

CFR modules for building integration -

Made in **Denmark**



Green energy in a colorful design

Solar energy gives architectural freedom

COLORED SOLAR CELL MODULES WITHOUT LIMITATIONS

Danish Solar Energy Ltd. can now present a revolutionary breakthrough with their patent: CFC - Colored photovoltaic modules that exceed all previous restrictions.

Due to the aesthetic and architectural possibilities represented by the colored solar modules, a whole new and very energy efficient architecture has been proposed, which knows no limits.

All types of facades and roofs etc. can be an active element of the energy supply, while the architecture is completely free.

There is a symbiosis between technique and aesthetics of completely new and unimagined dimensions.

ADVANTAGE:

- Light transparency of up to 85-95% and thus a unique high efficiency
- New aesthetic design options
- Economic production
- Completely expands the applications of the solar modules.

HEM CFR-module

Unique design - Choose:

Shape & size

Module color/colors

Light reflection

Efficiency

Design your own sustainable building

Danish Solar Energy gives our partners the opportunity to design their own solar module. From the color or colors, to the shape and size of the module to the degree of reflection. It is also possible to give the module patterns that are similar to the surrounding environments. When integrating into windows, the level of transparency is determined according to the desired lighting level and hue.

When designing the photovoltaic module, it must be decided whether it should be integrated into the building so that it minimizes visibility or whether the design of the building should be based on a futuristic appearance and the photovoltaic modules should be the „face“ of the building exterior. Implementing green energy in the construction in this way can, rightly, cement the architect's name in the industry and the building's green profile. We will jointly design the desired module, where we will be an active sparring partner who can advise on aesthetic possibilities, and make all the necessary calculations so that the plant is not only beautiful to look at, but also provides optimal energy production. Building-

integrated solar cells are an ideal solution in terms of reducing CO2 emissions from buildings and actively participating in reducing climate problems we face, a power plant with CO2-free energy production without being visible. We can provide complete systems if desired. We contact installers, professionals and suppliers. We thus simplify our partners' communication path.

With over 25 years of experience in the industry, we have built up a ‚know-how‘ beyond the ordinary, and have faced challenges that for most people seem impossible. All photovoltaic modules are produced at our factory in Denmark, which is built so that CO2 emissions are minimal during production. Despite having Denmark's largest production facility, we are very flexible in terms of wishes and specifications.



Green energy in Red design



Solar energy gives architectural freedom

Solar cells in all colors, textures and patterns - All types of facades, roofs and more can be an active element of the energy supply while the architecture is completely free. - The benefits of the new product are many. In addition to providing new aesthetic design options and the opportunity for more ways to integrate solar cells, they have outstanding high efficiency and quality while being an economical product.

Contact us at: Tel. +45 3536 7777
or: info@dansksolenergi.dk

Solar modules for red environments

An example of a project Dansk Solenergi has carried out is a building in Svendborg Denmark, which has our CFR brick red modules. The solar cells are selected in a slightly darker tone than the bricks, which in this case will darken over time and thus will get the same color as the solar cells. With the colored solar cells, a symbiosis between technology and aesthetics is thus envisaged, which we foresee will be widely used worldwide - and which is one of the solutions to the climate challenges we face.

The module could also be selected in other shades adapted to the surrounding environment that would almost make them invisible. We can produce modules up to Lx W 2.7x 1.7 m.

The modules come with a built-in mounting system for facades and roofs and with the same degree of sealing as traditional bricks and slate tiles.

With over 25 years of experience in the industry, Danish Solar Energy has built up a 'know-how' beyond the ordinary and has managed challenges that for most people seemed impossible.

All solar modules are produced at our own factory, which is Denmark's largest production facility for solar modules. The factory is also built so that there is minimal CO2 emissions during production.

Technical specifications:

Module type: CFR HEM-HHV80.3xR110GG6

Plant power: 6.4 kWp.

