, we believe that the CoE for GSHPs is critical for ramping up domestic capacity and overcoming the supply chain and workforce barriers standing in our way. Therefore, we strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,

A handwritten signature in black ink, appearing to read "Audrey Schulman". The signature is fluid and cursive, with the first name "Audrey" and last name "Schulman" clearly distinguishable.

Audrey Schulman
Co-Founder and Co-Executive Director



Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program
Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

We are writing on behalf of the New York Geothermal Energy Organization to express our full support for this Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. We are thrilled that the International Ground Source Heat Pump Association (IGSHPA) is helping increase the production of drill rigs and the training of geothermal drillers in the Northeast. This Center will be a key catalyst for our industry, and will overcome the bottlenecks that are stifling growth of the GSHP market in the U.S.

We firmly believe in the importance of GSHPs in achieving our country's climate and energy security goals. By operating on electricity, GSHPs reduce our reliance on oil and gas from adversarial nations. Their lower operating costs and wider operating ranges make them an ideal solution for regions like the Northeast that experience extreme weather conditions. Furthermore, to help scale more quickly, some states and utilities are developing district heating systems incorporating GSHP networks to meet their climate goals more quickly and equitably. We understand our critical importance to achieving a clean energy future and meeting the region's climate and energy independence goals.

However, we face a critical challenge in bridging the gap between GSHP production capacity and installation rates. Unlike air source heat pumps, GSHPs consist of two components: the heat pump itself and the ground heat exchanger. Our capacity to manufacture heat pumps currently outstrips the 70,000 units we ship per year, and we have plans to scale over the next four years. However, as outlined in the proposal, the lengthy delivery time for new drill rigs and the shortage of skilled workers specialized in ground heat exchanger installations present significant hurdles in deploying GSHPs. Our ability to produce GSHPs surpasses the installation capacity of drillers.

To overcome this supply chain bottleneck, IGSHPA is proposing to enhance regional drill rig availability by nearly 50 rigs per year and establish a core of locally trained geothermal drillers specializing in GSHP installations. We wholeheartedly support the drill rig leasing program, recognizing its potential to enable local drillers to promptly respond to large project requests. Additionally, we applaud the region-wide efforts to recruit and train drillers and other GSHP-related professionals, underscoring IGSHPA's forward-thinking approach in meeting the immense growth potential of GSHPs in the Northeast.

In conclusion, we firmly believe that IGSHPA's Center of Excellence will effectively scale up our capacity to install GSHPs in line with the projected demand in the Northeast. By addressing the challenges of drill rig availability and trained workforce shortages for ground heat exchangers, this initiative will alleviate the burdens hindering our industry's growth. We wholeheartedly urge your support for this transformative initiative, which has the potential to deliver significant economic, environmental, and security benefits to the United States.

Sincerely,

Executive Director



May 18, 2023

Office of Manufacturing and Energy Supply Chains
United States Department of Energy

RE: DOE Heat Pump Defense Production Act Program Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

The Geothermal Exchange Organization (GeoExchange) is pleased to offer this letter of support for the Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. GeoExchange is a nonprofit trade association focused on public policy to advance the adoption of geothermal heat pump (GHP, also known as ground source heat pump) technology. We are a partner organization of the International Ground Source Heat Pump Association (IGSHPA) and believe their proposal, if funded, will significantly increase deployment of GHP technology.

GHPs are the most efficient, climate friendly heating and cooling technology in existence, and thanks to the enactment of the Inflation Reduction Act and growing awareness around building decarbonization, the technology is poised to become a major solution in the fight against climate change. There are, however, impediments to the industry's ability to scale, particularly in the availability of skilled workforce and drilling equipment. This proposal would address both of these challenges in a way that empowers workers, fosters economic development, and addresses emissions reduction and energy equity.

GeoExchange's manufacturer members are currently in the process of ramping up their GHP production capacity. It is imperative that there also be adequate capacity for the installation of the ground heat exchanger portion of GHP systems. The two sides of the workforce need to be aligned for GHPs to achieve maximum market penetration and the Center of Excellence will be a catalyst for that alignment.

GeoExchange is willing to contribute a significant portion of its available resources to the Center should this proposal move forward. We are grateful for the opportunity to participate in this effort and are available to answer questions related to it.

Sincerely,

A handwritten signature in black ink, appearing to read "Ryan Dougherty".

Ryan Dougherty
President
Geothermal Exchange Organization
Ryan@GeoExchange.Org
(217) 891-5847

To Whom It May Concern,

I am writing on behalf of National Grid to express my full support for the proposal to create a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast.

I am pleased to hear that the International Ground Source Heat Pump Alliance (IGSHPA) is leading a coalition of manufacturers, educators, and drilling professionals to create a GSHP regional Center of Excellence with a mission to meet the projected regional increases in demand as gas utilities begin to radically increase the number of GSHP thermal networks.

National Grid aims to achieve net zero greenhouse gas (GHG) emissions by 2050, including our own operations and emissions that result from the sale of electricity and gas to our customers. We have developed a framework to achieve this by focusing our work on ten areas through 2050 and beyond. One of these 10 core areas is to integrate innovative technologies such as thermal networks (using boreholes and GSHPs) to decarbonize heat. We are planning to install our first thermal network in Massachusetts this year and are planning several much larger thermal network installations in New York state, but are already concerned about finding the drillers and drill rigs to install the system.

This grant proposal to enable the leasing of drill rigs, while a drill rig assembly plant is built, as well as to create a training school for drillers, will relieve this bottleneck by increasing regional drill rig production and training a local workforce.

I am particularly excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, I believe that the Center of Excellence for ground source heat pumps will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs, a large portion of them needed for thermal networks. Therefore, I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,



Caroline Hon
SVP, Network Planning & Strategy

To Whom It May Concern,

I am writing on behalf of Eversource to express support for the proposal to create a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast.

Eversource is pleased to hear that the International Ground Source Heat Pump Alliance (IGSHPA) is leading a coalition of manufacturers, educators, and drilling professionals to create a GSHP regional Center of Excellence with a mission to meet the projected regional increases in customer demand for decarbonized energy options as gas utilities begin to radically increase the number of GSHP thermal networks.

