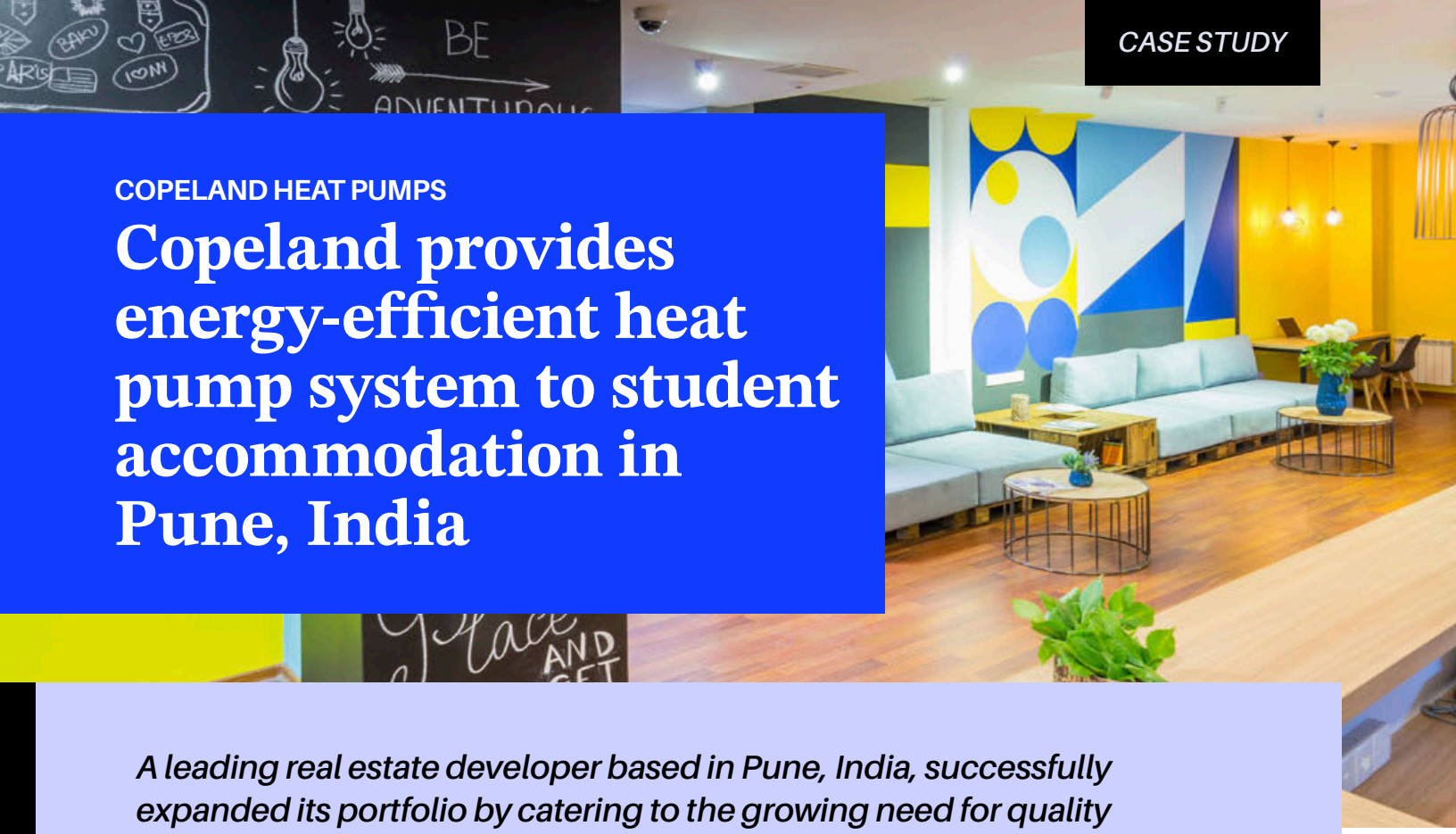
CASE STUDY



COPELAND HEAT PUMPS

Copeland provides energy-efficient heat pump system to student accommodation in Pune, India

A leading real estate developer based in Pune, India, successfully expanded its portfolio by catering to the growing need for quality accommodations for students in education hubs across the country.