Degree of reflection: RHEM600

Mounting bracket: * Yes

Mounting solution: Yes





Slate Integration



Customized solutions

- **Choose slate color**
We make the solar module in the color and size that suits your project
- **KEEP THE Aesthetics**
CFR slate integration modules integrate with the roof and retain the building's appearance
- **HIGH PERFORMANCE**
We use the highest quality material to achieve the best performance
- www.dansksolenergi.dk

Slate gray modules - quality and design - Made in Denmark

Reference project in Randers Denmark, CFR modules for integration in slate. The CFR modules are 100% integrated into the current roof and can advantageously be acquired by roof renovation or by purchasing a new roof. This results in a saving on roofing. Our slate-integrated solar cell modules are the optimal solution if you want to reduce your electricity consumption and CO2 emissions, and at the same time want to preserve the architectural expression of the building. They are easy to install with our mounting

system. The solar modules can be used either on some of the roof or as a complete roof solution.

Options:

1. Module color that approximates the slate color
2. Mounting system
3. Glass, level of reflection
4. Standard module size is:

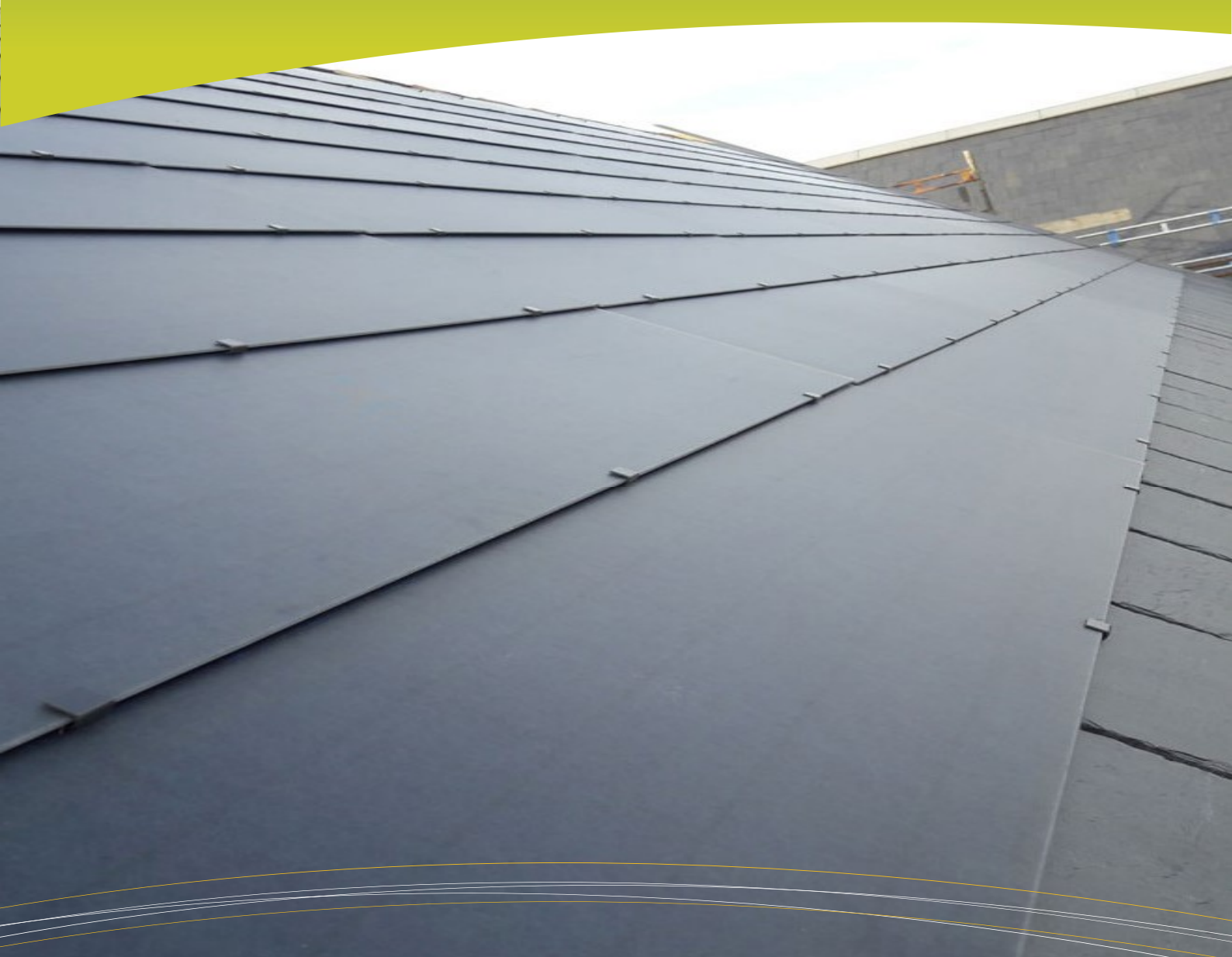
1605x (350-410) x6mm.

