



Jump ahead with sustainable PV.

Covestro Retrofit Anti-Reflective coating.



The solar business is all about sustainability: and so is Covestro.

We believe it really is possible to do well by doing good – and we're proving it every day with solar park owners and operators around the world.

Our goal is to create clean, affordable solar energy for all – and help redress the balance of a world where some 1.2 billion people still have little or no access to electricity. But as we all know...there is no sustainability without efficiency. According to the International Renewable Energy Agency (IRENA)*, solar PV is capable of providing 25% of the world's electricity demand by 2050. But if our industry is to reach that target, we'll need novel and unique new solar materials that deliver profitability hand-in-hand with sustainability.

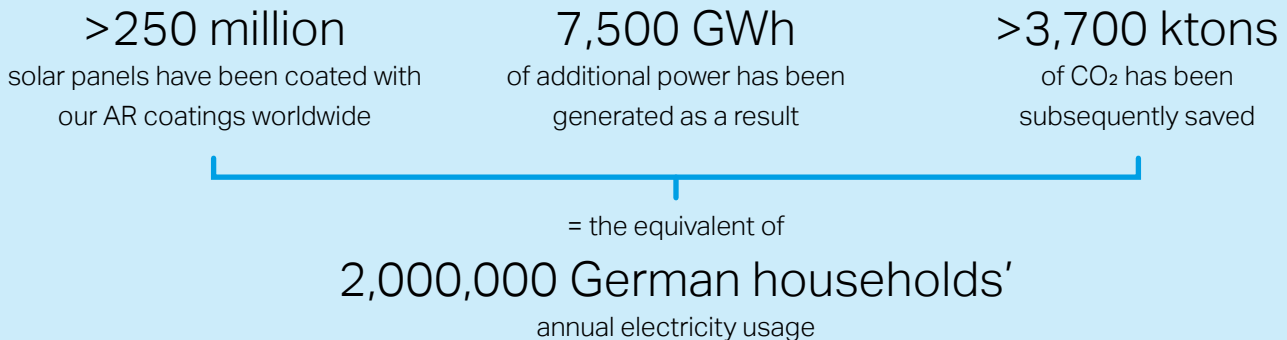
Welcome to the Covestro Retrofit Anti-Reflective (AR) coating: proven, effective and safe.

A proven coating

Our Retrofit AR coating solves a defining challenge for owners and operators of (especially) older solar parks: how can you make an installation more economically and environmentally sustainable without major renovation and replacement of the modules?

Specifically, our spray-on coating is fast, efficient and safe to apply and delivers a power gain of up to 3% in PV modules – all based closely on our long-established (non-retrofit) AR technology.

To put that into perspective, today:



An effective coating

Our Retrofit AR coating guides more light towards the solar cell, preventing it from being reflected and wasted.

It's also very efficient to apply. In fact, our technical team can coat several MWp's of solar modules per day. The result: you start generating more power (up to 3%) immediately – boosting financial performance while reducing carbon emissions. It takes just one or two months for you to recoup the carbon footprint of the coating process – after which your savings in Greenhouse Gas emissions continue for the entire lifetime of the coating.

Below is a Life Cycle Analysis we commissioned to establish the cradle-to-gate footprint of our Retrofit AR coating versus installed, uncoated solar panels.

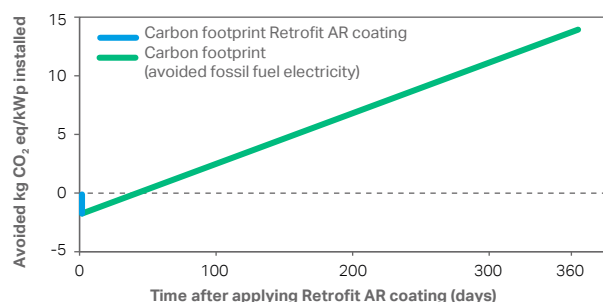
Case Study A: 10 mwp Solar Park Located in Italy

Coating liquid required	2.85 ton
Carbon footprint	16.6 ton CO ₂ eq. (including production & application)
CO₂ saving	0.414 ton CO ₂ per day

Energy PayBack Time (EPBT)

$$\text{EPBT} = \text{CO}_2 (\text{input}) / \text{CO}_2 (\text{benefit/day}) = 16.6/0.414 = 40 \text{ days}$$

This 'Payback' time will differ for different regions due to differences in light intensities.