Eversource is committed to meeting the emissions goals of the states that we operate in. One of our approaches to achieving this goal is to integrate innovative technologies such as geothermal networks (using boreholes and GSHPs) to decarbonize heating and cooling.

We are installing our first geothermal network in Massachusetts this year and one of the unique challenges we are facing are around the supply chain for both drillers and drill rigs necessary to install these systems.

This grant proposal will help to address this bottleneck by; enabling the leasing of drill rigs, increasing regional drill rig production while an assembly plant is built and most importantly, providing opportunities for local workforce with the creation of a training school for drillers..

We are also excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, Eversource believes that the Center of Excellence for ground source heat pumps will help to ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs, a large portion of them needed for geothermal networks. Therefore, we strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,



Nikki Bruno
Vice President, Clean Technologies



To Whom It May Concern,

I am writing on behalf of Skillings & Sons, LLC to express my full support for this proposal to create a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast.

I am pleased to hear that the International Ground Source Heat Pump Alliance (IGSHPA) is leading a coalition of manufacturers, educators, and drilling professionals to create a GSHP regional Center of Excellence with a mission to meet the projected regional increases in demand as gas utilities in the Northeast begin to radically increase the number of networked GSHP installations.

Skillings & Sons was established in 1970 as a small family business that drilled wells for drinking water. Today we are in our third generation. We operate in New Hampshire and Massachusetts and have a team of more than 75 employees with more than 350 years of combined experience

This IGSPHA grant proposal to enable the leasing of drill rigs, while a drill rig assembly plant is built, as well as to create a training school for drillers, will increase regional drill rig production and train a local workforce.

I am particularly excited that the Center is proposing to engage with workers to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, I believe that the Center of Excellence for ground source heat pumps will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs, a large portion of them needed for thermal networks. Therefore, I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the Northeast.

Roger Skillings



To Whom It May Concern,

I am writing on behalf of Vermont Gas Systems to express my full support for the proposal to create a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast. GSHPs are a critical component to meeting Vermont's ambitious climate goals.

I am pleased to hear that the International Ground Source Heat Pump Alliance (IGSHPA) is leading a coalition of manufacturers, educators, and drilling professionals to create a GSHP regional Center of Excellence with a mission to meet the projected regional increases in demand. This Center will be an important partner to help the Northeastern states meet our climate goals while creating a strong, local green job workforce.

Vermont Gas Systems is a small gas utility, serving 55,000 customers in northwestern Vermont. We have an ambitious climate plan to achieve net zero emissions by 2050. Thermal networks and ground source heat pumps are a significant piece of that plan.

Unfortunately, Vermont has little to no drillers or drill rigs in the state specializing in the deep, vertical boreholes needed for many geothermal projects. This proposal to enable the leasing of drill rigs, while a drill rig assembly plant is built, as well as to create a training school for drillers, will relieve this bottleneck by increasing regional drill rig production and training a local workforce.

In addition to improving production capacity, the Center of Excellence will support local job growth. I am particularly excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. Today Vermont Gas employs both construction and field service crews. As their work with natural gas pipelines and in home equipment decreases, we want to provide these skilled employees with the education and resources necessary to transition to jobs in the geothermal industry. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, I believe that the Center of Excellence for ground source heat pumps will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs. Therefore, I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,

Morgan Hood, CEM
Product Development Manager, Vermont Gas Systems



May 17, 2023

To Whom It May Concern,

I am writing on behalf of Dandelion Energy to express my full support for this proposal to create a Center of Excellence for geothermal (ground source) heat pumps (GSHPs) in the Northeast. GSHPs are among the most efficient ways to heat and cool buildings, according to the U.S. Environmental Protection Agency.¹ They are also the lowest cost way for homeowners and businesses to heat and cool their homes. As such, geothermal heat pumps represent a key technology for advancing energy affordability and value, increasing energy security, reducing greenhouse gas emissions, and achieving economy-wide decarbonization.

Household and commercial demand for GSHP installations is growing rapidly, and the geothermal industry is hiring workers for the full spectrum of installation jobs to meet market demand. However, the industry faces significant shortfalls in available workers, including drillers, driller helpers, electricians, and heat pump installers. These are good-paying jobs where workers earn strong, living wages, with typical starting salaries often over \$20 an hour, rising to over \$40 an hour for more experienced professionals.

I am pleased that the International Ground Source Heat Pump Association (IGSHPA) is leading a coalition of manufacturers, educators, and drilling professionals to create a GSHP regional Center of Excellence with a mission to meet the projected regional increases in demand. This Center will be an important partner to help the Northeastern states meet their climate goals while creating a strong, local green job workforce.

The Center of Excellence will relieve critical workforce bottlenecks in the deployment of GSHP systems by increasing regional drill rig capacity and training a local workforce. The Center of Excellence will also support local job growth by engaging with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. Increased GSHP deployment capacity will be especially critical in ensuring that states and communities have the workforce necessary to fully take advantage of the benefits provided by the Inflation Reduction Act, including tax credits of 30% or more and rebates of up to \$8,000 for GSHP systems for income-eligible households.

About Dandelion:

Originally conceived at X, Alphabet's innovation lab, Dandelion Energy was founded in 2017 and has grown into the nation's leading installers of geothermal heating and cooling systems in existing homes; our mission is to provide earth-powered heating for every home. Today we are

¹ "Geothermal Heat Pumps," Energy Star, U.S. Environmental Protection Agency, accessed April 20, 2023, https://www.energystar.gov/products/geothermal_heat_pumps

Dandelion Letter of Support for GSHP Center of Excellence

a team of over 250 people, most of whom are in the field everyday installing geothermal heat pumps for our customers in New York, Connecticut, and Massachusetts. To date, we have installed over 1,300 GSHP systems for homes in the Northeast, yielding over 630,000 tons of avoided greenhouse gas emissions – that's equivalent to taking more than 20,000 cars off the road.

