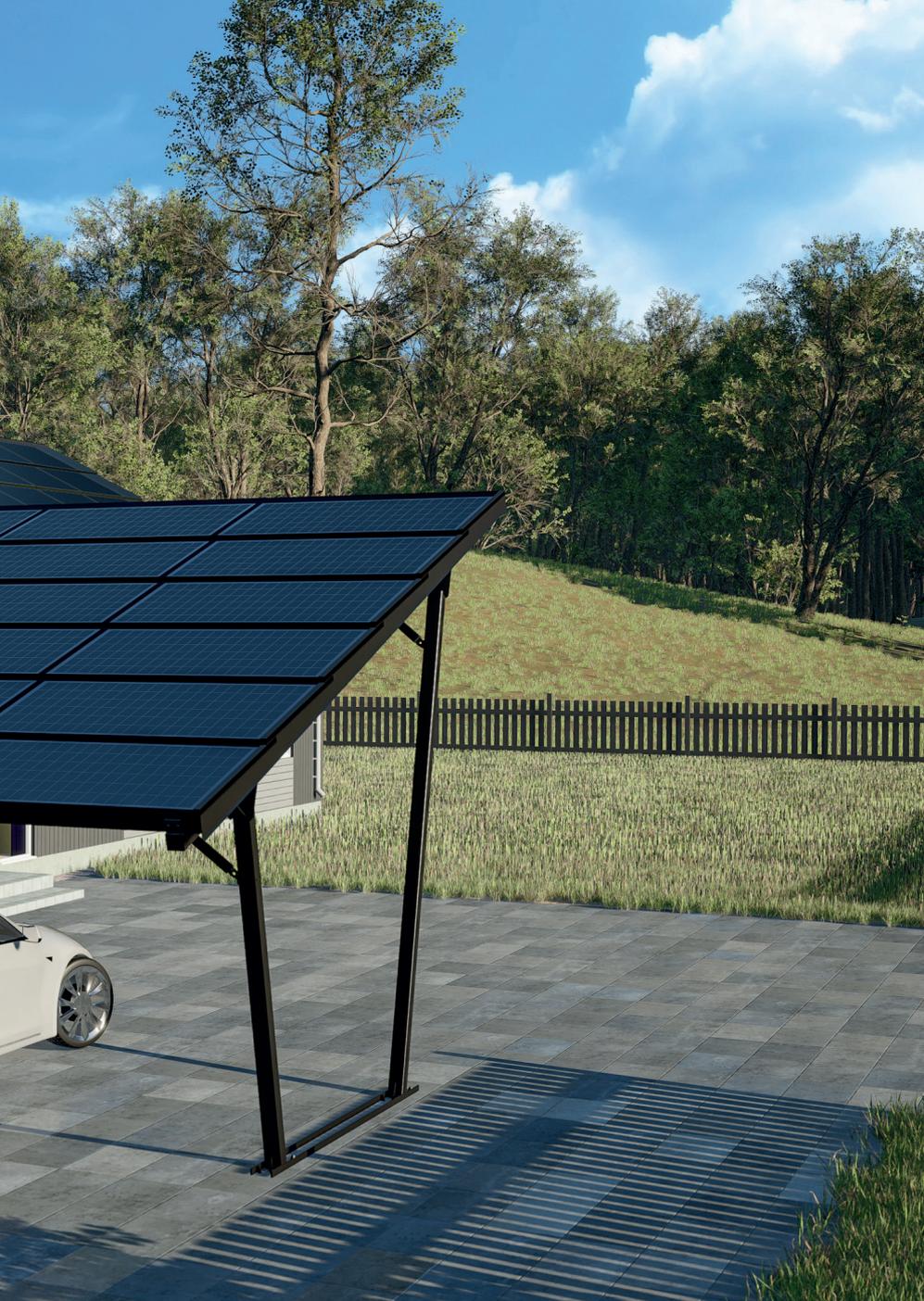


# Shaping the future of residential energy production

Amidst the renovation wave unrolling in the EU, smart and scalable local energy generation solutions are in high demand, with solar power being one of the major instruments. While many still believe that installing solar panels on top of an existing roof is a good solution, there are better alternatives. Solarstone, leading producer of building-integrated PV (BIPV) solutions in the Nordics, offers modern and affordable in-roof systems where solar panels serve a double function: roof covering and power production at the same time.



