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November 4, 2022

VIA ELECTRONIC MAIL

Internal Revenue Service
CC:PA:LPD:PR (Notice 2022-51)
Room 5203
P.O. Box 7604
Ben Franklin Station, Washington, DC 20004

Re: Request for Comments on Prevailing Wage, Apprenticeship, Domestic Content, and Energy Communities Requirements Under the Act Commonly Known as the Inflation Reduction Act of 2022, IRS Notice 2022-51

Thank you for the opportunity to submit comments in response to questions posed in IRS Notice 2022-51. GeoExchange is the nation's leading advocacy and public policy organization for the geothermal heat pump (GHP) industry. Our members manufacture, design, and install GHP systems in homes and businesses across the country. The benefits of GHPs have been recognized for decades and are a proven clean heating and cooling technology. They are the most efficient building heating and cooling system in existence and their deployment will play a central role in the fight against climate change.

We are grateful that Congress has shown such strong support for our technology in the Inflation Reduction Act (IRA). Provisions in the IRA have the potential to drive significant growth in the GHP industry and our members stand ready to deliver on the promise of a clean energy future. IRA implementation is a monumental task for the IRS, and GeoExchange is hopeful that its comments help guide and inform the hard work ahead.

Thank you for considering these comments and we are happy to engage further to answer any questions you might have.

Sincerely,

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Geothermal Exchange Organization
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.02 Apprenticeship Requirement

(2) Section 45(b)(8)(D)(ii) provides for a good faith effort exception to the apprenticeship requirement.

(a) What, if any, clarification is needed regarding the good faith effort exception?

There are instances where there are not established trade or labor unions with existing apprenticeship programs for certain professionals in the GHP industry. The Treasury Department and the IRS should clarify that, if no such program exists in the region where the project is being conducted, there is an exemption from the requirement.

.03 Domestic Content Requirement

(5) Please provide comments on any other topics relating to the domestic content requirements that may require guidance.

The domestic content bonus should be calculated on the basis of the component parts of the entire geothermal system. This includes the ground heat exchanger piping, flow centers, circulating pumps, and the heat pump unit itself. GHPs are a holistic system that must be considered in its entirety for the purposes of this section.

.04 Energy Community Requirement

(7) Please provide comments on any other topics relating to the energy community requirement that may require guidance.

The Treasury Department and the IRS should, once all determinations on what areas qualify have been made, should published a comprehensive map illustrating the locations and boundaries of all eligible energy communities. The ability to quickly ascertain whether or not a potential project is in an energy community will help drive GHP system installation in these regions.

.05 Increased Credit Amount for Qualified Facility With Maximum Net Output of Less than 1 Megawatt

Section 48(a)(9)(A) and 48(a)(12)(C) provide increased credit amounts for energy projects that satisfy the requirements of subparagraph 48(a)(9)(B), and one way to satisfy these requirements is if the energy project has a maximum net output of less than 1 megawatt of thermal energy. The purpose of this document is to propose a workable and accurate metric for the system size of

a geothermal heat pump property that corresponds to the maximum net output threshold of 1 megawatt defined in 48(a)(9)(B).

There are 2 basic geothermal heat pump (GHP) system types, distributed and centralized, each with a unique metric for the system size that correlates to a maximum net output of 1 megawatt of thermal energy.

Distributed GHP System

A distributed geothermal heat pump system consists of multiple water-source heat pump units located throughout a building and connected on a common piping loop along with the ground heat exchange means. Each GHP serves a specific, individually controlled thermal zone and is sized based on the zone's peak load. The sum of the capacities of all zone GHPs is the total installed capacity of the system. However, this gross metric does not represent the maximum net thermal output of the overall system.

