

**Revolutionary  
energy-generating  
facade material:**  
*optimal yield, visually  
appealing*



# Energy-generating facades

## Building a sunny future

The Paris Climate Agreement set ambitious climate and energy neutral building goals. In addition to the well-known application of solar panels on roofs, an increasing number of construction parties are discovering the potential of facades as a large-scale source of renewable energy generation - both in new constructions and in renovations of existing ones.

Solar Visuals facade panels offer an ideal solution. Thanks to a combination of efficiency and aesthetic quality, the panels are extremely suitable for facade applications.

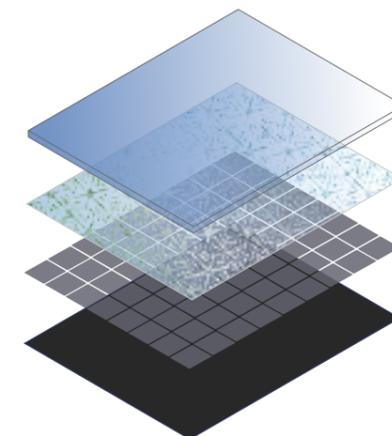
The facade material combines the generation of sustainable energy with a high-quality design look and immense design freedom.

The possibilities of Solar Visuals panels are endless: from facade-wide applications in residential blocks, office towers and large public buildings to smaller scale applications, such as a renovated gallery flat with solar balustrade Visuals panels, or an office tower or museum with energy-generating 'branding' on the facade. With Solar Visuals, even utilitarian objects, such as sound barriers or solar farms, can become visually appealing energy-generating designs.

Solar Visuals produces the facade material in cooperation with AGC, one of the largest glass producers in the world. Our facade material enables all parties in the construction chain – from architects and developers, to building owners and builders – to achieve ambitious sustainability goals and make houses, offices and public buildings energy neutral and the built environment more attractive to end users and local residents. Together we build a bright future.

*Solar Visuals enables developers, architects and builders at home and abroad to meet ambitious sustainability goals*

*Solar Visuals introduces a revolutionary facade material that combines sustainable energy generation with design freedom and a high-quality finish*



Solar Visuals panels are designed in such a way that they can be used in the facade structure of buildings, just like other facade materials. It is possible to choose full integration or solutions where the sheet material is placed on existing facades. The Solar Visuals panel is a laminated product consisting of a rear for mechanical suspension, a layer with the photovoltaic cells, which generates solar energy, and an integrated full colour print and tempered glass on the outside, which can be produced according to the customer's wishes. Solar Visuals is available in a number of standard designs. In addition, it is possible to offer tailor-made solutions.



## Solar Visuals: The Collection

For short-term projects, the Solar Visuals Collection is the preferred solution, with a wide choice of various standard prints and standard colours. A balanced and seamless repetition is created by means of one pattern per panel. The Collection consists of ready-made modules that can be delivered directly in two standard sizes:

- Size A: 995 x 1995 mm
- Size B: 995 x 1650 mm

## Solar Visuals: Customised projects

For architects and developers with a specific design or an idea of their own, customisation is possible. This can involve a repetitive pattern, or one image divided into multiple modules on one facade. The full-colour printing process allows any possible design to be delivered and incorporated into the energy-generating facade modules. This will be actively considered in order to achieve the desired result.

# Solar Visuals: The Collection

The building and construction industry has discovered the potential of facades as energy-generating surfaces. As an alternative to the traditional solar panels on roofs, you will see a shift towards the application in facades.

Facade modules from the Solar Visuals Collection combine a high energy yield with aesthetic quality. The Solar Visuals Collection is an accessible way for property developers, architects, builders, housing corporations, governments and other end users to build energy neutral with energy-generating facade panels that also add aesthetic value to the built environment. They are suitable for new construction projects and for making existing construction more sustainable.

The patterns in the collection are designed in such a way that the content blends seamlessly across the different panels in the facade, creating one powerful image from a distance. In addition to the standard size facade panels, fittings can be supplied.

It is also possible for these fittings to work with so-called dummy panels. These panels have the same look as the standard panels due to the full-colour print, but can contribute to a cost-efficient solution. The Collection is divided into four subcategories: Architectural Materials, Palette, Nature and Art.