Conclusion:

The Center of Excellence for GSHP will help fill a critical workforce and deployment gap, ramping up domestic capacity and relieving supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs. I strongly encourage you to support this initiative, which will provide significant economic, environmental, and security benefits to the United States.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'H. Deese', is positioned above the printed name.

Heather E. Deese
Senior Director, Policy and Regulatory
Affairs
Dandelion Energy



Empire State Water Well Driller's Association, Inc.

Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program
Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

We are writing on behalf of New Yorkers For Clean Power, Inc. to express our full support for this Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. We are thrilled that the International Ground Source Heat Pump Alliance (IGSHPA) is helping increase the production of drill rigs and the training of geothermal drillers in the Northeast. This Center will be a key catalyst for our industry, and will overcome the bottlenecks that are stifling growth of the GSHP market in the U.S.

We firmly believe in the importance of GSHPs in achieving our country's climate and energy security goals. By operating on electricity, GSHPs reduce our reliance on oil and gas from adversarial nations. Their lower operating costs and wider operating ranges make them an ideal solution for regions like the Northeast that experience extreme weather conditions. Furthermore, to help scale more quickly, some states and utilities are developing district heating systems incorporating GSHP networks to meet their climate goals more quickly and equitably. We understand our critical importance to achieving a clean energy future and meeting the region's climate and energy independence goals.

However, we face a critical challenge in bridging the gap between GSHP production capacity and installation rates. Unlike air source heat pumps, GSHPs consist of two components: the heat pump itself and the ground heat exchanger. Our capacity to manufacture heat pumps currently outstrips the 70,000 units we ship per year, and we have plans to scale over the next four years. However, as outlined in the proposal, the lengthy delivery time for new drill rigs and the shortage of skilled workers specialized in ground heat exchanger installations present significant hurdles in deploying GSHPs. Our ability to produce GSHPs surpasses the installation capacity of drillers.

To overcome this supply chain bottleneck, IGSHPA is proposing to enhance regional drill rig availability by nearly 50 rigs per year and establish a core of locally trained geothermal drillers specializing in GSHP installations. We wholeheartedly support the drill rig leasing program, recognizing its potential to enable local drillers to promptly respond to large project requests. Additionally, we applaud the region-wide efforts to recruit and train drillers and other GSHP-related professionals, underscoring IGSHPA's forward-thinking approach in meeting the immense growth potential of GSHPs in the Northeast.

In conclusion, we firmly believe that IGSHPA's Center of Excellence will effectively scale up our capacity to install GSHPs in line with the projected demand in the Northeast. By addressing the challenges of drill rig availability and trained workforce shortages for ground heat exchangers, this initiative will alleviate the burdens hindering our industry's growth. We wholeheartedly urge your support for this transformative initiative, which has the potential to deliver significant economic, environmental, and security benefits to the United States.

Sincerely,

David Rosick

David Rosick, CWD/PI

President of the Empire State Water Well Drillers' Association



Divisions of Kejr, Inc. • 1835 Wall St, Salina, KS 67401 • P: 785-825-1842 • F: 785-825-2097

Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program
Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

Geoprobe®/DRILLMAX® supports the proposed creation of a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast. GSHPs are a critical component to meeting the region's ambitious climate goals, and increasing the availability of drillers and drill rigs is central to achieving those goals. The International Ground Source Heat Pump Association (IGSHPA) is helping to increase the availability of drill rigs and the training of geothermal drillers in the Northeast. This proposed Center will further improve the ability to achieve increased GSHP installations at the scale and speed necessary to meet climate goals in the Northeast while creating a strong, local green-job workforce.

States like Massachusetts and New York have centralized networked geothermal systems (also called thermal energy networks) in their net zero transition planning. Massachusetts utilities are already installing networked geothermal systems, and New York has committed to investing \$15 million to develop thermal energy networks, with a goal of deploying 20 new networks by 2025. States are partnering with local municipalities, utilities, and private sector companies to deploy GSHP solutions at the speed and scale needed to decarbonize, which creates green jobs and supports economic growth. Running on electricity, GSHP installation not only plays a critical role in achieving the region's climate goals and a clean energy future, but also reduces U.S. reliance on foreign countries for oil and gas.

However, we face a critical gap in our ability to meet these goals. As described in this proposal, the local availability of drill rigs and skilled drillers needed to create the ground heat exchange are the major rate-limiting factors for deploying GSHPs in the region. As a group, we are increasing our drill rig production capacity. Enabling our industry to scale quickly, IGSHPA's leasing program makes drill rigs more rapidly available while their training program dramatically increases the number of trained drillers. We appreciate IGSHPA's support of our industry, smoothing the transition between supply and demand.

The GSHP Center of Excellence will support ramping up domestic drill rig production capacity and relieve supply chain and workforce barriers in order to meet the rapidly growing demand for GSHPs. We strongly support this initiative and hope the DOE recognizes the importance of drill rig manufacturing for meeting the climate and security goals of the United States.

Sincerely,

Tom Omli,
Geoprobe®/DRILLMAX® President



Address 601 Dempsey Road, Westerville, Ohio 43081-8978 U.S.A.
Phone 800 551.7379 • 614 898.7791 Fax 614 898.7786
Email ngwa@ngwa.org Websites NGWA.org and WellOwner.org

May 15, 2023

To Whom It May Concern,

I am writing to express my enthusiasm for IGSHPA's Concept Proposal to the Heat Pump Defense Production Act. We will be joining IGSHPA, GeoExchange, and a coalition of drill rig and heat pump manufacturers, drillers and ground heat exchange installers and other stakeholders to create a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast. Key components of this proposal are delivering a fleet of drill rigs for regional deployment and training, building a manufacturing and development facility, and creating a workforce training and advocacy program for drillers. This Center will be an important asset to help Northeastern states meet their climate goals, achieve energy security, and grow a strong, local green job workforce.