Buildings do not receive peak solar load on all compass exposures at the same time, nor do all thermal zones experience maximum occupancy, lighting or plug loads at the same time. Hence, the total installed capacity of a GHP system will always be greater than the maximum simultaneous load imposed on the zone GHPs. This coincident load, known as the building block load, is the single largest combination of actual zone loads that occurs at a particular time during the year. Since each GHP adds or removes heat from the common piping loop only as needed to maintain the individual zone temperature, the block load determines the maximum load imposed on the geothermal heat exchange means. Therefore, it is the block load that represents the maximum net thermal output of a GHP system.

We urge the use of a diversity factor to determine the block load, or maximum net output, of GHP projects based on their installed capacity. The diversity factor is the ratio of the block load to the total installed capacity. The diversity factor for a specific building can be determined through load calculations, or more accurately by building energy simulation. The Department of Energy's (DOE) Energy Plus program was used to simulate 4 different commercial buildings using DOE's prototype models in 13 U.S. climate zones (Figure 1 and Table 1). Zone GHP capacities were based on a sizing ratio of 1.15 over the zone peak cooling load in accordance with ASHRAE 90.1 baseline building HVAC system design requirements. These simulations resulted in a representative diversity factor which should be used in determining the total installed equipment capacity that equates to a maximum net output of 1 megawatt of thermal energy for a distributed GHP system. The commercial building models selected were those potentially large enough to exceed the 1-megawatt threshold and typical of the applications for GHP systems. Using these inputs, GeoExchange calculated a representative diversity factor of 0.64 (Table 2).

The total installed capacity of a GHP system is easily determined using mechanical equipment schedules or by field site survey. The block load, or maximum net output, of a distributed GHP system can then be calculated using the representative diversity factor of 0.64 discussed above:

Total Installed Capacity = Maximum Net Output / Diversity Factor

The total installed capacity that equates to a maximum net output of 1 megawatt of thermal energy is therefore calculated as:

1 megawatt / 0.64 = 1.5625 megawatts

This installed capacity can also be expressed as 5,331,470 Btu per hour or 444.3 tons of cooling

Centralized System

In the case of a centralized GHP system, zone load diversity is already factored into the sizing of the central plant equipment, usually large water-to-water heat pumps that provide a supply of chilled and hot water to serve the zone-level space conditioning means. In these projects the total installed capacity of the central plant GHP(s) is equal to the maximum net output of the system. The diversity factor of a centralized system is therefore equal to 1.0.

For centralized systems, the total installed capacity that equates to a maximum net output of 1 megawatt of thermal energy is therefore:

1 megawatt / 1.0 = 1 megawatt

This can also be expressed as 3,412,141 Btu per hour or 284.3 tons of cooling

Summary of Proposed Method

The proposed method to determine whether a GHP system (energy property) satisfies the requirements of subparagraph 48(a)(9)(B) should for simplicity be based upon the total installed capacity of GHP equipment in a project. To satisfy the requirements of subparagraph 48(a)(9)(B), the total installed capacity of GHP equipment shall be smaller than the following specific thresholds depending on the type of GHP system, which is determined with the maximum net output of 1 megawatt of thermal energy and the representative diversity factors as described above:

Distributed GHP systems: those with a total installed capacity of less than 445 tons of cooling

Central GHP systems: those with a total installed capacity of less than 285 tons

The total installed capacity is computed by summing the cooling capacities of all connected GHPs in the system as found in the mechanical equipment schedules for the project.