*Freedom of choice for any building. Prints designed by top architects. Ideal for new construction and more sustainable existing construction*

## Architectural Materials



## Example: Residence

A residence with Solar Visuals facade panels in brick print.



# Solar Visuals: The Collection

## Nature



## Art

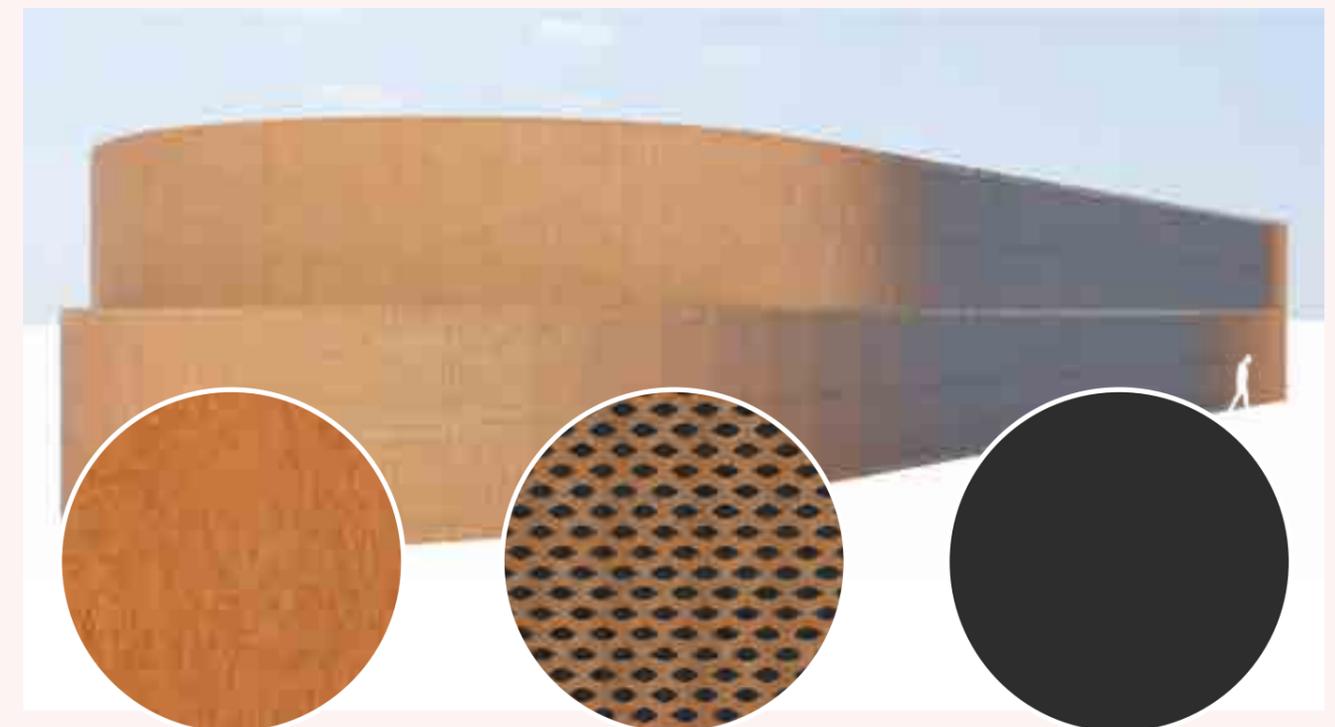


## Palette



## Example: Bicycle storage

Corten steel cladding flows smoothly into custom Solar Visuals cladding, to unprinted PV panels.



# Solar Visuals: Customised Projects

Solar Visuals offers customised solutions. For architects or project developers with their own design, the Tailor Service is extremely suitable. We work on the basis of supplied designs, but can also design an image in consultation with the customer. The size, shape and material structure of panels can vary according to the wishes. The printing possibilities are also endless: images can vary in size from one panel to a facade-wide image over multiple panels.

From monochrome in any desired RAL colour to abstract patterns and even photographic prints – *the sky is the limit*.

The printed modules are available with and without energy-generating solar cells – an interesting solution for a design where parts of the façade are in the shade or are oriented on the north side. In this way, a powerful uniform image is guaranteed.