GSHPs are a critical component of our energy supply chain with regard to energy security. They run on electricity, which will decrease the US dependence on foreign oil and gas. They have a lower operating cost than air source heat pumps and a wider operating range - areas like New England with extreme temperatures must rely on GSHPs to meet their heating and cooling needs. Finally, interconnected GSHPs show dramatic increases in efficiency and can ameliorate peak electrical loads. Networked GSHPs can therefore relieve the electrical grid of the projected crippling effect of building heating electrification, which is a critical security issue. For these reasons, states like Massachusetts and New York have centered networked geothermal systems (also called Thermal Energy Networks) in their net zero transition planning. Utility-scale networked GSHP systems would have a dramatic impact on market growth in the region. GSHPs are therefore a key component to achieving a clean energy future and meeting U.S. security goals.

In spite of their central importance, domestic production of GSHPs is not increasing at the rate and volume necessary to meet the region's climate goals. New York and Massachusetts have set goals of electrifying 1 million homes by 2030; if only 20% of those homes transitioned using GSHP, it would represent nearly 150 installations per day over the next 7 years. For comparison, only 14,000 heat pumps were installed in all of Massachusetts in 2022 (an almost 50% increase from the previous year but still under target). GSHPs represented a small fraction of those installations despite generous rebate programs and high customer demand.

The proposed CoE and manufacturing plant would address this critical gap in production. Unlike air source heat pumps, GSHPs have two components: a heat pump and a ground heat exchanger. As described in this proposal, the local availability of drill rigs and the skilled workers needed to create the ground heat exchanger is the major rate-limiting step for deploying GSHPs in the region. IGSHPA is proposing to relieve the bottleneck in the production of ground heat exchangers by increasing regional drill rig production and training a local workforce. The proposed CoE and manufacturing plant would help the region deploy GSHP solutions at the speed and scale needed to decarbonize



Address 601 Dempsey Road, Westerville, Ohio 43081-8978 U.S.A.

Phone 800 551.7379 • 614 898.7791 **Fax** 614 898.7786

Email ngwa@ngwa.org **Websites** NGWA.org and WellOwner.org

In addition to improving production capacity for ground heat exchangers, the Center of Excellence will support local job growth. I am particularly excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, I believe that the Center of Excellence for GSHPs will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs. Therefore, I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Morse", written in a cursive style.

Terry S. Morse, CAE, CIC

Chief Executive Officer

National Ground Water Association



May 15, 2023

To Whom It May Concern,

I am writing to express my enthusiasm for IGSHPA's Concept Proposal to the Heat Pump Defense Production Act. We will be joining IGSHPA, GeoExchange, and a coalition of drill rig and heat pump manufacturers, drillers and ground heat exchange installers and other stakeholders to create a Center of Excellence (CoE) for ground source heat pumps (GSHPs) in the Northeast. Key components of this proposal are delivering a fleet of drill rigs for regional deployment and training, building a manufacturing and development facility, and creating a workforce training and advocacy program for drillers. This Center will be an important asset to help Northeastern states meet their climate goals, achieve energy security, and grow a strong, local green job workforce.

Social Enterprise and Training Center is a workforce training organization with a commitment to serving young adults 18-24 and providing skills training, hands on work experience, transition and employment support for in demand careers in the Capital Region. SEAT Center is committed to supporting Green Industry jobs and recognizes the sustainable wage opportunities that are provided through this career track.

GSHPs are a critical component of our energy supply chain with regard to energy security. They run on electricity, which will decrease the US dependence on foreign oil and gas. They have a lower operating cost than air source heat pumps and a wider operating range - areas like New England with extreme temperatures must rely on GSHPs to meet their heating and cooling needs. Finally, interconnected GSHPs show dramatic increases in efficiency and can ameliorate peak electrical loads. Networked GSHPs can therefore relieve the electrical grid of the projected crippling effect of building heating electrification, which is a critical security issue. For these reasons, states like Massachusetts and New York have centered networked geothermal systems (also called Thermal Energy Networks) in their net zero transition planning. Utility-scale networked GSHP systems would have a dramatic impact on market growth in the region. GSHPs are therefore a key component to achieving a clean energy future and meeting U.S. security goals.

In spite of their central importance, domestic production of GSHPs is not increasing at the rate and volume necessary to meet the region's climate goals. New York and Massachusetts have set goals of electrifying 1 million homes by 2030; if only 20% of those homes transitioned using



GSHP, it would represent nearly 150 installations per day over the next 7 years. For comparison, only 14,000 heat pumps were installed in all of Massachusetts in 2022 (an almost 50% increase from the previous year but still under target). GSHPs represented a small fraction of those installations despite generous rebate programs and high customer demand.

The proposed CoE and manufacturing plant would address this critical gap in production. Unlike air source heat pumps, GSHPs have two components: a heat pump and a ground heat exchanger. As described in this proposal, the local availability of drill rigs and the skilled workers needed to create the ground heat exchanger is the major rate-limiting step for deploying GSHPs in the region. IGSHPA is proposing to relieve the bottleneck in the production of ground heat exchangers by increasing regional drill rig production and training a local workforce. The proposed CoE and manufacturing plant would help the region deploy GSHP solutions at the speed and scale needed to decarbonize.

In addition to improving production capacity for ground heat exchangers, the Center of Excellence will support local job growth. I am particularly excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, I believe that the Center of Excellence for GSHPs will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs. Therefore, I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,

A handwritten signature in black ink that reads "Rebecca Paavola". The signature is fluid and cursive, with the first name "Rebecca" being more prominent than the last name "Paavola".

Rebecca Paavola
Senior Director of Program Development
Social Enterprise and Training Center (SEAT)
131 State Street, Schenectady, NY 12305
(518)372-4100 work
(518)857-9099 cell



To: Office of Manufacturing and Energy Supply Chains
Cc: International Ground Source Heat Pump Association
From: Massachusetts Association of Community Colleges
Subject: IGSHPA Concept Paper

To Whom it May Concern:

On behalf of Massachusetts Association of Community College (MACC) representing the 15 Community Colleges across the Commonwealth, we wish to provide a Letter of Support International Ground Source Heat Pump Association (IGSHPA) to provide a Letter of Support for their Concept Proposal for the Heat Pump Defense Production Act. Massachusetts' community colleges whether individually, regionally, or as a statewide initiative, are committed to supporting workforce development training in identified technical areas as the organizations and partners see fit, sustainable, and attainable. If accepted, MACC would welcome the opportunity to partner with the IGSHPA, GeoExchange, and a coalition of drill rig and heat pump manufacturers, drillers and other stakeholders to create a Center of Excellence (CoE) for ground source heat pumps (GSHPs) in the Northeast.