method for renewable energy production. In fact, about 98% of rooftop solar installations are building-applied photovoltaics (BAPV). Unfortunately, they also result in wasteful use of materials. Double layer roofs can hardly be sustainable. The building sector is the single largest energy consumer, accounting for approximately 40% of EU & US energy consumption, and 36% of CO<sub>2</sub> emissions. Installing solar on all new and renovated buildings in the EU can save up to 7 million tonnes of CO<sub>2</sub> each year. But that only works if we do it in a smart and effective way.

#### Solutions exist: they just haven't been accessible

Building-integrated photovoltaics are revolutionizing how homeowners and businesses can incorporate solar energy production into their premises. BIPVs are multifunctional, generating renewable energy for the home while also being an integral and essential part of a permanent building structure. There are many building elements where BIPVs can be applied, such as roofs, facades, windows, skylights and balcony railings.

The list doesn't stop there. The housing industry is open to new technologies and solutions that incorporate renewable energy production into building structures, especially rooftops. Solar panels can blend into the building's architecture.

However, BIPVs are associated with three keywords: complexity, compatibility and price. And for a reason. These keywords illustrate quite comprehensively the disadvantages of building-integrated solar. Solar installers are not motivated to switch from regular solar to building-integrated solar, as it lacks economic advantages and similar functionality of a traditional roof. But that is changing.

#### Solar roofs made of standard PV panels

Solarstone's Click-on Full Solar Roof concept tackles all three aforementioned issues. The framing kit does not require any screws or adhesive to combine with standard PV modules. The kit can also be easily added onsite and, combined with aluminum non-active dummy modules, the most complex rooftop configurations can be handled with ease. The innovative 2 in 1 system has been successfully tested against fire, wind uplift and snow-load.

The Click-on framing kit has visual appeal and is the most cost-effective BIPV solution on the market. BIPV is especially suitable for new builds, saving on traditional materials and reducing workload. The difference comes from saving up on traditional roofing materials and reduced labour.

Costs are reduced because Solarstone does not produce the solar panels, but gives them new functionality by adding the Click-on

When Solarstone was founded, the solar panel market was mature; innovation was driven by materials science, but there were limited possibilities for the application of solar panels. Existing solar solutions available on the market were either too expensive or unfit for various reasons, mainly poor aesthetic appeal. For Solarstone's founders it made sense to cover new-build and retrofit roofs with 2 in 1 solar.

One key argument in favor of BIPVs is visual appeal. Building-integrated solar makes an architectural whole, whereas regular PV looks like a foreign body on a roof. Regular solar panels can't be installed in heritage properties and protected areas, whereas BIPV may be an option. Producing solar energy and maximizing self-consumption protects homeowners from possible larger fluctuations in electricity prices for decades. Also, in the real estate market, energy-efficient buildings with building-integrated solar panels are significantly more attractive to buyers.

The Estonian company launched its first product, tile interlocking solar modules, in 2015. These are solar modules that can be seamlessly integrated with regular roof tiles. Today it also offers a universal aluminum framing kit that renders any solar panel into 2 in 1 weatherproof roofing material without any additional sublayer. The patented framing kit is called Click-on and it's transforming the concept of BIPV for new-builds and renovation projects.

Currently, only 10% of the EU building stock, 130 million units, has been upgraded to meet climate change targets and efficiency standards. Significant opportunity exists equally for retrofits and new-builds and on both residential and non-residential buildings throughout the EU. Solarstone believes its solutions can play an important role in shaping the future of residential energy production.

#### Ineffective use of materials

On-roof solar systems are an affordable



frame. Panel production is left to those who do it best, Tier 1 manufacturers. Adding the frame does not void the original warranty but does make the panel sturdier. Tackling installation complexity, Solarstone solar roofs are mounted directly on the wooden battens without any expensive mounting systems. Standard 80m<sup>2</sup> rooftop can be easily fitted with panels in just one day.

