



Integration of solar roof tiles.

IS IT:

☒ *Product*

☐ *Technology*

☐ *Equipment*

APPLICABLE FOR:

☐ *Restoration*

☒ *Rehabilitation*

☒ *New Construction*

APPLICABLE ON:

☐ *1. Foundations and underground structures*

☐ *2. Vertical structures*

☐ *3. Horizontal structures and vertical connections*

☐ *4. Roof and terraces*

☐ *5. Façade and building envelope*

☐ *6. Finishes and completion elements*

☐ *7. Integrated services*

☒ *8. General strategies for building recovery*

Related companies: Tesla's roof tiles.

DESCRIPTION

Solar tiles are small PV modules designed to resemble regular roofing. When the main barrier to investing in solar is appearance, PV tiles can be the perfect solution. You may also hear them referred to as solar shingles or rack less solar systems, as they don't have the mounting frames in traditional rooftop installations.

WHY TO USE

The Tesla Solar Roof is a building-integrated photovoltaic (BIPV) product that functions as both a roofing material and a photovoltaic solar panel system. The solar roof tiles can be installed in place of regular roofing material with the same protection value, and they come in various designs resembling terra cotta tiles, slate, and composite shingles.

The solar roofing tiles come in two formats: energy producing and non-energy producing. Energy producing tiles incorporate solar cells that produce energy when exposed to sunlight. Non-energy producing roof tiles do not produce solar energy, rather they look nearly identical to the energy producing solar tiles and serve to complete the roof's protection and aesthetics.

Advantages of Tesla roofing over normal roofing:

- Provides energy efficient roofing solutions.
- Reduces energy consumption of the house.
- Reduces the electricity bill for the property.
- Leverages the natural renewable resource for power generation.
- Produce power at individual property level.
- Source extra power to the grid and contribute to the society.
- Long lasting roofs with no extra solar panels required.
- Beautiful curb appeal due to the elimination of bulky solar panels.
- Luxurious look due to the colored glass tiles.
- Robust roofs with impact resistant and high wind resistant glass tiles.

HOW TO USE AND APPLY

It's unlikely you can integrate solar tiles into existing roofing, so they're generally suited to newbuilds or renovations. The roof will be a mix of PV and dummy tiles, which look the same but don't generate electricity. These

cover unfavorable parts of the roof, like north-facing or shaded surfaces, or to scale the size of the PV system to the electricity demand of the property.

Tesla Solar Roof is actually pretty simple, with the photovoltaic cells being mounted on top of a firestone clad guard, which is a thin moisture barrier. The wiring for the tiles themselves is hidden underneath the shingles. Each Solar Roof tile represents itself as three shingles on the roof. As per Tesla's design, one to four of these tiles can be wired together to create branches, which are then wired to a diode trunk harness. The diode trunk harness carries the electricity from all the panels through the roof itself.

https://www.youtube.com/watch?v=I6lbc48G_rY

TECHNICAL CHARACTERISTICS

Solar roof tiles are suitable for roofs and facades with a slope of 3 to 90 degrees.

Size, weight, life service and other characteristics of tiles depends on the manufacturer.

Such a roof covering will significantly improve the quality of life for the homeowner, the house will meet the requirements of sustainability and at the same time be environmentally friendly. Because the roofing looks like conventional, it blends in with both classic and modern building architecture and generates electricity efficiently.

RECOMMENDATIONS AND OTHER INFORMATION

Unfortunately for homeowners with flat roofs, the Tesla Solar Roof will not be an option for you and your home. The minimum roof pitch eligible for a solar roof installation is 3:12 (or 14 degrees).

Traditional 6.2 kW solar systems produce roughly around 10,180 kilowatt-hours (kWh) of electricity per year.

Tesla roof tiles are made with tempered glass that is more durable than standard roofing tiles. Tesla stands behind the durability of their product with an infinite warranty (or the lifetime of your house). We don't know the full details of their warranty, but that's quite a bold offer.



EXAMPLES

New-builds or renovation projects. Solar panels (BIPV) perform as regular roofing material while harnessing solar energy. These tiles replace traditional roof tiles, shake or shingle roofs with innovative solar modules. Solar panels do not require any expensive mounting systems. Modules are installed directly to wooden battens; PV cables are connected to the inverter and voilà! Locally produced and consumed energy is most viable and sustainable way to combat climate and energy challenges.

The potential impact of snow and snow loads on solar panels, especially in the northern hemisphere, should be considered at the design stage as there may be a lot of snow during the winter season. The quality of snow also varies from year to year, so it is essential to think about how best to prevent snow from staying on top of the solar panels. It is known that the snow layer blocks sunlight from radiating to the solar panels and is therefore unable to generate energy.

The mounting angle of the solar panels can significantly affect the quantity of snow collecting on the solar panels. In new, large facade structures, wall PV panels may be a viable option because the panels don't accumulate snow. Wall panels, as well as snow-free rooftop integrated solar panels produce good energy, especially on sunny, bright, and cool winter days in March-April, as the reflection of snow enhances the radiation of sunlight onto the solar panels.