The modules can also be produced in others sizes and shapes.



Dansk Solenergi ApS
Danish Solar Energy Ltd.

Slate Integration



Slate integration



conservation-worthy buildings

Our CFR modules are especially suitable for conservation-worthy buildings, as they can be completely adapted to the existing old building materials and make them climate friendly, churches are a good that has large unused roof areas and facades, and a lot of energy is spent on heating and lighting the large rooms, with the new technology, will save CO2 and save money

We focus on quality and design - Made in Denmark

Danish Solar Energy was among the first in the market with solar modules for integration into slate. The solar cells are 100% integrated into the current roof and can advantageously be acquired by roof renovation or by purchasing a new roof. This saves you on roofing. Our slate-integrated solar cell modules are the optimal solution if you want to reduce your electricity consumption and CO2 emissions, and at the same time want to preserve the architectural expression of the building. They are easy to install with

our mounting system. The solar modules can be used either on some of the roof or as a complete roof solution.

Option:

Modulfarve (Dansk Patenteret system)

Glas mat/klar, refleksionsniveau

Mønstre

*Vores standard modulstørrelse er 1605x400(810)x5,5 mm., men modulerne kan produceres i andre størrelser og former efter aftale.



Dansk Solenergi ApS
Danish Solar Energy Ltd.

Facade integration



Customized solutions

- **GREEN PROFILE**
CFR Solar cells on the facade send a strong green signal that sustainability is thought into the building
- **UNLIMITED OPPORTUNITIES**
Tilbyder arkitekter mange innovative muligheder
- **HIGH PERFORMANCE**
Our CFR modules always use the high-performance solar cells to ensure as much climate-friendly energy as possible for our customers
- **REFERENCER**
We have provided many facade solutions. See more on our website.

Together we can design the future - Made in Denmark

Solar cells naturally integrated into facades are the future. With our latest technology, we can create invisible solar cells in almost any color, and we can even insert fonts and images and at the same time get a unique high energy output. Our CFR modules offer many opportunities to implement climate-friendly energy-producing solar cells on all facades and areas of solar radiation, without damaging the architectural design. Solar cells have always had two major restrictions on propagation. The first has been the price, which has dropped sharply,

which now makes solar cells fully competitive compared to other energy sources. The second limitation has been the ability to implement them in the existing architecture, without any architectural constraints. There is no such limitation today with our new and patented technology. Are we ready to make that difference, to keep the global temperature down that is required if we want a sustainable future for ourselves and our children.



