



“The arts are not just a nice thing to have or to do if there is free time or if one can afford it. Rather, paintings and poetry, music and fashion, design and dialogue, they all define who we are as a people and provide an account of our history for the next generation.”

MICHELLE OBAMA



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# HOUSE UNDER SHADOWS, KARNAL

ZED Labs, New Delhi

**Typology :** Residence

**Why is this project special?** Energy-efficient, net-zero and inspired by Nature.

This 1672 sq. m., two-family residence exhibits a near-net-zero, Nature-inspired design that enables sustainable living. The home is built for two brothers and their families who wanted to live in Nature, inspiring the fusion of two single-floor units through a common façade and a seamless double roof for visual cohesiveness on the exterior.

Due to the extremely hot and dry North Indian weather, the firm has followed a south-facing design and a zero-energy approach inspired by the Noor Mahal's *chowks* and *chhatris*, which are derived from the *havelis*.

The home starts with a common space sandwiched between two boxes that represent the familial units, punctured by two chowk-inspired rectangular courtyards and heatsinks. The central

courtyard with the swimming pool is embraced by stone-clad walls that provide mass insulation to prevent the heat island effect. The pool acts as a heatsink as it absorbs heat during the day and releases it at night, which lowers the net heat gain. Due to the radiant heat of the water body, the surrounding vertical greens experience evapotranspiration due to photosynthesis.

Cantilevers run along the units, shading the internal and external walls and enabling transition. The courtyards and cantilevers facilitate social cohesion and seamless movement between spaces. The layout accommodates naturally-lit and cross-ventilated interiors with sleeping areas oriented towards the southwest, while the living spaces are towards the northeast.

Bedrooms have glazed windows that allow minimum heat gain and glare, while offering views of the landscape. Living spaces are shielded from the southwest sun and open out into the



courtyard to allow in natural daylight. The kitchen and utility, bar, powder and servants' quarters are located around the central staircase, which is a vertical circulation element on the southwest. A multipurpose area is inspired by the elevated *chhatris* and dome-shaped pavilions found in traditional Indian architecture.

The double-roof canopies the entire home, promoting privacy with cohesiveness. A solid wooden roof with an extensive pergola runs along the house's length and breadth, and features a Voronoi pattern (filtered light and shadow patterns caused by the trees, branches and leaves in forest towards the sky).

A fibre reinforced polymer (FRP) pergola under a mild steel framework, constructed through digital modelling using parametrics, distributes weight through the steel columns. This reduces solar direct and diffused radiation by ninety per cent, while creating an interplay of light and shadow in the interiors. It also allows the underlying wooden roof to be utilized as a semi-outdoor space, while providing panoramic views of the neighbourhood's green and low-lying spaces.

Local materials are extensively used for an environmentally-conscious approach, with low-embodied carbon and neutral tones. This reduces mechanical cooling loads and creates visual lightness in the structure's elevation. Walls are dry-clad with Gwalior mint stone to enhance thermal mass performance, while the leather finish on stone renders a natural texture.

A solid Indian wooden ceiling imparts warmth to the free-flowing open spaces. Glazed aluminium windows rise floor-to-ceiling, while the interior furnishings and artwork maintain an earthy colour and texture palette. Due to the demand for a specific door-height ratio, the firm used pre-polished Indian veneer doors assembled on site.



photography : . andre j. fanthome