REFERENCES / SOURCES AND LITERATURE

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<https://www.teslarati.com/tesla-solar-roof-cal-fire-emergency-response-training-video/>

<https://blog.namastesolar.com/tesla-solar-roof-tiles>

https://solarstone.ee/en/?gclid=Cj0KCQjw5-WRBhCKARIsAAId9FlipVJljiadTkXbz7S9Hd7doYb6RxeBDV-uca8k_rankfw1ngsMI-0aApAdEALw_wcB

WEBSITE OF THE COMPANY

<https://www.tesla.com/solarroof>

IMAGES AND CAPTIONS

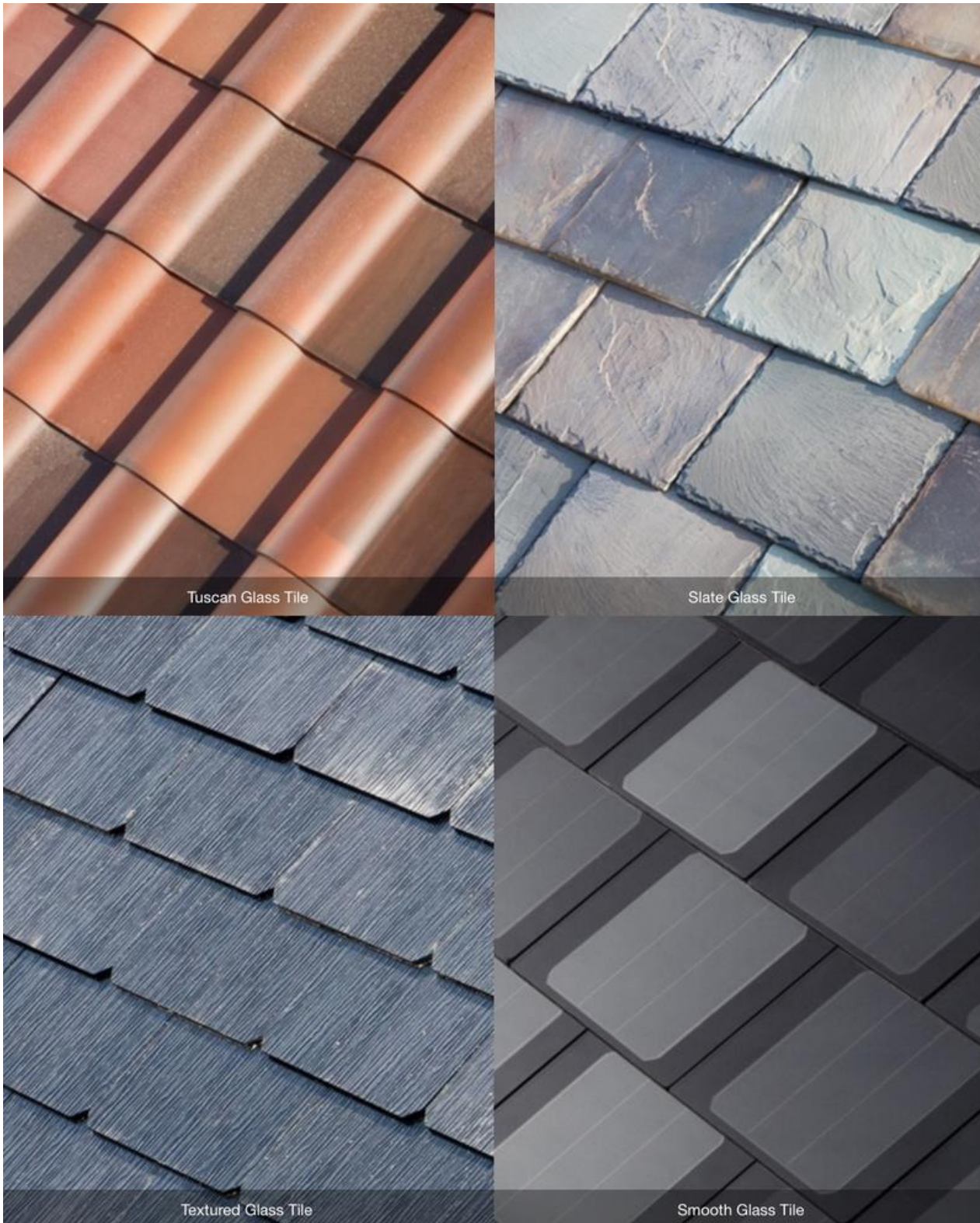


Fig.1: Tesla has developed four different styles of rooftop solar shingles: Tuscan, slate, textured, and smooth.

© <https://www.vox.com/energy-and-environment/2016/10/31/13469846/tesla-solar-roof-solpad-solarwindow>



Fig.2: First Tesla Solar Roof. © <https://i2.wp.com/ontario-solar-installers.ca/wp-content/uploads/2017/08/First-Tesla-Solar-roof.png?ssl=1>