Key components of this proposal are delivering a fleet of drill rigs for regional deployment and training, building a manufacturing and development facility, and creating a workforce training and advocacy program for drillers. This Center will be an important asset to help Northeastern states meet their climate goals, achieve energy security, and grow a strong, local green job workforce.

The proposed CoE and manufacturing plant would address a critical gap in production. As described in the IGSHPA proposal, the local availability of drill rigs and the skilled workers needed to create the ground heat exchanger is the major rate-limiting step for deploying GSHPs in the region. IGSHPA is proposing to relieve the bottleneck in the production of ground heat exchangers by increasing regional drill rig production and training a local workforce. The proposed CoE and manufacturing plant would help the region deploy GSHP solutions at the speed and scale needed to decarbonize buildings.

In addition to improving production capacity for ground heat exchangers, the Center of Excellence will support local job growth. We are particularly excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved

www.masscc.org

617-542-2911 PHONE · INFO@MACC.MASS.EDU

Berkshire Community College · Bristol Community College · Bunker Hill Community College · Cape Cod Community College · Greenfield Community College · Holyoke Community College
Massachusetts Bay Community College · Massasoit Community College · Middlesex Community College · Mount Wachusett Community College · North Shore Community College
Northern Essex Community College · Quinsigamond Community College · Roxbury Community College · Springfield Technical Community College



communities, to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, we believe that the Center of Excellence for GSHPs will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs. We strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

We are enthusiastic about IGSHPA's focus to develop a pipeline of trained talent to ensure a strong clean energy infrastructure.

Sincerely,

A handwritten signature in black ink, appearing to read "Nate Mackinnon".

Nate Mackinnon
Executive Director

www.masscc.org

617-542-2911 PHONE · INFO@MACC.MASS.EDU

Berkshire Community College · Bristol Community College · Bunker Hill Community College · Cape Cod Community College · Greenfield Community College · Holyoke Community College
Massachusetts Bay Community College · Massasoit Community College · Middlesex Community College · Mount Wachusett Community College · North Shore Community College
Northern Essex Community College · Quinsigamond Community College · Roxbury Community College · Springfield Technical Community College



Advancing equitable, sustainable heating and cooling

Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program
Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

We are writing on behalf of Vermont Community Geothermal Alliance to express our full support for the Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. Vermont is advancing ground source heat pump solutions, needed policy, financing and ownership models, and projects. We are working with a broad range of stakeholders, engaging communities and national experts, and learning from drillers, installers, and labor leaders. As we work to implement and scale geothermal energy, we also need to build the needed workforce and equipment. The drill rigs we have now in Vermont are already booked months out and more operators are needed, given lack of awareness and difficulty in recruiting and retaining workers. In our small state, we welcome the opportunity to participate in regional efforts that will support our initiatives and accelerate ground source heat pump installations across the Northeast.

We are thrilled that the International Ground Source Heat Pump Association (IGSHPA) is helping to increase the production of drill rigs and training of geothermal drillers in the Northeast. This Center is necessary to our success in scaling GSHPs and using the heat we already have under our feet. It will also be a key catalyst for the industry we depend on to meet our climate goals and deploy this clean heating and cooling solution, particularly in our smaller, more rural state and colder climates.

We understand the important role of GSHPs in achieving our climate and energy goals. By operating on electricity, GSHPs reduce our reliance on oil and gas from abroad. Their lower operating costs and wider operating ranges make them an ideal solution for our state and increase our resilience in the face of increasingly extreme weather conditions. To scale more rapidly, Vermont, like other states, is developing district heating systems incorporating GSHP networks to meet our climate goals more quickly and equitably. Robust drilling capacity is critical to this work to achieve a clean energy future and meet our state's climate and energy goals.

We are grateful to IGSHPA for proposing to enhance regional drill rig availability and establish a core of locally trained geothermal drillers specializing in GSHP installations. We fully support the drill rig leasing program, recognizing its potential to enable local drillers to promptly respond to large project requests. Additionally, we applaud and will add to region-wide efforts to recruit and train drillers and other GSHP-related professionals, appreciating IGSHPA's forward-thinking approach in meeting the immense growth potential of GSHPs in Vermont and the Northeast.

IGSHPA's Center of Excellence will enable our capacity to install GSHPs in line with the demand we are building in Vermont and the urgency of the climate crisis. By addressing the challenges of drill rig availability and trained workforce shortages for ground heat exchangers, this initiative will make it possible for us to take full advantage of one of the cleanest, demonstrated clean energy solutions we have in hand. We wholeheartedly urge your support for this transformative initiative, which has the potential to deliver significant economic, environmental, and security benefits to our state, our region, and the nation.

Sincerely,

A handwritten signature in dark ink, appearing to read "Debbie New". The signature is fluid and cursive, with a long horizontal stroke at the end.

Debbie New, Coordinator

On behalf of [Vermont Community Geothermal Alliance](#)

debbie@vcga.net

802.498.4714

May 16, 2023

To Whom It May Concern:

I am writing on behalf of Brightcore Energy LLC to express my full support for this proposal to create a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast.

I am pleased to hear that the International Ground Source Heat Pump Alliance (IGSHPA) is leading a coalition of manufacturers, educators, and drilling professionals to create a GSHP regional Center of Excellence with a mission to meet the projected regional increases in demand. This Center will be an important partner to help the Northeastern states meet our climate goals while creating a strong, local green job workforce.