*Ideal for companies, for architects and developers, with endless design options*

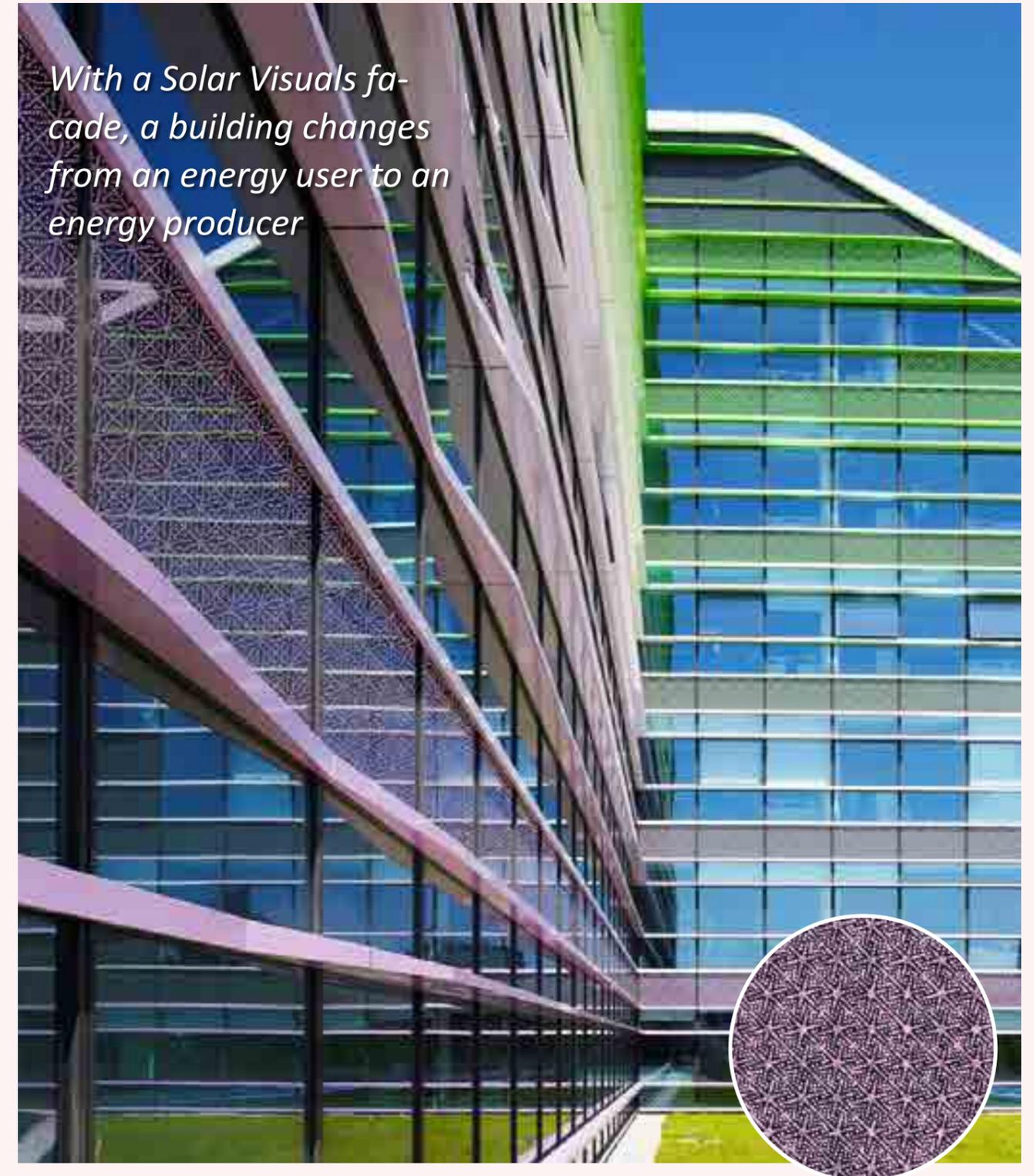
## Example: Laboratorium

With Solar Visuals you can make a transition from one material to another, as well as from flat to 3D.



