

WIND TOWERS FOR A MODERN SUSTAINABLE ARCHITECTURE IN IRAN

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Wind Towers are built in Iran using local construction methods and natural materials. Their design and aesthetic appearance provide an architectural example in harmony with traditional society and the environment.

From 40° C outside to 18° C inside, in few seconds. No air conditioned, no electric energy required. It's just an old system made in Iran: the so-called *Wind Towers*, *badgir* in Persian. Skyline of southern Iranian towns like Yazd or Kerman are still full of these wind towers, a natural tool to refresh houses and mosques.

In desert areas houses are closely set together, high-walled and made of baked brick with small windows facing away from the sun to minimize heat and maximize shade.

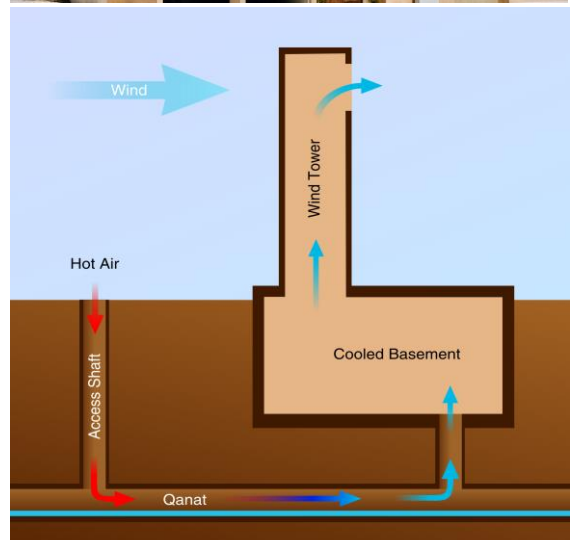
In order to provide people with constant comfort, wind towers were built with a four-directional orientation to catch wind from all directions and guide it into the house.

The design is very simple, to catch the wind and redirect fresh air into the buildings. Towers have four parts:

- the body containing shafts
- air shelves which catch hot air and prevent it from entering the structure
- flaps which redirect wind circulation
- roof covering.

Wind travels through the shafts on top of the tower to reach the interior of the building. The air flow inside the structure travels in two directions, up and down. The temperature difference between the interior and exterior of a building, causes pressure variations which results in the creation of air currents. In cities where the wind blows only from one single direction, only one of the shafts operates to receive the breeze and the other three work as air outlet passages.

With today's growing emphasis on reducing energy consumption, modern architecture can make use of traditional Iranian methods to utilize air currents and evaporation in cooling and air-conditioning living quarters. Wind towers display the compatibility of human-built architectural designs with the natural environment and the ingenuity of Iranian engineers.



Nowadays, natural ventilation has become an attractive solution for reducing the energy usage and cost and providing good indoor air environment while sustaining a comfortable, healthy and productive internal climate.

All over the world, we can see some examples of structures done on the wind towers' model. In particular, they can be found in traditional Persian-influenced architecture throughout the West Asia, in the Arab States of the Persian Gulf, in Pakistan and Afghanistan.

This ecological solution was also adapted to different contexts in northern European countries. The exhaust Tower of Tredal School in Sunndalsøra (Norway), for example, communicates with the surrounding mountain peaks and introduces a strong vertical element in the otherwise rather horizontal building body.

The Kvarterhuset (assembly building) in Kolding (Denmark) uses two stories tall, centrally located, communication spine as an exhaust stack for the ventilation air. Other examples are Tax Office in Enchede (Netherlands), the Lanchester Library in Coventry (United Kingdom), the Queen's Building of De Montfort University, Leicester (United Kingdom), and and the Jaer School in Nesodden (Norway).

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