Brightcore Energy is a provider of end-to-end clean energy solutions to the commercial and institutional market, including LED lighting conversions, commercial and community solar, high-efficiency renewable heating and cooling (geothermal), electric vehicle (EV) charging and battery storage. Our mission is to help our clients dramatically reduce their reliance on fossil fuels through a comprehensive approach to both energy efficiency and clean energy resources.

As described in this proposal, the local availability of drill rigs and the skilled workers needed to create the ground heat exchanger is the major rate-limiting step for deploying GSHPs in the region. IGSHPA is proposing to relieve this bottleneck in the production of ground heat exchangers by increasing regional drill rig production and training a local workforce. Brightcore Energy is ready and excited to support this effort in any way possible.

In addition to improving production capacity, the Center of Excellence will support local job growth. I am particularly excited that the Center is proposing to engage with local communities and community colleges, particularly in underserved communities, to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, I believe that the Center of Excellence for ground source heat pumps will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs. Therefore, I strongly encourage you to support this initiative, which Northeast.

Sincerely,



Dan Bengyak
Chief Administrative Officer



May 15, 2023

Whom It May Concern:

I am writing on behalf of the Christa McAuliffe Center for Integrated Science Learning at Framingham State University to express my enthusiasm for IGSHPA's Concept Proposal to the Heat Pump Defense Production Act, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant*. A key component of this proposal is creating a workforce training and advocacy program for drillers and other workers involved in ground source heat pump (GSHP) installations. The Center of Excellence will be an important asset to help states like Massachusetts meet their climate goals, achieve energy security, and grow a strong, local green job workforce.

GSHPs are an important component to achieving a clean energy future. Areas like New England with extreme temperatures could use GSHPs to meet their heating and cooling needs without overburdening our electric grid. For this reason, the Massachusetts' Department of Public Utilities is evaluating whether natural gas companies could transition to delivering utility-scale heating using networked geothermal systems. Framingham has become an important testing ground for this technology as our local gas utility Eversource is in the process of installing two networked geothermal systems.

Utility-scale networked GSHP systems could have a dramatic impact on the local job market and, as part of a grant from the Geothermal Technologies Office, Framingham State University is working with HEET, the City of Framingham, local workers and Eversource to identify opportunities for our students to participate in utility-scale deployment of GSHPs.

In addition to improving production capacity for ground heat exchangers, the Center of Excellence will support local job growth. I am particularly excited that the Center is proposing to engage with local communities and community and state colleges, particularly in underserved communities, to develop our green job marketplace. This is an area of great interest for the McAuliffe Center and Framingham State University.

Thanks to the overall redesign of its physical facility, to be completed by the end of 2023, the McAuliffe Center has strengthened its commitment to provide cradle-to-career efforts to support the development of the workforce with the skills and knowledge required by green industry employers. It is in this context that the McAuliffe Center is already engaging with HEET on the preparation of a group of high school students to work to address the energy needs and heat island hazards of our local community.

The McAuliffe Center's also partners with the MassHire Greater Boston Workforce Board that is currently funding some of the summer paid internships for high school student. MassHire supports young adults in developing the knowledge and skills needed to contribute to the green economy in Greater Boston, including private and public sector opportunities. Our current collaboration aims to create work-based learning experiences, in which high school and college students learn data collection and analysis, evidence-based communication skills, creative and computational thinking, and teamwork, which is the set of qualifications that employers seek to hire.

I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,

Irene Porro, PhD
Director, Christa McAuliffe Center



NEW ENGLAND GAS WORKERS ALLIANCE

100 MEDWAY ROAD #403, MILFORD, MASSACHUSETTS 01757

May 17, 2023

To Whom It May Concern,

I am writing on behalf of the New England Gas Workers Alliance to express my full support for this proposal to create a Center of Excellence for ground source heat pumps (GSHPs) in the Northeast.

I am pleased to hear that the International Ground Source Heat Pump Alliance (IGSHPA) is leading a coalition of manufacturers, educators, and drilling professionals to create a GSHP regional Center of Excellence with a mission to meet the projected regional increases in demand as gas utilities begin to radically increase the number of GSHP thermal networks.

The New England Gas Workers Alliance fights for improved gas safety and a responsible transition to renewable energy across the Commonwealth. Helping gas utilities transition to thermal networks is a very promising way to do that.

This grant proposal to enable the leasing of drill rigs, while a drill rig assembly plant is built, as well as to create a training school for drillers, will relieve this bottleneck by increasing regional drill rig production and training a local workforce.

I am particularly excited that the Center is proposing to engage with workers to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, I believe that the Center of Excellence for ground source heat pumps will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs, a large portion of them needed for thermal networks. Therefore, I strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the Northeast

Sincerely,

Kathy Laflash

President

NEGWA (New England Gas Workers Alliance), Inc.



Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program
Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

We are writing on behalf of New Yorkers for Clean Power to express our full support for this Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. We are thrilled that the International Ground Source Heat Pump Alliance (IGSHPA) is helping increase the production of drill rigs and the training of geothermal drillers in the Northeast. This Center will be a key catalyst for our industry, and will overcome the bottlenecks that are stifling growth of the GSHP market in the U.S.

We firmly believe in the importance of GSHPs in achieving our country's climate and energy security goals. By operating on electricity, GSHPs reduce our reliance on oil and gas from adversarial nations. Their lower operating costs and wider operating ranges make them an ideal solution for regions like the Northeast that experience extreme weather conditions. Furthermore, to help scale more quickly, some states and utilities are developing district heating systems incorporating GSHP networks to meet their climate goals more quickly and equitably. We understand our critical importance to achieving a clean energy future and meeting the region's climate and energy independence goals.

However, we face a critical challenge in bridging the gap between GSHP production capacity and installation rates. Unlike air source heat pumps, GSHPs consist of two components: the heat pump itself and the ground heat exchanger. Our capacity to manufacture heat pumps currently outstrips the 70,000 units we ship per year, and we have plans to scale over the next four year. However, as outlined in the proposal, the lengthy delivery time for new drill rigs and the shortage of skilled workers specialized in ground heat exchanger installations present significant hurdles in deploying GSHPs. Our ability to produce GSHPs surpasses the installation capacity of drillers.

