





# Guiding the growth of local energy production with in-roof solar

Smart and scalable local energy production solutions are highly sought during the current renovation sweeping the EU, with solar power serving as a powerful method. Leading provider of building-integrated PV (BIPV) solutions in the Nordic region, Solarstone, offers cutting-edge and affordable in-roof systems where solar panels simultaneously cover the roof and generate electricity.

When Solarstone first began, the solar panel market was just developing. Materials research was the primary driver of innovation, and there were few practical uses for solar panels. Existing solar products on the market were either unsuitable or too expensive for several reasons, primarily poor aesthetic appeal. Solarstone saw immediately that it made sense to cover both new construction and retrofit roofs with 2 in 1 solar.

The visual appeal of BIPVs is a significant selling point. Regular PV looks like an alien object on a roof, whereas building-integrated solar creates an architectural whole. In contrast to BIPV, standard solar panels can't be put in historic buildings or protected areas. Homeowners are shielded from longer-lasting, potentially more substantial swings in electricity prices by producing solar energy and maximising self-consumption. Additionally, homebuyers are substantially more drawn to energy-efficient buildings with solar panels integrated into the design.

2015 saw the launch of the Estonian company's first product, tile interlocking solar modules. In essence, typical roof tiles can be effortlessly combined with these solar modules. Today, it also supplies a universal aluminum framing system that transforms almost any solar panel into a two-in-one sublayer-free roofing material that is waterproof. The revolutionary framing kit, called Click-on, has changed the way BIPV is considered for new builds and renovation projects.

In the EU, there is enormous potential for solar in new construction and retrofits of

residential and non-residential structures. Only 10 per cent of the EU's building stock, that is 130 million units, has been updated to fulfill efficiency and climate change goals. Solarstone believes that its products can significantly influence how energy at homes is produced in the future.

## **Irresponsible use of resources**

Solar panels mounted on roofs are a cost-effective way to generate renewable

energy. In reality, 98 per cent of rooftop solar installations use photovoltaics attached to buildings (BAPV). Unfortunately, they also lead to the wasteful use of resources. Double-layered roofs are unlikely to be long-lasting. The building industry is the single most significant energy consumer, making up over 40% of energy consumption in the EU and the US (36 percent of CO<sub>2</sub> emissions). Up to 7 million tonnes of CO<sub>2</sub> per year could be saved in the EU by installing







solar on all new and refurbished structures. But it will only be successful if it is approached wisely and efficiently.

#### Building-integrated solar is gaining momentum

The integration of solar energy production into buildings is being revolutionised by building-integrated photovoltaics. BIPVs serve two purposes: they can provide renewable energy for the home, while also serving as a crucial component of a long-term building framework. BIPVs can be used on various building components, including roofs, facades, windows, skylights, and balcony railings. This is not the end of the list. The housing sector is ready for innovative ideas and methods for incorporating rooftop solar panels and other renewable energy sources into the design of buildings. Architecturally, solar panels can and should blend seamlessly with the structure.

BIPVs are linked to three keywords: complexity, compatibility, and price. And for a reason. The drawbacks of solar energy systems that are integrated into buildings are very well illustrated by these keywords. Building-integrated solar (BIPV), which lacks financial advantages and functions similarly to a conventional roof, is not encouraging solar installers to convert from traditional solar. However, that is changing.

#### Solar roof using regular PV panels

The Click-on Full Solar Roof concept from Solarstone addresses the three issues above. To join the framing kit with standard PV modules, no screws or adhesive are needed. The kit is simple to add in the factory or

on-site. Even the most complicated rooftop designs can be handled with ease when combining PV panels and aluminum non-active dummy modules. A breakthrough two-in-one system that protects against fire, wind uplift and snow load has been proven effective.

The Click-On framing kit is the most affordable BIPV option on the market, improving the eye-friendly concept even further. BIPV is highly practical for new

construction. The difference is that saving money on conventional roofing materials and a smaller workload.

Rather than manufacturing the solar panels, Solarstone adds new functionality to them by including the Click-on frame, resulting in significant cost savings. The addition of the frame does not affect the original warranty and actually strengthens the panel. Panel production is left in the hands of Tier 1 manufacturers, who excel at it. Solarstone







solar roofs are fixed directly on the wooden battens without the use of pricey mounting methods, tackling the complication of installation. Solarstone panels can be installed on a typical 80 m<sup>2</sup> rooftop in just one day.

#### Featuring Click-on and dummy modules, a full solar roof

Active and passive modules seamlessly fit into the design of a modern solar roof. Dummies, or non-active modules, can be used effectively around the roof's perimeter, in locations with persistent shade, and next to stationary impediments, such as chimneys, skylights, ventilation outlets, snow barriers, etc. Dummy modules are constructed from aluminum honeycomb panels and are similarly structured using the Click-on system. If passive aluminum modules are not the first option, special transition flashings can accommodate ordinary roofing material.

#### A universal answer

Solar roofs can be added to residential and commercial sloped rooftops, carports, façades, and PVC and steel halls using Click-on technology. To create different combinations in addition to the full black

solar roof experience, it's now possible to combine, colored PV modules with Click-on framing kit. This gives architects and city planners yet another practical option to traditional solutions.

#### Limited resources for in-roof solar design

A roofing project's planning and estimation require various outdated tools and data for validation, frequently on-site visits and labour-intensive checks. Another problem is that solar may not be installers' first choice.

Alongside scalable and cost-effective solar solutions, a digital toolkit utilising clever algorithms, geolocation, and satellite data is required for automated layout planning, quoting, and production management. Customers and resellers of Solarstone can already take advantage of an online calculator and layout design to simplify a somewhat complex solar project. Digital twins or 3D BIM models of the roofs are available for architects and planners, making solar roof design simple.

#### Solar roofs with tiles

Solarstone also provides tile interlocking solar modules in addition to Full Solar Roofs. One panel interlocks with any concrete or

clay tile and replaces precisely six roof tiles. Two distinct size and output modules of 90W & 108W can be matched with a wide range of roof tiles on the market. Perfect for projects involving new construction or renovations when a tiled roof is the preferred option.

The solar modules' streamlined and elegant appearance blends seamlessly with the home's natural architecture. Tiled roof modules are produced in Estonia by Solarstone, whilst solar modules paired with Click-On are purchased from Tier 1 suppliers.

#### Is a solar roof worth the investment?

The economic benefit of solar roofs is that they perform two tasks. They are beneficial for homeowners who want to maintain the looks and functionality of their roof while also needing a new roof. Solar is even more appealing because local renewable energy production still receives subsidies in many nations. A solar roof may reduce an efficient home's electricity costs to almost nothing. Solar roofs are typically a good investment, despite their high initial cost. Remember that installing a standard roof won't reduce your electricity costs or pay for itself.

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