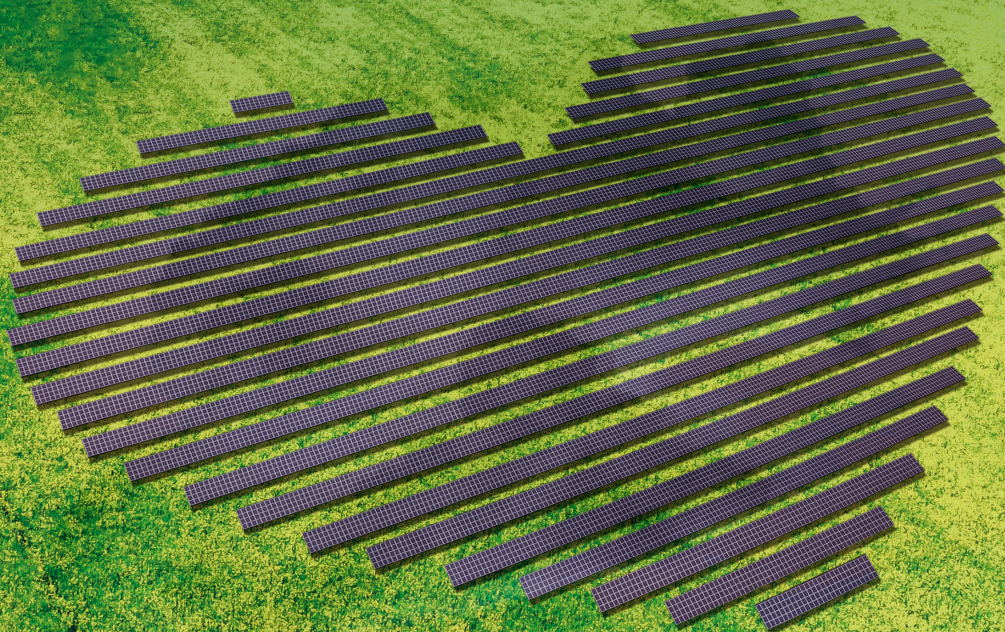


Fall in love with sustainable solar

Sustainable backsheet

Endurans™ HP



The solar business is all about sustainability: and so is Endurans™ solar.

We believe it really is possible to do well by doing good – and we’re proving it every day, through our fluorine-free, recyclable Endurans™ backsheets now being used by module manufacturers around the world.

At Endurans™ Solar we’re dedicated to preserving the world’s natural resources and unlocking more value from the limited resources we have. To put that into perspective, by 2050 there will be enough solar panels installed on earth to reach to the moon and back if you stack them on top of each other. So, instead of turning that pile into waste we’re striving to re-use these materials again.

It’s this challenge that drove us to create the co-extruded polyolefin-based backsheet Endurans™ HP. After all, what is the point in solving one of our world’s defining challenges (the provision of clean energy) only to create another one (the needless waste of valuable resources)?

Welcome to Endurans™ HP: backsheets that are proven, durable and circular-by-design.



A sustainable solution

A brighter future for the solar industry means creating solar modules from more sustainable materials and components. Today, most backsheets contain fluoropolymers that pose toxicity risks and thus create high waste costs. But our solution is very different. Just take a look. Polymeric waste fractions containing fluoropolymers are considered hazardous and difficult to treat. In particular, the

backsheets have to be incinerated in specialized plants to manage corrosive HF gasses; or (where allowed) are landfilled – which then poses a toxicity risk to the planet.

Endurans™ HP solves this problem. These backsheets are made from traceable materials with a low carbon footprint. They are toxin free; and they're fully **recyclable** at end-of-use.

1GWp

PV installation

save
2
kton
of hazardous
polymeric waste

save
5
kton
of CO₂

avoid
900k
euro
end-of-use
waste costs

A safer future

Fluoropolymers are classified as a Perfluorinated Alkyl Substance (PFAS) – which represents a wide and diverse group of chemicals with persistent, bio-accumulative and toxic characteristics. While the risks associated with some PFAS polymers have not been fully investigated, here at

Endurans™ Solar we believe that they should be avoided as a precautionary measure to prevent damage to the environment and health. Why take the risk? All Endurans™ HP backsheets are fluorine-free, delivering an effective performance alternative that prepares us for a sustainable future.