**Full solar roof with Click-on and dummy modules**

Non-active modules, or 'dummies', can be utilized in the roof perimeter, areas with permanent shading and positions with fixed obstacles, like chimneys, skylights, ventilation outlets, snow barriers, etc. Dummy modules are made from aluminum honeycomb panels and are framed with the same Click-on technology. Active and non-active modules blend naturally with the overall concept of a modern solar roof. Special transition flashings are available to accommodate regular roofing material if passive aluminum modules are not the first choice.



**A universal solution**

Click-on technology allows solar roofs to be installed in residential and commercial sloped rooftops, carports, façades and PVC and steel halls. It's even possible to combine colorful PV modules with Click-on framing kit to deliver various combinations alongside the full black solar roof experience, providing architects and city planners with a viable alternative to conventional solutions.

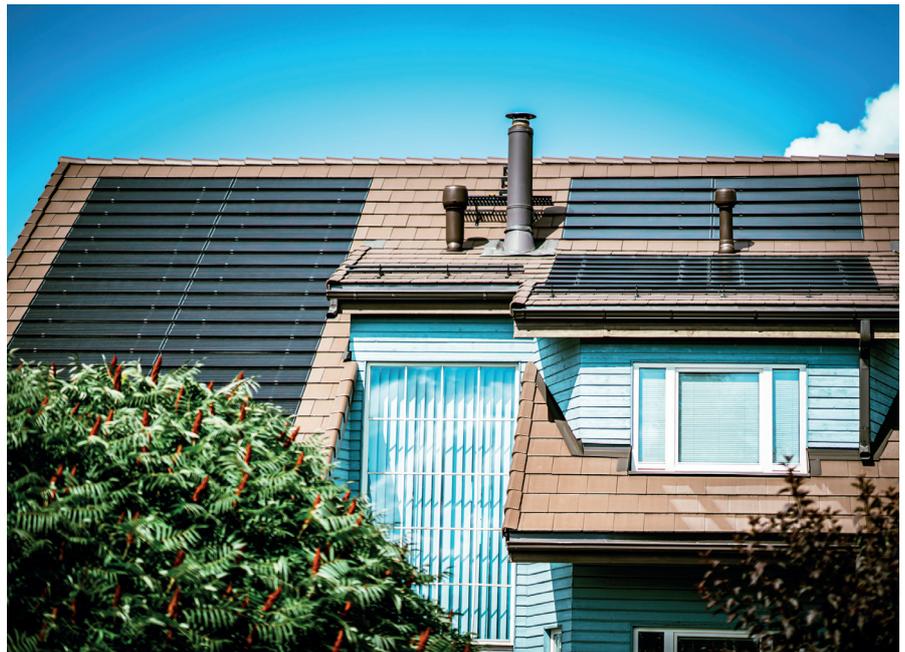
**Lack of tools for in-roof solar design**

Planning and quoting a roofing project require various old school tools and data for validation, often onsite visits and labor intensive checks. This is why a digital toolset using smart algorithms, geolocation and satellite data for automated layout planning, quoting and production management is needed in parallel with scalable and affordable solar solutions.

Solarstone customers and resellers can make use of an online calculator and layout planning to make a moderately complicated solar project less complex. For architects and planners, digital twins or 3D BIM models of the roofs exist, making solar roof designing convenient.

**Tiled solar roofs**

Besides full solar roofs, Solarstone also offers tile interlocking solar modules. One panel replaces exactly six roof tiles and interlocks with any concrete or clay tile. Two different size and output modules of 90W and 108W are available to match with a comprehensive selection of roof tiles available on the market.



Perfect for new-builds or renovation projects with tiled roofs. The elegant and sleek design of the solar modules complements the natural design of the house.

While solar modules combined with Click-on are bought from Tier 1 manufacturers, tiled roof modules are made in Estonia by Solarstone.

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

Economically, solar roofs serve a double function. They are especially beneficial for

homeowners who need a new roof and want to retain aesthetics and roof functionality. In many countries there are still subsidies for local renewable energy production, which makes solar even more attractive. A solar roof can potentially cut the electricity bill of an efficient home down to near zero.

Bear in mind that a traditional roof does not bring your electricity costs down nor earn the investment back.

[www.solarstone.ee/en](http://www.solarstone.ee/en)

