

# Heat Pump Awards 2026

Application submission

**Golden Age Home for the Elderly renewable energy modernization,  
300 kW heat pump heating and DHW production**

Panasonic Marketing Europe GmbH | Building Solutions Award

## 1. Application overview

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|----------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Award category</b>                        | Building Solutions                                                                                          |
| <b>Title of the project</b>                  | Golden Age Home for the Elderly renewable energy modernization, 300 kW heat pump heating and DHW production |
| <b>Organisation Name</b>                     | Panasonic Marketing Europe GmbH (South-East Branch Hungary)                                                 |
| <b>Exact address of the project</b>          | Hungary, 6035. Ballószög, Aranykor út 38.                                                                   |
| <b>Funding</b>                               | Private                                                                                                     |
| <b>Organisations involved in the project</b> | Bács Klíma Kft.                                                                                             |
| <b>Project ending date</b>                   | 28/07/2026                                                                                                  |
| <b>Project website</b>                       | <a href="https://aranykor.hu/idosek-otthona/">https://aranykor.hu/idosek-otthona/</a>                       |
| <b>Sector of application</b>                 | No answer provided.                                                                                         |

## 2. Applicant & EHPA contact details

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| <b>Full name</b>            | Attila Toth                  |
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| <b>EHPA member involved</b> | Panasonic                    |
| <b>Role of EHPA member</b>  | Manufacturer                 |

## 3. Project description and benefits

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

The project aimed to modernize and improve the energy efficiency of the district heating system serving the Golden Age Home for the Elderly, a residential care facility with approximately 150 residents. The objective was to create a highly controllable and sustainable heating solution based partly on renewable energy, utilizing the site's existing photovoltaic capacity while eliminating natural gas heating, significantly reducing biomass fuel consumption, lowering local emissions, and decreasing operating costs. The district heating network connects multiple buildings and supplies local heat substations, domestic hot water systems, underfloor heating circuits, and swimming pool heating. To complement the existing 500 kW biomass-fired boiler, a 300 kW air-to-water heat pump system was integrated. The renewable cascade system consists of ten Panasonic Aquarea Big M T-CAP R290 heat pumps, each rated at 30 kW, providing

precise capacity control, optimized seasonal performance, and balanced operating hours across all units. The use of R290 refrigerant, with an ultra-low GWP of 0.02, minimizes environmental impact, while Panasonic's patented T-CAP technology ensures reliable heating capacity down to  $-25^{\circ}\text{C}$  outdoor temperature and maintains flow water temperatures of up to  $65^{\circ}\text{C}$  year-round.

### **Expected or achieved benefits**

- Reduced energy costs through the use of high-efficiency air-to-water heat pumps and onsite solar PV generation.
- Lower carbon emissions and environmental impact by replacing fossil fuel heating and significantly reducing biomass consumption.
- Improving energy independence and reducing exposure to fuel price volatility.
- Improved seasonal efficiency through cascade operation and precise capacity modulation
- Enhanced system reliability and resilience thanks to multiple heat pump modules
- Reduced local air pollution compared to conventional biomass and gas-fired heating systems.
- Stable heating performance in extreme weather down to  $-25^{\circ}\text{C}$  and flow temperatures up to  $65^{\circ}\text{C}$ .
- Lower maintenance requirements and operating costs compared to traditional combustion-based heating systems.
- Long-term sustainability and future-proofing, supported by the use of natural refrigerant R290 with an ultra-low GWP of 0.02.

### **Obstacles/barriers encountered during development**

- High-temperature operation: Existing systems required flow temperatures up to  $65^{\circ}\text{C}$ .
- District heating integration: Seamless connection to the existing multi-building heating network.
- Variable seasonal loads: Heating, DHW, and pool heating demands change significantly throughout the year.
- Outdoor unit placement: Limited space and airflow requirements had to be carefully managed.
- Noise control: Acoustic impact on residents and neighboring areas needed to be minimized.
- Footprint limitations: 300 kW capacity had to fit within the available installation area.
- Electrical demand: Increased power consumption required electrical infrastructure assessment and upgrades.
- Renewable energy utilization: Heat pump operation had to be optimized to maximize onsite PV self-consumption.

### **Why should this project win an award?**

This project demonstrates how sustainability, clean energy, and social responsibility can deliver tangible benefits for both people and the environment. Serving a 150-resident nursing home, the system improves comfort, reduces emissions, enhances local air quality, and creates a healthier living environment. During the coldest winter periods (around  $-15^{\circ}\text{C}$ ), the previous biomass boiler consumed approximately 40-60  $\text{m}^3$  of wood per week, at a cost of €10,000-11,000 per week. The new Panasonic Aquarea T-CAP heat pump system is expected to replace around 70-75% of this fuel consumption. Even in the coldest conditions, heat pump operation is expected to be more economical than wood firing, while in milder weather, when COP exceeds 2-3, operating costs can be reduced by up to 50-75%. The project also eliminates much of the wood storage, handling, and transport workload, while significantly reducing local combustion-related emissions. In addition, the site's wellness facilities are open to external visitors, meaning the benefits of renewable energy, cleaner air, and lower environmental impact extend beyond residents to the wider community. Technically, the installation showcases Panasonic Aquarea Big M T-CAP R290, a leading high-end heat pump solution. Its patented T-CAP technology maintains reliable high-temperature heating even in extreme winter conditions, demonstrating how renewable energy can successfully decarbonize demanding district heating applications while delivering environmental, social, and economic value.

