

Here, buildings had thick walls, few windows facing the Sun, openings to take in air on the side of prevailing winds and an exit vent on the other side – known in Arabic as malqaf architecture. Though some argue that the birthplace of the wind catcher was Iran itself.

Wherever it was first invented, wind catchers have since become widespread across the Middle East and North Africa. Variations of Iran's wind catchers can be found in the barjeels of Qatar and Bahrain, the malqaf of Egypt, the mungh of Pakistan, and many other places, notes Fatemeh Jomehzadeh of the University of Technology Malaysia and colleagues.



The Persian civilisation is widely considered to have added structural variations to allow for better cooling – such as combining it with its existing irrigation system to help to cool the air down before releasing it throughout the home. In Yazd's hot, dry climate, these structures proved remarkably popular, until the city became a hotspot of **soaring ornate** towers seeking the desert wind. The historical city of Yazd was recognised as a UNESCO World Heritage site in 2017, in part for its **proliferation** of wind catchers.

Soaring /'sɔ:riŋ/ adjective: flying or rising high in the air.

Ornate /ɔ:'neɪt/ adjective: highly decorated.

proliferation/prə'lɪfə'reɪʃn/ noun: large number of something.

As well as performing the functional purpose of cooling homes, the towers also had a strong cultural significance. In Yazd, the wind catchers are as much a part of the skyline as the Zoroastrian Fire Temple and Tower of Silence.

Among them is the wind catcher at the Dowlatabad Abad Gardens, said to be the tallest in the world at 33m (108ft) and one of the few wind catchers still in operation. Housed in an octagonal building, it overlooks a fountain stretching past rows of pine trees.



Parham has extensively studied the scientific application and surrounding culture of wind catchers in contemporary architecture. He says inconveniences like **pests** entering the **chutes** and the gathering of dust and desert debris have meant many have turned away from traditional wind catchers. In their place are mechanical cooling systems, such as conventional air-conditioning units. Often, those options are powered by fossil fuels and use **refrigerants** that act as powerful greenhouse gases if released into the atmosphere.

The **advent** of modern cooling technologies has long been blamed for the **deterioration** of traditional methods in Iran, the historian of Iranian architecture Elizabeth Beazley wrote in 1977. Without constant maintenance, the harsh climate of the Iranian Plateau has worn away many structures from wind catchers to ice houses.

advent / 'advɛnt/ **noun**: the arrival of a notable person or thing.

"There needs to be some changes in cultural perspectives to use these technologies. People need to **keep an eye on** the past and understand why energy conservation is important," Kheirkhah Sangdeh says. "It starts with recognising cultural history and the importance of energy conservation."

Fossil-fuel-free methods of cooling like the wind catcher might well be due a revival, but to a surprising extent they are already present – **albeit** in a less magnificent form than those in Iran – in many Western countries.

In the UK, some 7,000 variations of wind catchers were installed in public buildings between 1979 and 1994. They can be seen from buildings such as the Royal Chelsea Hospital in London, to supermarkets in Manchester.

These modernised wind catchers bear little **resemblance** to Iran's towering structures. On one three-storey building on a busy road in north London, small hot pink ventilation towers allow **passive ventilation**. **Atop** a shopping centre in Dartford, **conical** ventilation towers rotate to catch the breeze with the help of a **rear** wing that keeps the tower facing the prevailing wind.



conical ventilation towers

rear wing

The US too has adopted wind-catcher-inspired designs with enthusiasm. One such example is the visitor center at Zion National Park in southern Utah. The park sits in a high desert plateau, comparable to Yazd in climate and topography, and the use of passive cooling technologies including the wind catcher nearly eliminated the need for mechanical air-conditioning. Scientists have recorded a temperature difference of 16C (29F) between the outside and inside of the visitor centre, despite the many bodies regularly passing through.



There is further scope for the spread of the wind catcher, as the search for sustainable solutions to overheating continues. In Palermo, Sicily, researchers have found that the climate and prevailing wind conditions make it a ripe location for a version of the Iranian wind catcher.