Green energy in beautiful design

CFR Solar Energy provides architectural freedom

COLORED CFR SOLAR MODULES WITHOUT LIMITATIONS

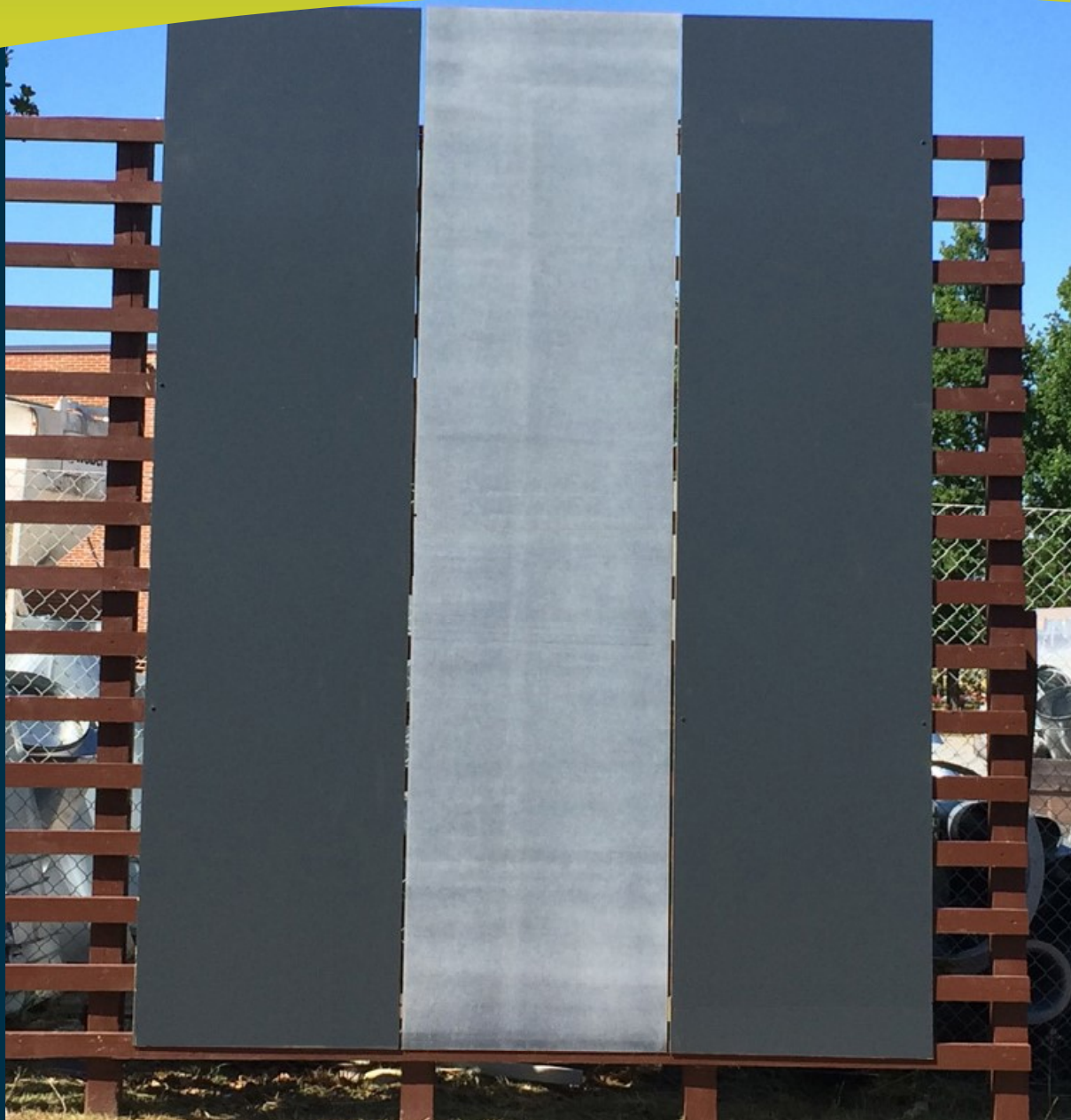
Only the imagination limits the possibilities offered by the CFR solar modules.

All surfaces facing the sun can be a CO₂-free energy-producing supply, while not detrimental to the neighbor.

Let us know what you want.

We develop and customize our CFR modules to exactly your unique wishes - whether they are round, pentagonal, white, red or green.

Call and get a non-binding call on +45 3536 7777 or send an E-mail to info@dansksolenergi.dk and have a dialogue with one of our engineers.



CFR plant, The Danish Technological Institute

Danish Solar Energy, HEM-CFR module - Matt white V.7, with ultra low reflection degree. These unique modules can replace any RockPanel. The choice of dimensions and color here is due to the desire to show the aesthetic expression that these modules can add to facades with RockPanes. The module could also be selected in an approximate matte gray color that would almost make them invisible. We can produce CFR modules up to LxW 2.7x1.7 m.

