

Heat Pump Awards 2026

Application submission

Hamburger Hut - ski lodge

Vaillant Group Austria GmbH | Building Solutions Award

1. Application overview

Award category	Building Solutions
Title of the project	Hamburger Hut - ski lodge
Organisation Name	Vaillant Group Austria GmbH
Exact address of the project	Anger 63, 5630 Bad Hofgastein, Austria
Funding	Other: Deutscher Alpenverein, Sektion Hamburg und Niederelbe e.V.
Organisations involved in the project	a. Deutscher Alpenverein, Sektion Hamburg und Niederelbe e.V. - (Owner & Investor) b. Lüftenegger ARCHITEXTUR (Architect) c. HTPLAN GmbH (HVAC-Planner) d. KRAFT & WÄRME Heizung-Lüftung- Sanitär GmbH (Installer) e. BMT Taxer GmbH (Depht probe drilling) f. Vaillant Group Austria GmbH (Supplier Heat Pumps & System Components)
Project ending date	30/09/2026
Project website	https://www.dav-hamburg.de/huette/hamburger-skihuette#
Sector of application	Commercial

2. Applicant & EHPA contact details

Full name	Philipp Poandl
Email address	philipp.poandl@vaillant-group.com
Phone number	436641051523
EHPA member involved	Vaillant Group
Role of EHPA member	Heat Pump & System components supplier

3. Project description and benefits

Project description (goal, problem addressed, and solution provided by the heat pump)

This project replaces an aging oil-fired boiler with a future-proof, heat pump heating system that ensures long-term renewable energy efficiency and low operating costs. The primary goal is to provide a sustainable and economically viable heating solution for a mountain lodge while reducing dependence on fossil fuels.

The project faces several challenges: the building was originally constructed in 1935 and is located at 1,970 meters above sea level in the heart of the Austrian Alps. Existing heating infrastructure has evolved over decades and requires complete modernization. In addition, the installation of geothermal boreholes in mountainous terrain presents significant technical and logistical challenges but is leading innovative.

The solution consists of two brine-to-water heat pumps that utilize geothermal energy as a reliable and renewable heat source. The system will provide both space heating and centralized domestic hot water supply, ensuring year-round comfort and efficient operation.

By combining modern heat pump technology with geothermal energy, the project creates a sustainable, cost-effective, and future-oriented energy solution that supports the long-term economic viability of the lodge operator.

Expected or achieved benefits

The project enables a fully renewable energy supply for a mountain lodge located in the heart of the Alps. Compared to alternative heating concepts, the geothermal heat pump system offers the highest efficiency because its performance remains largely independent from outdoor temperatures. As a result, only a relatively small amount of electrical energy is required to provide heating and domestic hot water.

In addition to lower operating costs, the new heating system requires minimal day-to-day intervention and maintenance, reducing the workload for the lodge operator. Modernized infrastructure also improves energy security and provides a future-ready solution that complies with long-term sustainability objectives.

Overall, the project delivers environmental, operational, and economic benefits by combining renewable geothermal energy with highly efficient heat pump technology, creating a dependable and financially sustainable foundation for the continued operation of the lodge.

Obstacles/barriers encountered during development

The project faced several significant challenges due to both its location and the existing building infrastructure. The mountain lodge is situated at an altitude of 1,970 meters in the Alps and operates primarily during the winter season, making construction, logistics, and future maintenance particularly demanding.

One of the key technical challenges was the limited available land area for the geothermal system. To provide sufficient renewable energy, a geothermal borehole field consisting of seven boreholes, each 140 meters deep, was installed. Carrying out deep drilling operations in alpine terrain required careful planning and specialized execution. To ensure long-term efficiency, the geothermal probes are regenerated during the summer months using air collectors.

Another major obstacle was the existing heating infrastructure. The building's hydraulic system, including the original single-pipe heating network and open, non-pressurized heating system, had to be completely redesigned and adapted to modern heat pump technology. Integrating a renewable heating solution into a historic building while maintaining operational reliability required extensive engineering work.

The most important objective throughout the project was to provide the lodge operator with an energy-efficient, reliable, and low-maintenance heating system that minimizes operating costs and creates a sustainable economic foundation for long-term operation.

Why should this project win an award?

This alpine project demonstrates that the transition to renewable heating is possible even in some of the most challenging environments. Located at 1,970 meters above sea level in the Alps, the mountain lodge represents a pioneering example for ski huts, alpine restaurants, and remote hospitality facilities facing increasing pressure to achieve climate targets.

What makes this project particularly remarkable is the courage to transform a building originally constructed in 1935, with decades of historically evolved heating infrastructure, into a modern renewable heat pump energy system. Few comparable projects have been realized under such demanding conditions. Rather than discussing what might be possible in the future, this project proves what can be achieved today: we are taking action and leading by example.

