

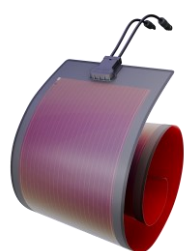


## Organic Photovoltaics – Truly Green Energy "End-of-life"

### Climate Change – Does PV have all the answers?

To achieve our climate goals, the installed PV capacity must increase rapidly to several TW in the next decades. This also means that the PV waste stream will grow massively to estimated 60-78 million tons of PV waste by 2050<sup>1</sup>. It is a major challenge to provide suitable industrial recycling processes for these volumes, capable to recycle all elements of a solar module, including the solar cells as well as critical materials. Heliatek's solar films have a much easier end-of-life treatment.

#### HeliaSol



22 MJ/kg

#### Wood Pellets



17  
MJ/kg

#### Residual Waste



9  
MJ/kg

#### Heating Oil



41  
MJ/kg

#### Lignite



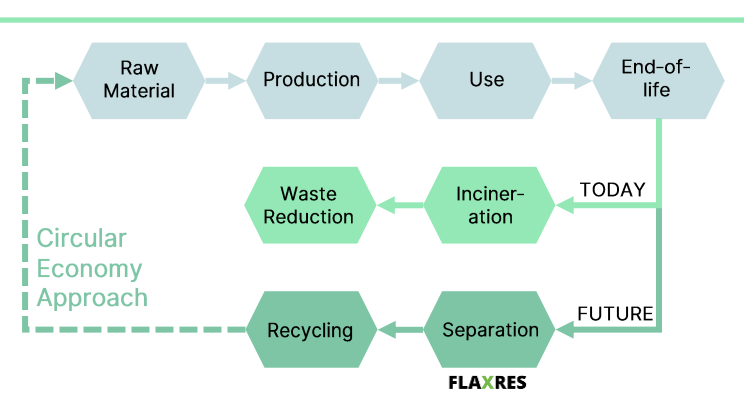
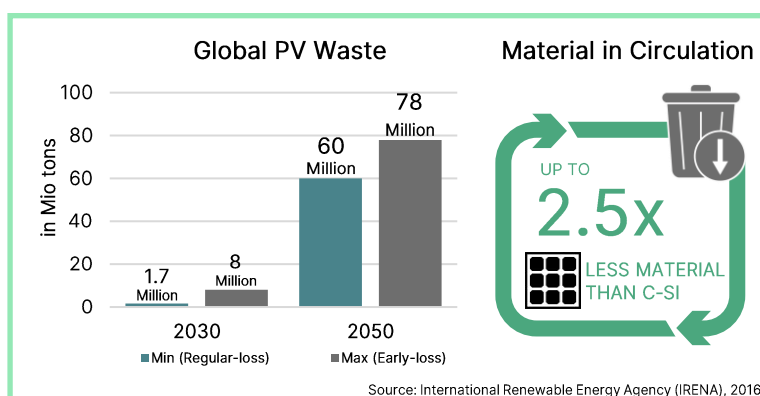
13  
MJ/kg

### Second Use – Solid Recovered Fuel

Our organic solar films are declared as non-hazardous waste and have been classified as solid recovered fuel (SRF)<sup>2</sup>. This means that our solar modules can be incinerated as a high-quality calorific fuel (22 MJ/kg), producing more energy from one kg than wood pellets, residual waste or even lignite. This also saves natural resources, as SRFs replace primary energy sources as fuel.

### Waste Reduction

Our organic solar films require only a minimal material input of non-scarce raw materials. Compared to c-Si based solar panels, up to 2.5 times<sup>3</sup> less material per installed power is put into circulation. After 20 years of truly green electricity production, the incineration generates additional energy while saving natural resources. In addition, incineration is widely available and reduces irrecoverable waste disposal to landfills.



### Recycling Research

We are exploring an environmentally friendly and economically viable recycling process, investigating whether it makes sense to reuse some of the module components in secondary raw material streams. With partners like FLAXRES we have tested with initial success layer separation through high-intensity light pulses. This is an important first step towards circular use of raw materials from our solar films.

[Click here to learn more about our truly green solar films.](#)

<sup>1</sup> International Renewable Energy Agency (IRENA), 2016

<sup>2</sup> bifa environmental institute

<sup>3</sup> Comparison values for c-Si (mono c-Si & multi c-Si) from IEA PVPS Task 12, 2022 & UBA, 2021