The modules are available with a waterproof mounting system for facades and roofs and the roof can be saved completely.

The project was made in collaboration with RockPanel.

Technical specifications:

Technical specifications:

Module type: HEM-CFRHV.7 - DarkWhite

Modular area: 2.6 m²

Active area: 2.2 m²

Module power: 340 Wp.


Degree of reflection: RHEM600

Mounting bracket: * Yes

Waterproof mounting solution: No.

The plant is tested by: TI Tåstrup



 Dansk Solenergi ApS
DANISH SOLAR ENERGY LDT

ZINC - COPPER - ALUMINUM - STEEL

Integrated



Customized solutions

- **FOR ZINC, COPPER, STEEL ROOF**
The CFR modules from Danish Solar Energy are fully integrated and the color matches the choice of material
- **Produced in Denmark**
All CFR modules are produced at Dansk Solenergi ApS's own factory in Holeby, Denmark
- **Suitable for putting on older roofs**
For example, on top of an older Asphalt roof is obtained, additional protection against condensation from the metal is obtained
- **FLEXIBILITY**
Danish Solar Energy is flexible in terms of size, material and color choice

We focus on quality and design - Made in Denmark

Protects against rain and wind like ordinary roof modules and at the same time CFR roof modules produce electricity. CFR roof modules are laid as a regular roof and can be used on all constructions. This profile solution is also suitable for renovation tasks. The modules are based on a folded metal roof covering which provides an absolute windproof, weatherproof and waterproof roof, due to the complete diffusion density of the roofing material.

A light roof that fits all roof structures. Fully integrated into the metal profile, with a unique fastening method that ensures the solar cell modules optimum performance and fastening to the profiles, under the harsh environmental conditions to which they are exposed. The CFR modules are available in the desired color and can be delivered both finished modules integrated and laminated in the same roof panels or as independent modules.



CFR modules for glass integration



Customized solutions

- **CHOOSE GLASS**

We produce our CFR module in the size, shape and with a surface for the desired reflection, that fits your project

- **DETERMINE LIGHT RADIATION**

Choose how transparent the module should be and as something brand new now they are also available with a color tone, for example in red, blue or yellow, or any other color.

- **HIGH PERFORMANCE**

Our CFR modules always use the high-performance solar cells to ensure as much climate-friendly energy as possible for our customers

- **REFERENCE**

We have delivered a complete glass integrated system to Herlev Hospital

We focus on quality and design - Made in Denmark

Transparent CFR skylights open a world of architects and offer a wealth of aesthetic options.

By integrating the transparent modules in the building, a futuristic expression is achieved, while at the same time reducing the light penetration and at the same time giving the modules a color shade can create completely unique light environments, all while helping the modules comply with the energy frame of the building and produce CO2 free energy.

By integrating the CFR modules into windows, the constellation can also be used

for solar shading. By using our transparent bifacial CFR modules, further energy production can be obtained by reflections.

Since we always use the best raw materials on the market, optimal energy production is achieved.

Our CFR modules are manufactured according to international certifications: IEC 61215 and EN 730.

Dansk Solenergi ApS, has more than 25 years of experience, with the production of solar modules..



CFR glass integration



Tailor made glass solutions
now also with a color tone

- **CHOOSE GLASS**

Size, shape and surface for the desired reflection that fits your project

- **SELECT LIGHT RADIATION**

Choose transparency, color tone, for example in red, blue or yellow or another color

- **HIGH PERFORMANCE**

We use the best materials on the market for the best performance

- **REFERENCE**

We have delivered a complete glass integrated solar cell system to Herlev Hospital