## Example: Office building

Closed parts of the facade are activated with energy-generating panels fitting to the design.



*With a Solar Visuals facade, a building changes from an energy user to an energy producer*

# How does it work?

As soon as the choice is made on which pattern or image will appear on the facade, the image is converted into a pattern of dots; this allows the sun's rays to penetrate into the photovoltaic layer. The gridization process developed by Solar Visuals has three basic patterns, each based on different algorithms: the othogonal pattern, the star pattern and the radial pattern. The patterns, each with a different geometric design, have specific properties that perfectly match with the chosen solar cells and the visual quality of the facade.

## Rectangular pattern

This pattern is developed for the best colour representation from afar.

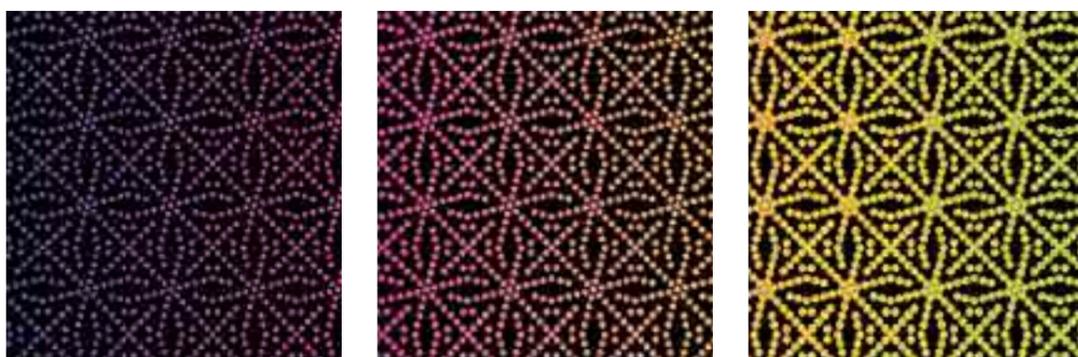
Visual range:  
Long distance  
(35 metres or more)



## Star pattern

This pattern has been developed for the best colour effect from far away and closer.

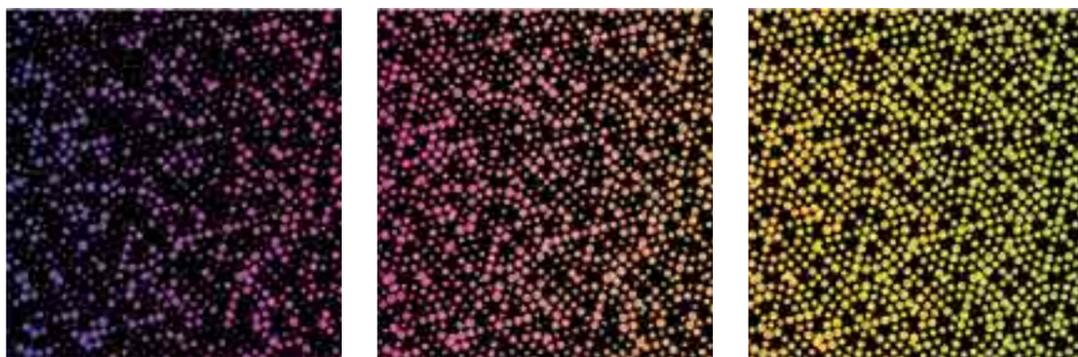
Visual range:  
Middle distance  
(25 metres or more)



## Radial pattern

Developed for the best colour representation at short distances, and suitable for designs with great detail due to the fine dots.

Visual range:  
Short distance  
(5 metres or more)



Energy stallion: **Optimal**  
(Ca. 155 Wp/m<sup>2</sup>)

Energy stallion: **Medium**  
(Ca. 145 Wp/m<sup>2</sup>)

Energy stallion: **Basic**  
(Ca. 126 Wp/m<sup>2</sup>)

