

Heat Pump Awards 2026

Application submission

**Cerveceria Guadalajara Mexico Bombas de Calor
empaque.**

Johnson Controls | Large Heat Pump Award

1. Application overview

Submitted	2026-08-11
Award category	Large Heat Pump Award
Title of the project	Cerveceria Guadalajara Mexico Bombas de Calor empaque.
Organisation Name	Johnson Controls
Exact address of the project	Calz. Lázaro Cárdenas 975, Colón Industrial, 44940 Guadalajara, Jal.
Funding	Private
Organisations involved in the project	Johnson Controls, Heineken, Siemens
Project ending date	2026-10-31
Sector of application	Industrial

2. Applicant & EHPA contact details

Full name	Oscar Herrejón Mejia
EHPA member involved	Jose Luis Hernandez Martinez
Role of EHPA member	Project engineer

3. Project description and benefits

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

Two ammonia/ammonia cascade heat pumps are supplied to generate condensation for the plant's refrigeration system. On the high-temperature side, hot water at 85°C will be generated to avoid the consumption of superheated water in the packaging process for product fermentation.

The expected benefits include reduced steam consumption, reduced fossil fuel combustion, reduced energy consumption in evaporative condensers, and reduced water consumption in condensers, and a reduced carbon footprint.

Expected or achieved benefits

Reduced energy bills, reduced water consumption in condensers, and reduced carbon footprint.

Obstacles/barriers encountered during development

Installation costs, complexity of installation in confined spaces on the factory floor.

Why should this project win an award?

This is the first heat pump project with a two-stage system using reciprocating compressors and an ammonia/ammonia cascade system. The design aimed for maximum efficiency.

4. Technical specifications

Capacity of unit(s)	1700 KW hot Water 85°C each Heat Pump
Energy sources used	Electricity 4160VCA
Coefficient of Performance (COP)	6.27
Service provided	It is used for cooling by condensing refrigerant from the refrigeration plant and generating hot water for the product pasteurization process.
Refrigerant type	Natural refrigerant: R-717 (Ammonia)

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

The project includes two Sabroe Dual PAC heat pumps in parallel. Each heat pump uses two compressors in series (boost and high-stage) with 12 and 16 cylinders, respectively.

The electric motors are IP55 rated and compatible with variable frequency drives (VFDs). The starters are medium-voltage (4160 VAC) VFDs. The evaporator is a cascade shell and plate type. The condenser is a high-efficiency shell and plate type with a sub cooler, condenser, and desuperheater design. It includes motorized expansion valves, oil recovery, and refrigerant level sensors. The minimum refrigerant charge is 115 kg of ammonia per heat pump.

5. Renewable energy integration and grid response

Integration of renewable energy sources

The plant generates superheated water at 16 bar and 125°C in the boilers. This water is used in the cooking and pasteurization processes.

The heat pump generates hot water at 85°C, sufficient for the pasteurization process. The heat pump reduces energy consumption from burning natural gas.

Response to energy demand / smart grid integration

In the evaporator section, the system aims to maintain the plant's floating condensation pressure in the cascade condenser. The control system generates the condensation set point, and the control panel generates the evaporation temperature for the booster compressor. A stratified hot water tank, a hot water flow meter, and supply and return temperature sensors are used. These three instruments calculate the plant's thermal load and generate a set point for the operating capacity of the heat pumps and the water flow that must pass through the hot water condensers. This will determine the rotational speed of the heat pump motors and compressors. A thermal level must be maintained in the stratified hot water tank. If the plant demands hot water, the thermal level will decrease and a second heat pump will be switched on. If the stratified tank increases its thermal level to 90%, one heat pump will be switched off.

6. Innovation and monitoring

Why the project is innovative

It is the first heat pump project in Mexico, and one of the few cascade condenser applications in the world. It includes a centrifugal pump transfer unit that sends the condensed refrigerant to the plant's liquid receiver, helping to lower the receiver temperature and generating a greater cooling effect in the evaporators by supplying subcooled refrigerant.

Monitoring approach (performance, cost, and carbon targets)

Through the control panel of each compressor (UNISAB IV), which communicates with the plant's PLC, information on speed, thermal load, and energy consumption is collected. The plant also sends information on boiler operation (capacity reduction, gas consumption), which is then sent to a centralized PLC via the plant's SCADA system to consolidate information and support decision-making.

Technology/technique developed solely for this project

The project is a custom-designed solution using commercially available low- and high-temperature equipment, developed specifically for its correct operation under the design conditions.

Differentiation from state-of-the-art solutions & market maturity

It's a project in the installation phase, but it will trigger more projects in Mexico and worldwide. The most advanced technology currently available is being used for its installation and operation.

Once the cost savings are justified, the project should trigger at least 20 projects worldwide.

7. Replicability and regional impact

Why the project serves as a model for others

It is a viable example of non-standard applications; it does not require a cooling tower or chilled water for hot water generation. This project utilizes both low-temperature and high-temperature systems to achieve maximum efficiency. The low refrigerant charge makes it suitable for small refrigeration plants, while the high compression ratio makes it viable for plants with both low-temperature and high-temperature applications.

Potential for expansion to other locations/industries

Yes, heat pumps can be installed in parallel as long as the plant has condensation of heat rejection and hot water demand. This allows for installation in different plants, with the flexibility to modify operating conditions.

Barriers to replication elsewhere

If the plant's condensation rate is too high, a different type of heat pump application should be implemented. It is feasible to define the heat pump operating conditions for its design and manufacture, as it can only operate within its design operating range.

Regional benefits (energy savings, emissions, jobs, infrastructure)

Greenhouse gas emissions will be reduced through a smaller carbon footprint. Since it is a beverage plant, the production plant, by reducing water consumption in the condensers, will be able to allocate this water flow to its product production.

The city area is currently experiencing water scarcity, so less water will be drawn from wells, measured in hectolitres annually.

8. Commercial potential

Business opportunities for expansion, licensing, or commercial production

Production is at Johnson Controls' Sabroe plant.

Commercial potential (further elaboration)

The project has the potential to be replicated in more similar beverage plants, but licensing is not an option since the equipment is manufactured at Johnson Controls' Sabroe plant.