To overcome this supply chain bottleneck, IGSHPA is proposing to enhance regional drill rig availability by nearly 50 rigs per year and establish a core of locally trained geothermal drillers specializing in GSHP installations. We wholeheartedly support the drill rig leasing program, recognizing its potential to enable local drillers to promptly respond to large project requests. Additionally, we applaud the region-wide efforts to recruit and train drillers and other GSHP-related professionals, underscoring IGSHPA's forward-thinking approach in meeting the immense growth potential of GSHPs in the Northeast.

In conclusion, we firmly believe that IGSHPA's Center of Excellence will effectively scale up our capacity to install GSHPs in line with the projected demand in the Northeast. By addressing the challenges of drill rig availability and trained workforce shortages for ground heat exchangers, this initiative will alleviate the burdens hindering our industry's growth. We wholeheartedly urge your support for this transformative initiative, which has the potential to deliver significant economic, environmental, and security benefits to the United States.

Sincerely,

Betta Broad
Campaign Director
New Yorkers for Clean Power



May 18, 2023

To Whom It May Concern,

I am writing to express the Building Decarbonization's Coalition's strong support for *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*, a Concept Proposal submitted to the Heat Pump Defense Production program.

The Building Decarbonization Coalition (BDC) is a national nonprofit that brings together building industry stakeholders, labor, environmental groups, environmental justice organizations, utilities, and local governments to electrify the built environment. We believe that along with other clean energy technologies, geothermal and networked geothermal are essential for achieving the scale of decarbonization needed to reach our state and national climate goals.

We commend the trade and advocacy organizations that are supporting a coalition of ground source heat pump (GSHP) manufacturers, drillers and ground heat exchange installers, and other stakeholders to support the GSHP supply chain in the Northeast. Key components of this proposal are delivering a fleet of drill rigs for regional deployment and training, onshoring a manufacturing and research and development (R&D) facility, and creating a workforce training and advocacy program for drillers. This Center of Excellence will be an important asset to help the Northeast meet its climate goals, achieve energy security and resilience, and grow a strong, local workforce.

Currently production capacity of GSHPs is not adequate to meet even current demands. Unlike air source heat pumps, GSHPs have two components: a heat pump and a ground heat exchanger. As described in this proposal, the local availability of drill rigs and the skilled workers needed to create the ground heat exchanger is the major rate-limiting step for deploying GSHPs in the region. IGSHPA is proposing to relieve this bottleneck in the production of ground heat exchangers by increasing regional drill rig production and training a local workforce.

In addition to improving production capacity, the Center of Excellence will support local job growth. We are particularly excited that the Center is proposing to engage with local communities and labor, in underserved communities, to develop our green job marketplace. This will help to promote economic growth while supporting the transition to a cleaner energy system.

In conclusion, we believe that the Center of Excellence for ground source heat pumps will ramp up domestic capacity and relieve supply chain and workforce barriers needed to meet the rapidly growing demand for GSHPs. Therefore, we strongly encourage you to support this initiative, which has the potential to provide significant economic, environmental, and security benefits to the United States.

Sincerely,

A handwritten signature in black ink, appearing to read "Panama Bartholomy", with a long horizontal flourish extending to the right.

Panama Bartholomy
Building Decarbonization Coalition



May 18, 2023

Office of Manufacturing and Energy Supply Chains
United States Department of Energy

**RE: DOE Heat Pump Defense Production Act Program Funding Opportunity
Announcement DE-FOA-0002987**

To Whom It May Concern,

I am writing on behalf of WaterFurnace International (WFI) to express our full support for this Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. WFI is a manufacturer of geothermal heat pump (GHP) equipment based in Fort Wayne, Indiana. We are thrilled that the International Ground Source Heat Pump Association (IGSHPA) is helping to increase the availability of drill rigs and the training of geothermal drillers in the Northeast. This Center will be a key catalyst for our industry, and will overcome the bottlenecks that are stifling growth of the GHP market in the U.S.

We firmly believe in the adoption of GHPs as a means of achieving our country's climate and energy security goals. By operating on electricity, GHPs reduce our reliance on imports of oil and gas. Lower operating costs and wider operating ranges make GHPs an ideal solution for regions like the Northeast that experience extreme weather conditions. Furthermore, to help scale more quickly, some states and utilities are developing district heating systems incorporating GHP networks to meet their climate goals more quickly and equitably.

We face a critical challenge in bridging the gap between GHP production capacity and installation rates. Unlike air source heat pumps, GHP systems consist of two components: the heat pump itself and the ground heat exchanger. Without each component installed and operating together, the system will not work. Our goal is to meet rising demand for our products, however, as outlined in the proposal, the lengthy availability of drill rigs and skilled workers specialized for ground heat exchanger installations present significant challenges in the deployment of our equipment.

In conclusion, we firmly believe that IGSHPA's Center of Excellence will effectively scale adoption of GHPs in line with the projected demand in the Northeast. By addressing the constraints of drill rig availability and trained workforce shortages for ground heat exchangers, this initiative will alleviate the burdens hindering our industry's growth. We wholeheartedly urge your support for this transformative initiative, which has the potential to deliver significant economic, environmental, and security benefits to the United States.

Sincerely,

John Thomas, President & CEO



Enertech Global, LLC
2506 S. Elm Street
Greenville, IL 62246
Tel: 618-664-9010
Fax: 618-690-3253
enertechusa.com

May 18, 2023

Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

I am writing on behalf of Enertech USA to express our full support for this Concept Proposal, *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. Enertech is a manufacturer of geothermal heat pump (GHP) equipment based in Greenville, Illinois. We are thrilled that the International Ground Source Heat Pump Association (IGSHPA) is helping increase the production of drill rigs and the training of geothermal drillers in the Northeast. This Center will be a key catalyst for our industry, and will overcome the bottlenecks that are stifling growth of the GHP market in the U.S.