* 'Global Energy Transformation' by Remap https://www.irena.org//media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf

Case Study B:



4 Module's end of life

- Standard glass recycling

3 Module in operation

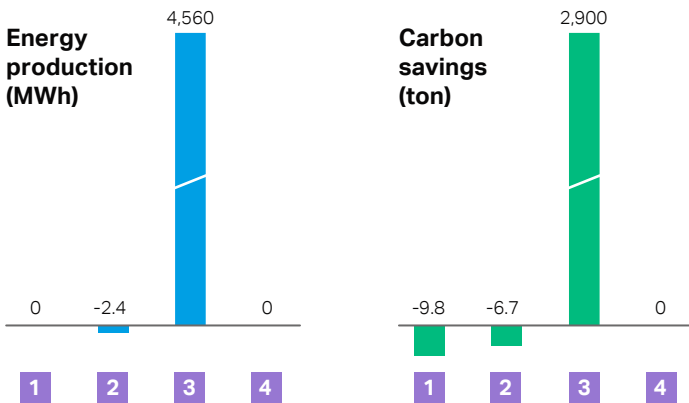
- Easy to clean
- Up to 3% more power output
- Energy payback time < 2 months
- No environmental risk

1 Production

- World-class manufacturing site in NL
- Use of Best Available Techniques
- Running at 100% green electricity

2 Transport & Application

- Use of Best Available Techniques
- No environmental risk
- Efficient application with minimal emissions



Doing well by doing good

At Covestro we've aligned our commercial strategy with the Sustainable Development Goals (SDGs) outlined by the United Nations as essential to the future prosperity of our planet and its people.

For solar, our Retrofit AR coating is contributing to two critical SDGs.

No 7: Ensuring access to affordable, reliable, sustainable modern energy for all.

No 13: Taking urgent action to combat climate change and its impacts.

A safe coating

Our Retrofit AR coating is safe to handle, store and apply based on extensive independent Environmental Risk Assessments. Regulatory information regarding the environment is available in the Material Safety Data Sheet (MSDS). Covestro employees and the employees of our subcontractors have been thoroughly trained to operate in accordance with the guidelines of the MSDS, also in the event of environmental incidents. The coating itself is applied using the Best Available Techniques (BAT) by qualified technicians from Covestro and its partners.