DANISH SOLAR ENERGY LDT
Dansk Solenergi ApS

UN Headquarters in Copenhagen



Customized solution

- 1/3 of the energy comes from climate-friendly CO2-free solar cells
- The 1,400 HEM-PV solar modules are produced in Lolland by Danish Solar Energy and cover 30% of the building's energy consumption
- Dette eksempel viser, hvor vigtigt det er for arkitekten at indtænke standard modulers karakteristiske udseende fra starten, for at opnå den ønskede arkitektur
- All modules are produced on our unique, automated production line with the finest finishing. The process ensures the highest level of precision and even kind and top quality
- **CERTIFICATIONS**
All Danish Solar Energy modules are produced according to international certifications IEC61215 IEC EN730

UN headquarters in Copenhagen

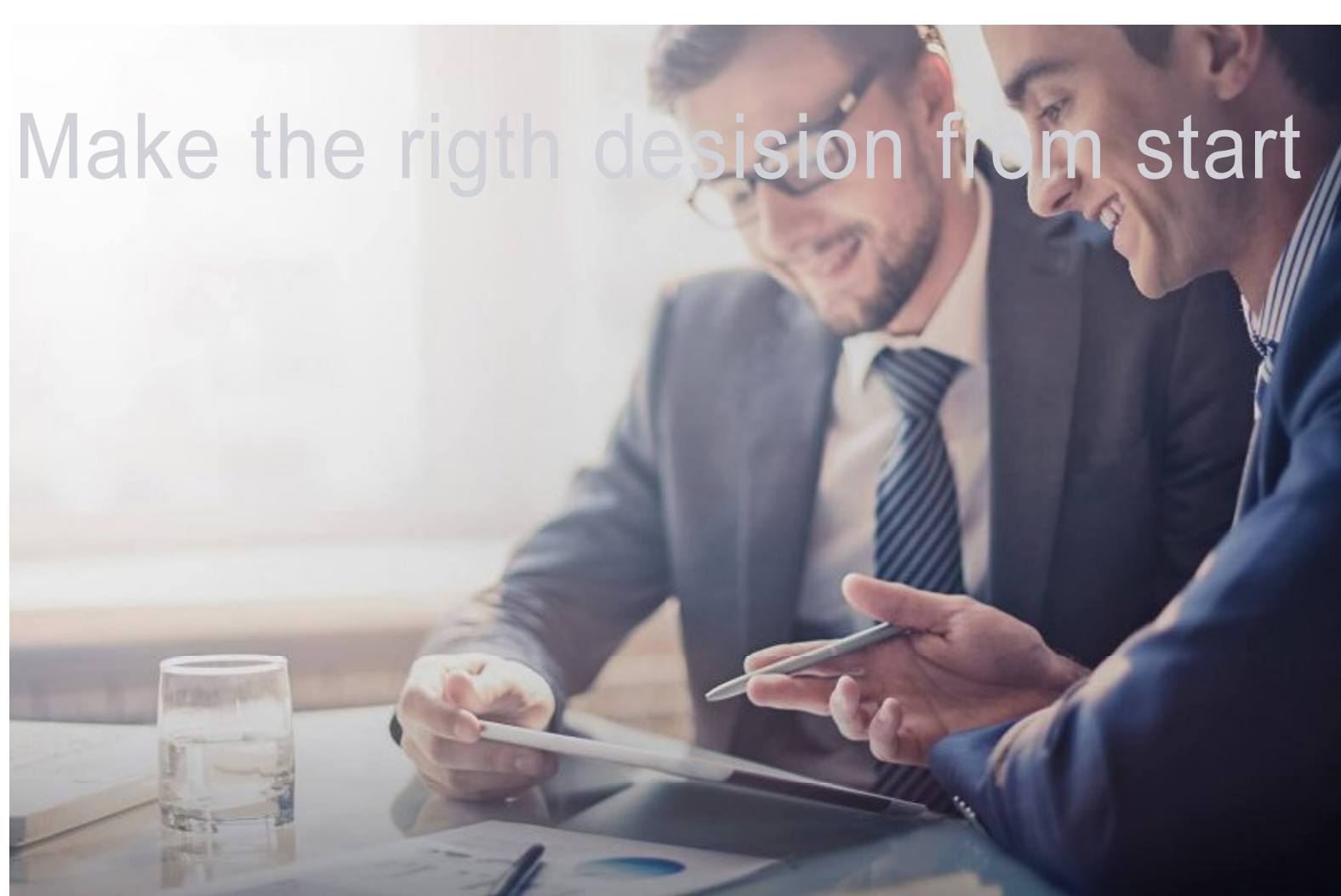
Solcellemodulerne er produceret i Danmark