We firmly believe in the importance of GHPs in achieving our country's climate and energy security goals. By operating on electricity, GHPs reduce our reliance on oil and gas from adversarial nations. Their lower operating costs and wider operating ranges make them an ideal solution for regions like the Northeast that experience extreme weather conditions. Furthermore, to help scale more quickly, some states and utilities are developing district heating systems incorporating GHP networks to meet their climate goals more quickly and equitably. We understand our critical importance to achieving a clean energy future and meeting the region's climate and energy independence goals.

However, we face a critical challenge in bridging the gap between GHP production capacity and installation rates. Unlike air source heat pumps, GHP systems consist of two components: the heat pump itself and the ground heat exchanger. Without each component installed and operating together the system will not work. Enertech is undergoing expansion of its production capacity at its headquarters in Greenville and its existing manufacturing plant in Mitchell, South Dakota. Our goal is to meet rising demand for our products. However, as outlined in the proposal, the lengthy delivery time for new drill rigs and the shortage of skilled workers specialized in ground heat exchanger installations present significant hurdles in getting our equipment deployed. Our ability to produce GHPs surpasses the installation capacity of drillers.

To overcome this supply chain bottleneck, IGSHPA is proposing to enhance regional drill rig availability by nearly 50 rigs per year and establish a core of locally trained geothermal drillers specializing in GHP installations. We wholeheartedly support the drill rig leasing program, recognizing its potential to enable local drillers to promptly respond to large project requests. Additionally, we applaud the region-wide efforts to recruit and train drillers and other GHP-related professionals, underscoring IGSHPA's forward-thinking approach in meeting the immense growth potential of GHPs in the Northeast.

In conclusion, we firmly believe that IGSHPA's Center of Excellence will effectively scale up our capacity to install GHPs in line with the projected demand in the Northeast. By addressing the challenges of drill rig



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enertechusa.com

availability and trained workforce shortages for ground heat exchangers, this initiative will alleviate the burdens hindering our industry's growth. We wholeheartedly urge your support for this transformative initiative, which has the potential to deliver significant economic, environmental, and security benefits to the United States.

Regards,

Tim Wright
Chief Strategy Officer

706-508-2374
tim.wright@enertechusa.com



7300 Southwest 44th Street
Oklahoma City, OK 73179
405-745-6000

May 19, 2023

Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program
Funding Opportunity Announcement DE-FOA-0002987

To the Office of Manufacturing and Energy Supply Chains,

I am writing on behalf of Climate Control Group and our companies. **ClimateMaster** geothermal heat pumps and **ClimaCool** modular heat pump chillers stand ready to join the International Ground Source Heat Pump Association (IGSHPA) in their efforts to promote the Concept Proposal: Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast. We believe this initiative can play a crucial role in increasing the production of geothermal drill rigs and the training of geothermal drillers, which are essential for the widespread adoption of ground source heat pumps (GHSPs) in the region and beyond.

At Climate Control Group, we are committed to the idea that GSHPs are the game-changing technology for addressing our country's climate and energy security goals. As a renewable technology GHSPs can reduce our dependence on fossil fuels from unstable or hostile regions. They can also provide reliable and efficient heating and cooling in a variety of climates, making them an ideal solution for areas with extreme weather conditions. Moreover, GHSPs can help to mitigate the demands on the electrical grid and when integrated into district heating systems, will help states and utilities meet their climate goals more quickly and equitably.

However, we also recognize that our industry faces a significant challenge in bridging the gap between GHSPs product production capacity and geothermal installation. Unlike air source heat pumps, GSHPs require two components: the heat pump itself and the ground heat exchanger (GHX). While our company is ready to increase our manufacturing production capacity to meet the growing demand, we face a bottleneck in the supply of drill rigs and skilled workers specialized in ground heat exchanger installation. To address this challenge, IGSHPA is proposing to enhance drill rig availability and establish a core of locally trained geothermal drillers specialized in GHX installations.

We believe that IGSHPA's Center of Excellence and a drill rig leasing program can be a transformative initiative that will enable us to scale up our capacity to install GSHPs in line with projected market growth. This can have a significant economic, environmental, and security benefit for the United States, as well as serve as a model for similar initiatives in other parts of the country. We therefore urge your support for this important initiative and look forward to working together to achieve our shared clean energy future and independence goals.

Sincerely,

Kevin McNamara - Chief Operating Officer
The Climate Control Group, Inc.
A NIBE Group Member
7300 Southwest 44th Street
Oklahoma City, OK 73179





May 19, 2023

Office of Manufacturing and Energy Supply Chains
United States Department of Energy
RE: DOE Heat Pump Defense Production Act Program
Funding Opportunity Announcement DE-FOA-0002987

To Whom It May Concern,

The Plastics Pipe Institute (PPI) is an Irving, Texas based 501 (c)(6) organization supported by over 170 member firms involved with the production of plastic pipe and fitting systems for the North American market. Geothermal ground source heating and cooling systems incorporate plastic piping systems from PPI member firms as the ground heat exchanger, also known as the ground loops, buried in the ground, or submerged in water. PPI supports the ground source heat pump industry through research and technical development of piping materials, publication of industry documents and tools such as calculators for design and installation of systems, contributions to the development of industry codes and standards, and educational efforts.

The Plastics Pipe Institute is in support of the concept proposal *Building a Ground Source Heat Pump Center of Excellence and Geothermal Drill Rig Manufacturing Plant in the Northeast*. We are confident that the International Ground Source Heat Pump Association (IGSHPA) has a clear and thoughtful vision for this proposal which will benefit American manufacturers and the public through the increased usage of ground source heat pump systems to deliver the heating and cooling needs of residential, commercial, and institutional facilities across the country.

Please do not hesitate to contact us with any questions about our support for this proposal, consistent with the goals of the DOE Heat Pump Defense Production Act Program Funding Opportunity Announcement DE-FOA-0002987.

Sincerely,

Lance MacNevin, P.Eng.

Director of Engineering, Building & Construction Division
The Plastics Pipe Institute
105 Decker Court, Suite 825
Irving, TX 75062
Office: 469-499-1057
lmacnevin@plasticpipe.org

cc: Jeff Hammond
Executive Director - IGSHPA