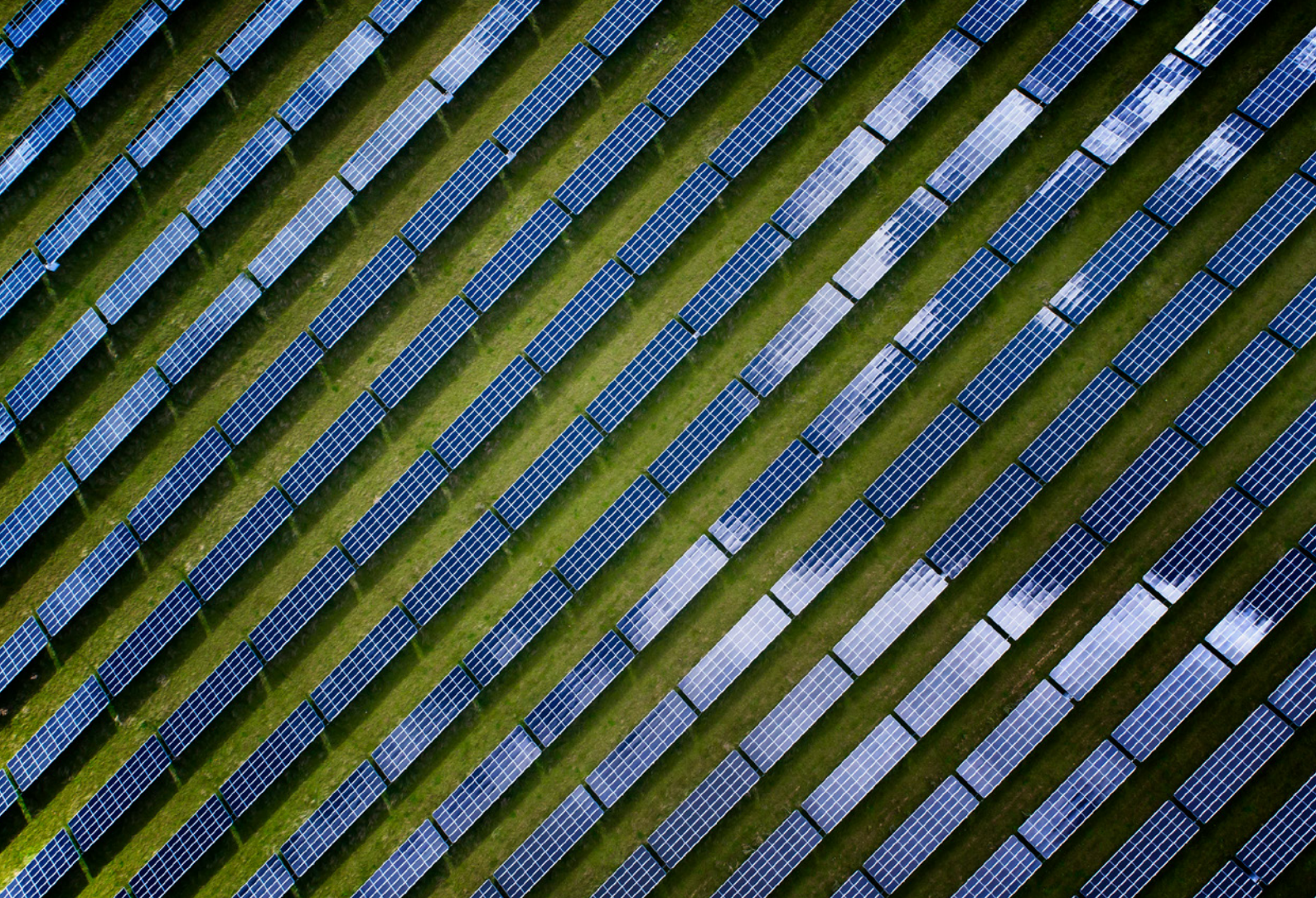
The technology complies with applicable regulations of the European Union regarding safety, health and environment. Local regulations and regulations in other countries will be checked prior to application of the technology.

For more details of our risk assessment or to obtain the MSDS please contact us.



However, our advocacy of a low-carbon world stretches way beyond our solar solutions. For example, Covestro is a signatory of the Climate Group's Renewable Energy 100 (RE100) initiative, which brings together the world's leading companies committed to sourcing 100% of their electricity from renewable sources.

The intermediate target we set for 2030 is for 75% of our purchased electricity to be obtained from renewable sources.



If you share our passion – and want to accelerate our move to a more sustainable, solar-powered world – why not get in touch with us today to learn more about our Retrofit AR coating.

“The longer we fail to address climate change, the higher the costs of adaptation for future generations.”

Feike Sijbesma, Honary Chairman Covestro, Sept. 2018

The manner in which you use our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, is beyond our control. Therefore, it is imperative that you test our products to determine suitability for your processing and intended uses. Your analysis must at least include testing to determine suitability from a technical, health, safety, and environmental and regulatory standpoint. Such testing has not necessarily been done by Covestro, and Covestro has not obtained any approvals or licenses for a particular use or application of the product, unless explicitly stated otherwise. If the intended use of the product is for the manufacture of a pharmaceutical/medicinal product, medical device¹ or of pre-cursor products for medical devices or for other specifically regulated applications which lead or may lead to a regulatory obligation of Covestro, Covestro must explicitly agree to such application before the sale. Any samples provided by Covestro are for testing purposes only and not for commercial use. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information, including technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed by you that you assume and hereby expressly release and indemnify us and hold us harmless from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent. These values are typical values only. Unless explicitly agreed in written form, they do not constitute a binding material specification or warranted values.

¹Please see the "Guidance on Use of Covestro Products in a Medical Application" document.
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