

# **Solar Panels in Residential Projects: Efficiency Without Compromising the Aesthetics**

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# Solar panel

- Solar energy is one of the most commonly employed strategies in residential architecture, both **active and passive**.
- Many countries around the world offer **incentives to encourage the use of solar systems**, and **the benefits** of installing these systems can be seen in a short period of time, with a **reduction of up to 95% in the monthly energy expenses**, which makes this strategy one of the **most attractive of all sustainable solutions**.
- Furthermore, the average **lifespan of a solar panel is 25 years**, operating entirely on its own and requiring only basic cleaning once a year.

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- However, despite the **popularization of solar systems in architecture due to their many undeniable advantages**, their **impact on aesthetics** is still an obstacle for **architects and clients**.
- Nowadays, some alternatives allow better **integration of this technology** into architecture since the **newest photovoltaic panels** can also be used as **cladding in flat or sloped roofs, facades**, or even in **shading structures** such as **pergolas, sun baffles, verandas, etc.**

- **Yin Yang House Project, built in California**, incorporate solar panels into the design from the very start.
- The system developed by students at the **US Department of Energy** elegantly.
- They combines **engineering technology** with the **aesthetics** of good residential architecture.
- The bifacial photovoltaic panels can absorb solar energy from sunlight on the front surface and by reflected light on the rear, maximizing the amount of energy produced per square meter.



[Yin Yang House](#) ,USA,  
4700ft2 ,2011

- In addition, they are visually appealing and create an interesting composition when applied to balconies, as seen here.



- Similarly, the [Bundeena Beach House](#) features a **sixteen-panel photovoltaic system** and **Tesla battery**, seen as a linear reflection pond within the roof garden design that provides all the owner's electricity needs.
- It was important that the PV panels were thoroughly integrated into the house and roof garden design, serving as an example of how environmental features can enhance, rather than detract, from a design.



[Bundeena Beach House](#) in Australia  
2018, 265m<sup>2</sup>

- [UrbanEden](#), North Carolina's, is powered by an array of photovoltaic panels on an adjustable track system over the roof of the house.
- The solar panels can be moved out over the deck to provide shading to both the exterior rooms and to the southern wall during the summer.
- The panels can be retracted in the winter to allow the sun to passively heat and light the home through the southern glass wall.







- [Jenson-DeLeeuw NZE House](#) in the United States is a 200-square-meter home that generates enough renewable energy to service the home's energy needs as well as fully power an electric car.
- The roof was designed in the perfect position and slope to accommodate 56 photovoltaic panels, creating a single, remarkable surface.
- The dark color also dialogues with the material palette used in the house.
- The [Passive House](#) also features this same strategy, adding the panels over the sloping bamboo roof structure.



- The [Newhall South Chase](#) houses also use this strategy, each house featuring 5.4 sqm of photovoltaic roof tiling.
- Although much more modest than the previous example in terms of scale, the addition of the panel over the sloping roof, which is clad in gray stone, is discreet but also very efficient.



- The [CO2 Saver House](#) is a good example of this by positioning the solar panels on the main facade in alignment with the glazed roof to emphasize the projecting structure.