# Efficiency

## Maximum visual impact at optimal efficiency

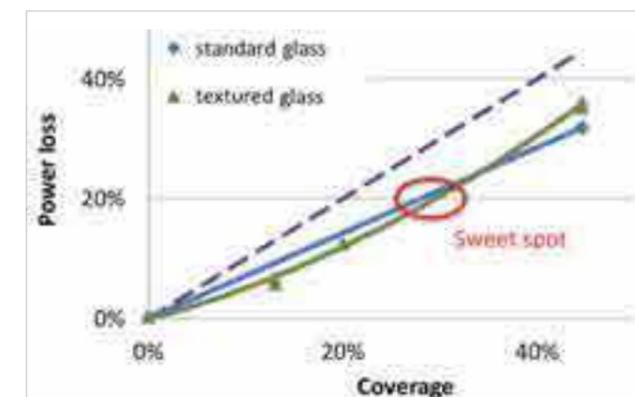
To optimise energy output, we use our own patented algorithm that can convert any chosen image into a gridized pattern of dots. This gridization process makes it possible to strike a balance between showing content on the facade and the maximum sun raid on the cells, which is required for generating energy. The chosen image can be converted into different coverage levels.

Up close this is readable in the form of the coloured dots, and from afar the intended image becomes visible. to the human eye, the printed content can be seen from a few metres away as an even print with great visual impact. Thanks to this special technique, a printed facade panel with a 20 percent coverage level can deliver an energy yield of up to 90 percent.

When processing the content, two principles are guiding. A print design can be approached primarily from the point of view of efficiency and energy yield, with a gridization with minimal coverage obvious.

The design can also be optimised on aesthetics and visual

impact. For this approach, energy yield is still of great importance, but in doing so, the coverage of the gridization is adapted to the desired visual effect. The golden middle ground between these two approaches is considered the sweet spot (see figure below), a balance of efficiency and visual quality recommended by Solar Visuals.



# Technical specifications

## Standard sizes of facade panels from The Collection:

- Size A: 995 mm x 1995 mm
- Size B: 1000mm x 1650 mm

**Material:** 4 mm low iron tempered glass

**Power:** (depending on the coverage of the print and the type of solar cells used):

- 32 cells panel: 105-140 Wp
- 60-cells panel: 200-260 Wp
- 72 cells panel: 240-310 Wp

**Suspension:** The facade panels can be mounted blindly, with a profile glued to the panel, as well as mechanically secured to the facade.

**Return fee:** SDE grant 15 years

**Lifespan:** 30 years

**Product warranty:** 10 years

**Power guarantee:** 90% after 10 years, 80% after 25 years

**Dutch Solar Design:** Solar Visuals is an initiative of ECN part of TNO, arch tech company UNSense and print specialist TS Visuals. The product was developed in collaboration with the Dutch Solar Design research consortium.



# From design to realisation



## Thinking along with your needs and ambitions

You are an architect/designer, property developer or building owner and are curious about the possibilities of a beautiful looking, energy-generating facade. In this case, we would like to inform you about the visual possibilities of the Solar Visuals panels and the different printing possibilities and appearances.



## Calculation and preliminary design

You will gain insight into the specifications of the product and the expected yield based on your specific case. We work with you to advise on which facade surface gives the optimal application of Solar Visuals panels in terms of energy yield and efficiency. We inform the project architect and any other stakeholders in your team about the design possibilities by sharing reference projects, samples and digital design files. On this basis, the architect can make a preliminary design.



## Final design and prototype

The preliminary design is developed with one or more panels in collaboration with the architect. A vector pattern is also developed, which is then converted by means of an algorithm to a gridization in the most optimal coverage rate. The architect and/or involved design team makes a visualisation of what the building and facade will look like from close range and a distance. If necessary, a number of test panels will be manufactured.



## Construction

If the design is as desired and the facade is technically feasible and profitable, the production of the panels will be started as planned. The Solar Visuals team advises and guides the construction team where necessary in the preparatory work on the facade. Then the contractor and subcontractor install the electrical infrastructure, the possible suspension, and assemble the panels. We also assist you with advice and guidance during the assembly phase.



## After commissioning

After the building is commissioned, we take care of the control and maintenance of the panels. Together with you, we make a maintenance plan for the Solar Visuals panels. We also support you in case of repairs or replacement of parts.



## Recycle

In the case of demolition or renovation of a building or facade, we take back the panels, for (partial or full) reuse.



[www.solarvisuals.nl](http://www.solarvisuals.nl)

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