We are proud that we were given the task of delivering a 355 kWp photovoltaic plant to the UN headquarters in Copenhagen. The photovoltaic system was nominated at Intersolar in Munich, as one of the finest and best integrated systems in architecture.



DANISH SOLAR ENERGY LDT
Dansk Solenergi ApS

Make the right decision from start



CO2 free Energy solution

- **GREEN EXPOSURE**
CFR Solarmodules and low CO2 print, sends a strong green signal to the world
- **UNLIMITED POSSIBILITIES**
Offers architects a myriad of possibilities.
- **HIGH PERFORMANCE**
We use the market's highest-performance material to achieve most CO2 free energy.
- **REFERENCE**
We have been consulting small single customer to some of the biggest companies in Denmark . See the UN buildings in Copenhagen.

SAVE the World and MONEY

Are you planning to build or renovate an existing building and think about how you can reduce your carbon footprint without compromising on architecture while saving money on your energy costs.

Then we can help you!

Our examination of the result of this has shown that our customer can get a sustainable expression and at the same time reduce their energy costs.

Wouldn't that be interesting?

With over +25 years of experience from a country like Denmark one and with the highest energy efficiency in the world due to lack of energy and

very high electricity prices forced us to think twice three times each time we use energy.

Over the past 50 years, Denmark has developed some of the most innovative techniques for improving energy efficiency and implementing renewable energy such as solar and wind. We therefore know that we can provide you with the best advice and save you unnecessary expenses, while at the same time making a difference for yourself and the next generations in relation to global temperature increases that have catastrophic costs.

Danish Solar Energy factory is fully automated production facility located in the heart of a green environment in southern Denmark

Manufacture of HEM CFR modules

Our factory is designed and built by one of the world's pioneers in solar energy.

Our photovoltaic modules are produced in a unique and fully automated production line. The factory is designed and built to provide flexibility for production of tailor-made solar modules.

Enthusiast in innovative design

We are proud to be the world's pioneers in solar cell technology. We love design, innovation and creativity. We are proud to produce aesthetic solutions to suit your wishes and needs. We want to be your creative partner. We have extensive experience designing and developing innovative system solutions for building integration such as facades, roofs, windows, as well as street lights, surveillance systems, advertising signs, beautiful solar parks and even for artistic sculptures.

Whatever you can imagine, there are no restrictions. Just call us.



A little about us

The factory primarily uses renewable energy as an energy supply. The plant is super insulated and uses the sun's energy, not only for electricity in production and heat pumps, but also for direct heating and lighting in the factory. The heat from the machines is also reused. We have established a large basin for collecting rainwater and for optimizing energy production from our solar cells.

Our efficient robotic technology and modern design action ensures the highest level of precision and consistent quality products with minimal environmental impact.

We are one of the pioneers in solar energy with more than 25 years of global experience. We have designed and delivered innovative solutions for many different types of construction projects - more than 1000 cases worldwide, ranging from battery-powered plants, building-integrated plants to medium and large solar parks.

In particular, we are proud to have delivered many plants over the years

to the 3rd world where education and technology transfer have been made. We have prepared various sustainable energy solutions for areas with or without sufficient infrastructure.

Danish Solar Energy has delivered projects in a large part of the world including Scandinavia, Germany, Spain, Italy, Portugal, Greece, North and South America, East and West Africa, Asia, Greenland, the Middle East and many more.

Since the 1990s, Dansk Solar Energy has collaborated with a number of recognized research institutions such as RISØ, DTU, University of Copenhagen, University of Aarhus, Forschungszentrum Jülich and others.

Danish Solar Energy's production facility



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