Figure 1

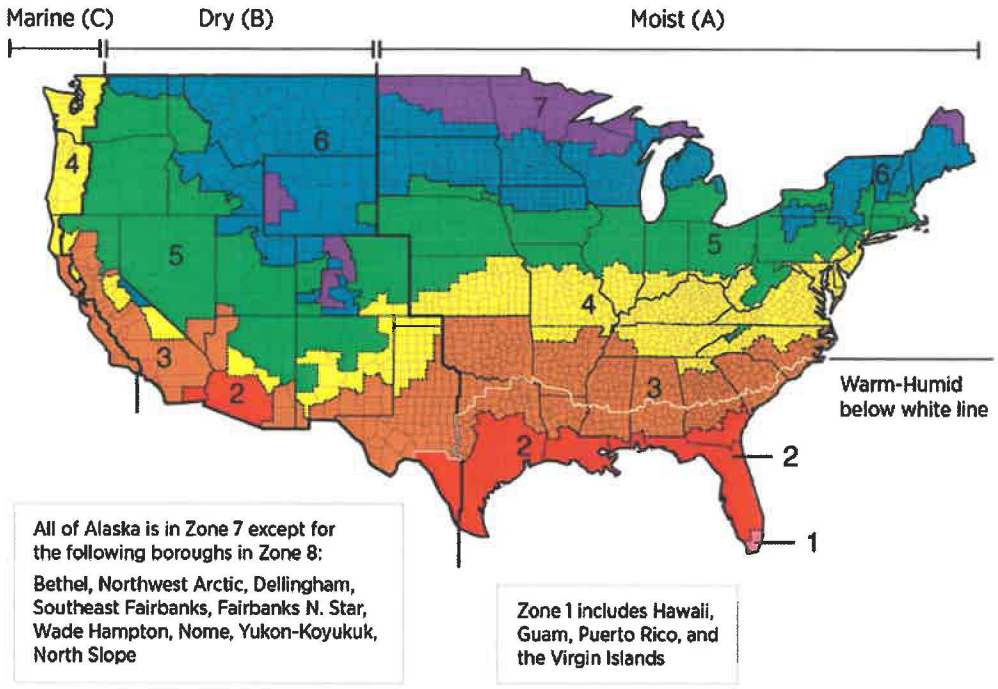

Table 1

Climate Zone	Weather Data
"1A"	USA_FL_Miami-Kendall-Tamiami.Executive.AP.722029_TMY3.epw
"2A"	USA_TX_Houston-Bush.Intercontinental.AP.722430_TMY3.epw
"2B"	USA_AZ_Phoenix-Sky.Harbor.Intl.AP.722780_TMY3.epw
"3A"	USA_GA_Atlanta-Hartsfield-Jackson.Intl.AP.722190_TMY3.epw
"3B"	USA_NV_Las.Vegas-McCarran.Intl.AP.723860_TMY3.epw
"3C"	USA_CA_San.Francisco.Intl.AP.724940_TMY3.epw
"4A"	USA_MD_Baltimore-Washington.Intl.AP.724060_TMY3.epw
"4B"	USA_NM_Albuquerque.Intl.AP.723650_TMY3.epw
"4C"	USA_WA_Seattle-Tacoma.Intl.AP.727930_TMY3.epw
"5A"	USA_IL_Chicago-Midway.AP.725340_TMY3.epw
"5B"	USA_CO_Boulder-Broomfield-Jefferson.County.AP.724699_TMY3.epw
"6A"	USA_MN_Minneapolis-St.Paul.Intl.AP.726580_TMY3.epw
"6B"	USA_MT_Helena.Rgnl.AP.727720_TMY3.epw
"7A"	USA_MN_Duluth.Intl.AP.727450_TMY3.epw

Table 2

Diversity Factor

	1A	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	6A	6B	7A	Average
Large Office	0.63	0.64	0.63	0.60	0.62	0.53	0.61	0.53	0.54	0.62	0.50	0.63	0.51	0.56	0.58
Secondary School	0.86	0.84	0.77	0.81	0.75	0.74	0.80	0.67	0.65	0.83	0.66	0.76	0.63	0.81	0.76
Large Hotel	0.61	0.62	0.61	0.57	0.57	0.44	0.57	0.48	0.47	0.59	0.44	0.61	0.45	0.52	0.54
Highrise Apartment	0.76	0.79	0.72	0.67	0.76	0.64	0.77	0.63	0.57	0.78	0.54	0.85	0.60	0.67	0.70
															0.64