	Endurans™ HP	Traditional backsheets
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Sustainability Credentials

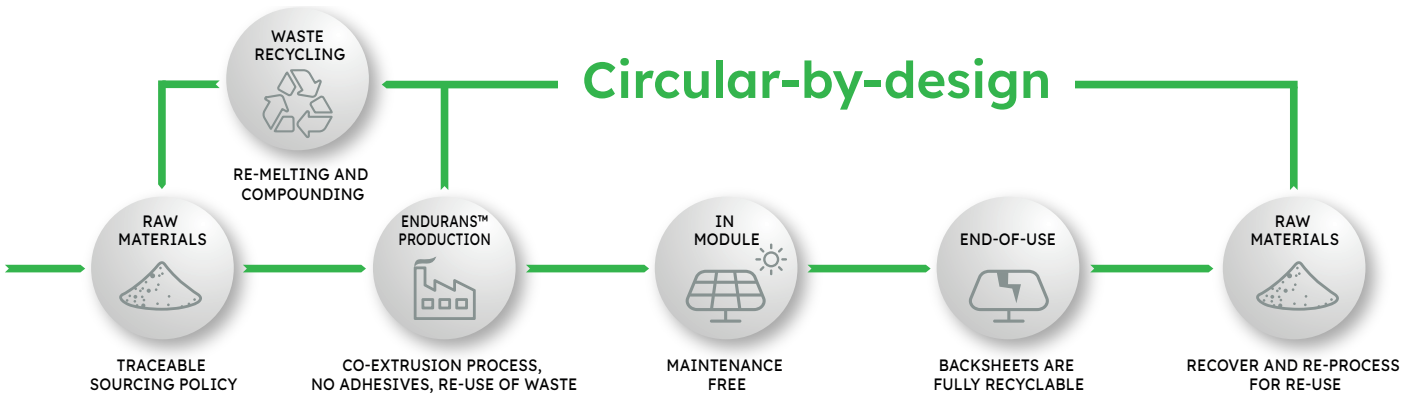
Fluoropolymer free	✓	✗
Traceable materials	✓	✗
Low carbon footprint	✓	✗
Recyclable production waste	✓	✗
Recyclable at end-of-use	✓	✗



Endurans™ HP are fully recyclable

Today, more than one million solar modules are installed each day. That equates to 800 tons of backsheet waste daily once modules reach their end-of-use (20-to-25 years). By working with customers and recyclers, we're reducing this impact on

human health and the environment, from cradle-to-grave. After end-of-life recovery, an Endurans™ HP backsheet can be easily re-melted and shaped into new products. In fact, we're already doing it with the waste generated in our manufacturing process.



- 4 Module's end-of-use**
- Fully recyclable
 - Avoiding expensive pyrolysis
 - Low cost energy-to-waste option
 - Low toxicity risk in case of landfilling

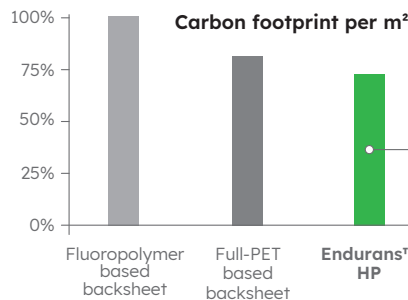
- 3 Module in operation**
- No environmental risk (e.g. floating PV)
 - Long maintenance-free lifetime
 - No risk of toxic HF gasses in event of fire

Life Cycle Analysis of Endurans™ HP



- 1 Production**
- Lower energy consumption
 - Low GHG emission (Fluoropolymer and solvent-free)
 - Recycling of production waste

- 2 Transport & Module assembly**
- Manufacturing close to customers



27% lower carbon footprint compared to fluoropolymer backsheets and 10% vs full-PET based backsheets.

- LCA according to ISO 14040 & 14044:2006 standard
 - CFP calculated using IPCC 2013 GWP 100a method
 - Module production and operations phase (2+3) considered equal for all backsheet types
 - End-of-life recycling for Endurans™ HP backsheet not yet included. Municipal incineration assumed for all backsheets at end-of-life.

Data source: all Endurans™ Solar data

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Doing well by doing good

At Endurans™ Solar we strive for a more circular way of working, where we follow a strategy of REDUCE, REPLACE, EXTEND, DESIGN & RECOVER (Strategic Development Goal #12 of the United Nations).

Over the past decade our industry has made real progress in REDUCING the amount of materials - and energy - required to produce PV modules by Wp unit. We're helping the solar industry step up these efforts by REPLACING fluoropolymers and enabling material RECOVERY at the end-of-use with our Endurans™ HP co-extruded backsheet.


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 award-winning solutions.

“The new Endurance* non-fluorinated backsheet is designed to be fully recyclable. This embraces the spirit of this award, thinking to the future.”

Jurors of pv magazine's 2019 sustainability award

* Endurans™ Solar was formerly part of DSM Advanced Solar and Endurans™ HP backsheets were traded under the name "Endurance backsheets".

For more info please email to info@endurans.com or visit www.endurans.com

 Follow us on LinkedIn

IMPORTANT NOTICE:

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