Background

Its hostel venture hopes to cater to the under-supplied demand for value student housing. A few years ago, the company tapped a local-based contractor to replace the existing solar water heaters at a student accommodation facility with Copeland's heat pumps.

Challenge

One of hostel's goals is to fulfill the unmet needs of a facility for student accommodation, that promises all-day availability of hot water through solar water heaters that can handle 3,000 liters per day (LPD). These heaters are installed on the rooftop of the facility. However, the hot water generated during the day is typically consumed by students when they shower at night. As a result, the 3,000 liters of hot water meant for the next day is consumed through 18-kilowatt electrical backup heaters, which require more power. During the rainy season, students tend to depend more on these electrical backup heaters. It's for this reason that the facility is forced to pay a hefty electricity bill despite having solar water heaters installed.

Solution

To address this problem, Copeland provided its heat pump system as the replacement for the facility's existing solar water heaters. Copeland supplied three machines, each with a capacity of 200 liters per hour (LPH) and integrated with a 1,000-liter hot water mixing tank.

Copeland's heat pump system uses a water-cooled condenser to reject the heat absorbed from air by the evaporator and the heat of compression. The maximum water temperature that the solution can reach is limited by the condenser's Log Mean Temperature Difference (LMTD) and the maximum condensing temperature permissible for the system's compressor. Additionally, the heat pump's heating capacity is limited by the evaporating temperature range of its compressor. The solution helps reduce carbon emissions and save energy by 70% compared to electric geysers, 56% compared to solar water heaters with electric backup heaters, and 55% to 60% compared to liquefied petroleum gas (LPG) and diesel-fired boilers.

COPELAND
Engineered for Sustainability

Copeland 200LPH Heat Pump

500 LPD Solar Water Heater

Aside from its operational efficiency, the heat pump system uses renewable energy sources, making it an environmentally friendly solution that requires low maintenance. Combining renewable sources and applying vapor compression technology creates sustainable water heating processes, helping developers and contractors achieve their sustainability goals. Moreover, Copeland's heat pump systems are fully automatic, eliminating the need for manual interventions. They are also indigenously designed, manufactured and proven for Indian climatic conditions.

Result

Copeland worked closely with the hostel group to understand the challenges of the facility in using solar water heaters. Copeland's authorized system integrator partner integrated the heat pump system with the facility's hot water mixing tank and provided additional plumbing work. The HVACR provider also monitored the installation and commission of heat pumps at the site, as well as demonstrated how heat pumps can be a cost-effective and sustainable solution compared to solar water heaters supported by electrical backup heaters.

Copeland is in a unique position to help building owners and contractors meet sanitary water heating requirements in India. The company provides a locally built, GreenPro-certified, highly-efficient, and reliable product range and offers strong channel networks and customer service support.

Hot water system	Solar water heater	Heat pump
Heat pump/solar	500 LPD x 6	200 LPH x 3
Tank size	500 x 6 + 100 x 3 (EB)	1000 x 3
Total hot water storage	3300	6000
Hot water requirement per day	6300	6300
Daily working hours	12 hrs.	10 hrs.
Heating capacity (Kw)	(3*6 Kw) 18 Kw	(3*7 Kw) 21 Kw
Input power (Kw) for 3 machines	18 Kw	3 x 2.1 Kw
Required electrical units per day	216 Kw	63 Kw
Electricity charge per unit (INR)	USD 0.16	USD 0.16
Energy cost per day (INR)	USD 34.00	USD 9.90

Average electricity cost saving of heat pump per day	USD 24.00
Annual electricity cost saving (with 10 months running)	USD 7,218.00
Capital investment cost for heat pump & tank	USD 9,186.00
Return on investment (ROI)	15 Months

To learn more, visit **copeland.com**

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