

Designing a novel integrated solar roof tile to cut household annual energy bills by up to 94%

Solar
Capture

Engineers at the National Composites Centre (NCC) have worked with UK SME, Solar Capture Technology, to develop the initial design for a novel roof tile with integrated solar modules that can be used in domestic and industrial roofing applications to make solar power more efficient and affordable.

The UK Government has a clear target to increase solar capacity by nearly fivefold to 70GW by 2035 as part of wider plans to power Britain with cleaner, economical, and more secure energy sources. Accordingly, latest figures from the Microgeneration Certification Scheme shows a record surge in solar photovoltaic (PV) installations – up 82% year-on-year in the first half of 2023. However, despite green grants and incentives, competition from cheap solar imports have placed a strain on domestic manufacturers. With 6 million households reportedly living in fuel poverty and unable to cover bills, low-income and vulnerable homes would significantly benefit from an affordable solution.

Challenge

Renewable energy company Solar Capture Technologies (Solar Capture) specialise in the design, research and development, as well as manufacture of solar PV modules at their Mega Watt manufacturing facility in Blyth, Northumberland. The SME aims to create a dual-purpose solar module that performs as both a roof covering and solar PV panel.

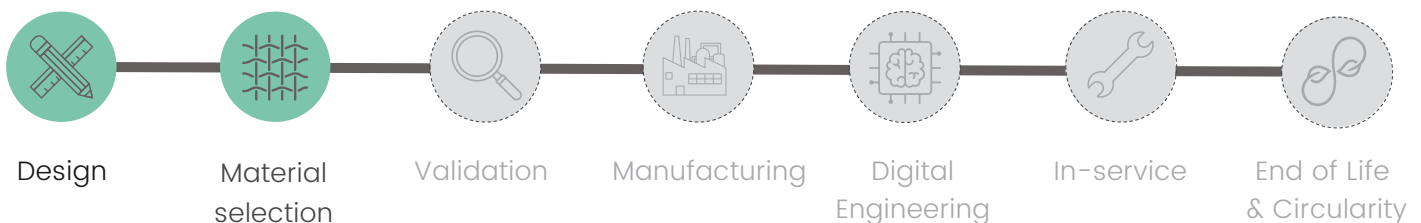
Having identified market entry barriers for solar tiles to be high cost, low efficiency, high weight and difficulty to install, Solar Capture wanted to design a composite solar tile that performed as efficiently as a standard solar panel with significantly reduced installation times. The UK SME approached the NCC's dedicated SME team for end-to-end engineering support to create a high-powered, durable solar roof tile.

Results

Utilising the NCC's matched funding programme (formerly SME Boost), which offers up to 50% matched funding on projects that align to our strategic business goals, Solar Capture sought to prove their integrated solar concept could be manufactured using an automated process. The NCC's specialist team established that both high-pressure resin transfer moulding and compression moulding offered suitable processes that would help meet high volume production requirements, with the potential to achieve tight unit cost targets.

Results from this encouraging feasibility study helped secure funding from the UK Government's Energy Entrepreneurs Fund (Phase 8) to further develop Solar Capture's product design. With a keen understanding of Solar Capture's precise design requirements, NCC's in-house team worked to de-risk critical design elements towards an initial prototype ahead of testing and physical prototyping. In tandem with these efforts, a thorough supply chain study connected Solar Capture with a critical manufacturing supplier to finalise and certify product design for expedited launch to market.

NCC services sought



Innovation and impact

With support from the NCC, Solar Capture's solution offers:

- **Reduced energy bills:** Designed to cover all available roof space, the solar roof tile can generate sufficient energy to significantly reduce household energy bills by up to 94%.
- **Quick installation:** The tile's patented interlock design easily attaches to roof battens without the need for additional structural work. Being lighter and larger, the dual-purpose solar roof tile enables faster installation – a benefit that is particularly advantageous for social housing associations keen to streamline projects.



Launched: A re-roofing solution that is better at capturing sunlight and able to cut average household emissions by up to 3 tonnes in CO₂ per annum.

Next steps

In July 2023, Solar Capture secured their [first commercial sale](#) in partnership with [ORE Catapult](#), the UK's leading technology and innovation research centre for offshore renewable energy. The SME is currently finalising industrialisation while working with combined authorities and social housing associations across the UK to explore their novel product's potential to become the new standard in social housing, benefiting both new build and retrofit roofing schemes.



From the initial complementary consultation to receiving funding for access to engineering expertise, Solar Capture's collaboration with the National Composites Centre has been pivotal in guiding us through the journey of innovation, particularly in the material selection and structural design of our solar tiles. The NCC leveraged its industry expertise to identify local material manufacturing partners for Solar Capture to collaborate with, thereby enhancing the resilience of our local supply chain. This ensures that our unique solar product can swiftly offer affordable and more sustainable energy solutions to a wider UK market.

Lewis Caseley, Commercial Director
Solar Capture



Energy producers need to innovate, drive efficiencies, and cut emissions and mainstream new, more sustainable energy sources if we're to meet global decarbonisation goals. Only high-strength, low weight, design-friendly composites can unlock this greener future, playing an enabling role at every stage of the energy transition.

The NCC's matched funding programme offers to double an SME's investment with the aim to help make innovative composites R&D as straightforward as possible for the UK's smaller companies. For Solar Capture, NCC's support kick-started a de-risked environment to progress their novel renewable energy solution from initial concept to final design.

James Helm, Technology Programme Manager – SME Delivery
National Composites Centre



If you are a UK SME, reach out to the dedicated [NCC Connect team](#) for support to fast-track your innovation and overcome any potential barriers to business growth.