The installation of geothermal energy and two brine-to-water heat pumps demonstrates that heat pump technology is not limited to newly built single-family homes. Even in extreme alpine conditions, heat pumps can provide a reliable, efficient, and sustainable heating solution when properly designed.

As a result, the project serves as a lighthouse initiative for the entire alpine region, showing owners, operators, and organizations a practical pathway toward decarbonization. It combines innovation, sustainability, and economic viability while inspiring others to follow the same path toward a climate-friendly future.

4. Technical specifications

Capacity of unit(s)	2x 19,62 kW @ B0/W35 = 39,24kW
Energy sources used	The heating system is based on two brine-to-water (ground-source) heat pumps powered by electricity. The renewable thermal energy is extracted from the ground through seven geothermal boreholes, each 140 meters deep, providing a stable and efficient heat source throughout the year. To further enhance system performance and sustainability, air collectors are used during the summer months to help regenerate the geothermal field and maintain long-term ground temperature stability.
Coefficient of Performance (COP)	4,54 (B0W35) 3,18 (B0W55)
Service provided	The heat pump system provides space heating and domestic hot water (DHW) production for the entire mountain lodge operation. Specifically, the system supplies: -) Low-temperature radiators in the restaurant and hospitality areas. -) Heating coils within the air handling unit to support the ventilation system. -) Low-temperature radiators in guest accommodation areas. -) Centralized domestic hot water preparation for the entire facility.
Refrigerant type	R410A

Heat pump details (compressor technology, heat exchanger, system configuration)

The project utilizes two Vaillant flexoTHERM VWF 197/4 brine-to-water heat pumps operating in a cascade configuration to provide reliable and efficient heating for the alpine lodge. Each heat pump is equipped with a high durability scroll compressor, ensuring efficient operation, high reliability, and long service life, even under demanding operating conditions.

The heat pumps are connected in parallel and supply thermal energy to a 1,000-liter heating buffer tank. From this buffer, three mixed heating circuits are controlled and regulated by the heat pump controller to meet the varying heating demands throughout the building.

In parallel to the heating buffer, and connected via a changeover valve, a 1,000-liter stratified buffer storage tank provides the standby volume required for the domestic hot water system. This tank supports freshwater stations and ensures hygienic domestic hot water production.

An electric backup heater is directly connected to the buffer tank to provide additional security during exceptional peak load situations.

System control is managed by the integrated heat pump controller Vaillant sensoCOMFORT VRC 720/3, which automatically stages the units according to heating demand and balances operating hours between both heat pumps to ensure optimal efficiency and equal wear distribution.

5. Renewable energy integration and grid response

Integration of renewable energy sources

Renewable energy is integrated into the project through a combination of geothermal energy, brine-to-water heat pumps, and an on-site photovoltaic (PV) system.

The two brine-to-water heat pumps form the core of the heating system, using renewable geothermal energy extracted from the borehole field as the primary heat source. This allows the building's heating and domestic hot water demand to be covered with highly efficient and low-emission technology.

In addition, the system is connected to a PV-installation, enabling locally generated renewable electricity to be used directly for heat pump operation. By maximizing self-consumption of solar power, the project reduces electricity purchases from the grid, lowers operating costs, and further decreases the carbon footprint of the facility.

Response to energy demand / smart grid integration

The heating system is designed to respond dynamically to changing energy demands through the integrated control system of the two Vaillant flexoTHERM VWF 197/4 heat pumps. The heat pumps operate in a cascade arrangement, allowing the controller to automatically activate one or both units depending on the building's heating and domestic hot water requirements. This ensures that only the required capacity is used at any given time, maximizing efficiency and minimizing energy consumption.

The system includes a 1,000-liter heating buffer tank and a 1,000-liter stratified domestic hot water storage tank, which provide thermal storage and help balance peak loads. This enables the heat pumps to operate efficiently even when demand fluctuates significantly throughout the day.

In addition, the installation is compatible with Vaillant EnergyPLUS, the manufacturer's intelligent energy management platform. EnergyPLUS can optimize heat pump operation based

on photovoltaic generation forecasts and dynamic electricity tariffs, automatically shifting operation to periods of available renewable electricity or lower energy prices. The system can also integrate with existing smart energy infrastructure without requiring additional hardware, enabling advanced load management and improved self-consumption of renewable electricity.

6. Innovation, monitoring and replicability

General (all awards)

Why the project is innovative *(all awards)*

This project is innovative because it demonstrates that geothermal heat pump technology can be successfully implemented in an extreme alpine environment, where such applications have traditionally been considered highly challenging or even impractical.

Located at 1,970 meters above sea level in a remote ski resort, the project overcomes multiple obstacles, including harsh winter conditions, demanding geothermal drilling in mountainous terrain, and the complete modernization of an aging heating infrastructure dating back to 1935. Few comparable alpine hospitality buildings have undergone such a comprehensive transition from fossil fuels to renewable energy.