## 4. Technical specifications

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|-----------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Capacity of unit(s)</b>              | 300 kW (10 Pcs of 30 kW)                                                                         |
| <b>Energy sources used</b>              | Electricity only, from the electricity distribution network and from onsite solar PV generation  |
| <b>Coefficient of Performance (COP)</b> | COP=3 (A +7 °C, W 55 °C), Seasonal energy efficiency SCOP=3,46 (heating average climate W 55 °C) |
| <b>Service provided</b>                 | heating, pool water heating, domestic hot water                                                  |
| <b>Refrigerant type</b>                 | R290                                                                                             |

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

• Heat pumps: 10 × Panasonic Aquarea Big M T-CAP R290 in cascade • Capacity: 10 × 30 kW = 300 kW total • Hydraulically connected in parallel, each unit is equipped with its own pump. • Compressor technology: Inverter-driven scroll compressor with vapor injection (T-CAP) • Refrigerant: R290 (propane) • Heat exchangers: Brazed plate water heat exchanger and finned-tube air heat exchanger with a Bluefin treatment • Maximum water temperature: Up to 65°C in this application (75°C capability) • Low-temperature operation: Stable operation and capacity retention down to –25°C outdoor temperature.

## 5. Renewable energy integration and grid response

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### Integration of renewable energy sources

Renewable energy is integrated through a 300 kW air-to-water heat pump cascade system, which extracts heat from the ambient air and converts it into useful heating and domestic hot water for the facility. This significantly improves overall efficiency by replacing a large portion of biomass consumption with renewable heat, reducing operating costs, emissions, and local air pollution while maintaining reliable high-temperature heating throughout the year

### Response to energy demand / smart grid integration

The heat pump plant uses a cascade control strategy, automatically staging and modulating ten units to match the building's highly variable heating, DHW, and swimming pool loads while maintaining high seasonal efficiency. Integrated control continuously balances runtime across all heat pumps, ensuring reliable operation, improved equipment lifetime. The photovoltaic renewable electricity is reducing dependence on conventional energy sources.

## 6. Innovation, monitoring and replicability

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### General (all awards)

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#### Why the project is innovative *(all awards)*

This project is innovative because it combines high-temperature heat pump technology with an existing district heating network, enabling a transition from combustion-based heating to clean, renewable energy. The cascade system of ten Panasonic Aquarea Big M T-CAP R290 heat

pumps delivers precise capacity control, high reliability, and improving efficiency across varying heating demands. By combining renewable electricity, natural refrigerant R290, and advanced heat pump technology, the project significantly reduces emissions, operating costs, and local air pollution while providing a scalable model for sustainable heating.

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

The cascade heat pump system is self-controlled and automatically stages and modulates the ten units according to the site's real-time heating demand, ensuring efficient operation under varying load conditions. System monitoring is performed through the Panasonic Aquarea Smart Cloud, which supervises the master heat pump unit and provides access to key operating parameters, alarms, temperatures, and performance data. In addition, an electricity meter records the total power consumption of the facility. This data is used to track operating costs comparing to previous years, verify energy savings, assess system efficiency compared with the previous biomass-based heating system.

### **For Large Heat Pump or Building Solutions Award**

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

This project serves as a model for other buildings by demonstrating how an energy efficient heat pump cascade system can successfully decarbonize an existing district heating network without compromising performance or comfort. It delivers high comfort for residents and visitors while significantly reducing energy consumption, local emissions, and dependence on conventional fuels. The solution is highly cost-effective, lowering operating expenses through the combination of renewable electricity and high-efficiency heat pump technology. By improving air quality and reducing environmental impact, the project makes a meaningful contribution to society and provides a practical, sustainable pathway for similar facilities seeking to modernize their heating systems.

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

The project is highly scalable and can be replicated across a wide range of building types, including retirement homes, hotels, healthcare facilities, educational campuses, and district-heated residential developments. Based on the positive results achieved, the owner plans to install a similar Panasonic Aquarea Big M T-CAP heat pump cascade system in a new building within the retirement home complex, providing both space heating and domestic hot water. Cooling will be supplied by VRF air-conditioning systems, while heating will rely entirely on electric heat pumps, without any conventional fossil-fuel or biomass-based heat source. This demonstrates that the solution can be adapted to both retrofit and new-build projects, delivering a sustainable, energy-efficient, and cost-effective pathway toward building decarbonization. The project provides a proven model for future developments seeking to maximize renewable energy use, reduce emissions, and achieve long-term operational savings.

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

The main barriers to replication are the high initial investment cost, sufficient electrical infrastructure capacity, and the technical challenge of integrating heat pumps into existing high-temperature heating networks. These challenges can be overcome through phased implementation, maximizing onsite renewable electricity generation, and selecting high-temperature heat pump technologies such as the Panasonic Aquarea Big M T-CAP, which can be integrated into both retrofit and new-build projects with minimal changes to the existing heating system.

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

The project creates strong opportunities for wider commercial deployment, as the Panasonic Aquarea Big M T-CAP cascade concept can be replicated in retirement homes, hotels, healthcare facilities, apartment buildings and other buildings with high heating and hot water demand. The successful integration of high-temperature heat pumps into an existing district heating network provides a proven and scalable reference solution that can be adapted to similar retrofit and new-build projects. It also demonstrates a commercially viable pathway for accelerating the adoption of renewable heating technologies and decarbonizing large buildings.

**For Innovation Award**

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**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.