What makes the project particularly unique is that it challenges the common perception that heat pumps are only suitable for newly built, highly insulated residential homes. By integrating two geothermal brine-to-water heat pumps into a historic mountain lodge with complex existing heating systems, the project proves that heat pump technology can deliver reliable and efficient performance even under extreme climatic and operational conditions.

As one of the first projects of its kind, it serves as a lighthouse project for alpine huts, ski lodges, and mountain hospitality facilities, showing owners and operators that ambitious decarbonization goals can be achieved without compromising comfort, reliability, or economic viability. The project does not just showcase innovation in technology, but also innovation in courage, implementation, and real-world sustainability leadership.

Monitoring approach (performance, cost, and carbon targets) *(all awards)*

The heat pump system is continuously monitored through the integrated Vaillant VR940f communication module, enabling remote supervision and optimization 365 days a year. The connected heat pumps transmit operating data in real time, allowing performance to be monitored remotely and ensuring reliable system operation throughout the year.

Through Vaillant's 365-day live monitoring service, the system automatically reports irregularities, faults, or deviations from expected operating parameters to the service team. This proactive approach enables early detection of potential issues, reducing downtime and preventing comfort losses for guests and operators. Many adjustments and optimizations can be carried out remotely without the need for an on-site service visit.

The collected operational data includes key performance indicators such as energy consumption, heat output, operating hours, temperatures, and system status information. This data is used to verify that the heat pumps operate efficiently, achieve the expected energy and cost savings, and deliver the targeted reduction in carbon emissions. Continuous monitoring also supports preventive maintenance, system optimization, and long-term performance analysis, ensuring that the installation remains reliable, energy-efficient, and economically beneficial for the lodge operator.

For Innovation Award

Technology/technique developed solely for this project *(Innovation Award only)*

No answer provided.

Differentiation from state-of-the-art solutions & market maturity *(Innovation Award only)*

No answer provided.

Regional benefits (energy savings, emissions, jobs, infrastructure) *(Innovation Award only)*

No answer provided.

Commercial potential *(Innovation Award only)*

No answer provided.

For Large Heat Pump or Building Solutions Award

Why the project serves as a model for others *(Large Heat Pump or Building Solutions Award)*

This project serves as a powerful reference for building owners, hospitality operators, and organizations seeking practical solutions to decarbonize existing properties. It demonstrates that even highly challenging buildings can successfully transition from fossil fuels to renewable energy when the right technology and system design are applied.

Most importantly, the project shows that heat pumps are not limited to new, highly insulated buildings. It provides real-world evidence that modern heat pump technology can successfully operate in demanding environments and within existing building stock. As a result, it acts as a lighthouse project, inspiring others to move from planning to implementation and proving that ambitious sustainability goals can be achieved today.

Potential for expansion to other locations/industries *(Large Heat Pump or Building Solutions Award)*

The concept can be adapted for alpine huts, ski lodges, mountain restaurants, hotels, and other hospitality facilities that are looking to replace fossil-fuel-based heating systems. It is also relevant for public buildings, commercial properties, and institutions located in rural or difficult-to-access areas where fuel delivery is costly or logistically complex.

Barriers to replication elsewhere *(Large Heat Pump or Building Solutions Award)*

The replication of this project is primarily influenced by site-specific conditions, investment costs, and construction constraints. The alpine location at high altitude presents challenges related to geology, weather conditions, and the installation of deep geothermal boreholes. The feasibility of geothermal energy use depends heavily on local ground conditions and available space for the borehole field.

From a financial perspective, the high upfront investment required for geothermal drilling, heat pumps, and building system upgrades can be a significant barrier. In this project, implementation was economically viable because it formed part of a comprehensive building renovation, allowing multiple infrastructure upgrades to be coordinated and optimized together. Without a long-term commitment from the owners and a clear sustainability strategy, such investments may be difficult to justify.

Operationally, the project had to be completed within a very short construction window. Due to the mountain location and seasonal operation of the lodge, installation work was only possible

during the summer period between May and September, requiring detailed planning and coordination.

Business opportunities for expansion, licensing, or commercial production *(Large Heat Pump or Building Solutions Award)*

This project demonstrates strong potential for expansion and wider commercial application. Similar challenges exist in many mountain lodges, alpine huts, remote hospitality facilities, and other buildings located in mountainous regions, where aging fossil-fuel heating systems need to be replaced with sustainable alternatives.

The project's technical approach can therefore be scaled and adapted to other mountain tourism facilities, hotels, lodges, and remote buildings seeking to reduce operating costs and carbon emissions. This creates clear business opportunities for further deployment, engineering services, and commercial implementation in similar applications across alpine and rural regions.