



Organic Photovoltaics – Truly Green Energy “Carbon Payback Time”

What is Carbon Payback Time?

The Carbon Payback Time (CPBT) is the time that a solar module requires to pay back its released greenhouse gas (GHG) emissions over the entire life-cycle by avoidance of GHG emissions. This is achieved by displacing more emission-intensive energy sources. The shorter the Carbon Payback Time, the earlier a contribution to decarbonization of the energy sector is achieved.

15 kg
CO₂e

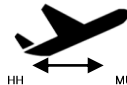


1 m²
HeliSol



24 kg
CO₂e

1 kg beef



310 kg
CO₂e

HH MUC

1 flight for 1 person



82 kg
CO₂e

1 Smartphone



8.800 kg
CO₂e

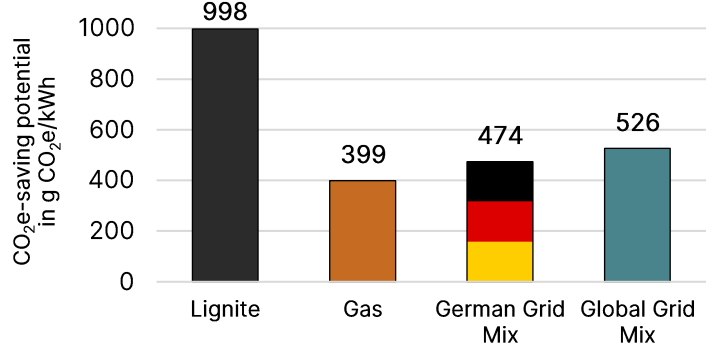
Annual GHG emissions
per capita (Germany)

Released GHG Emissions

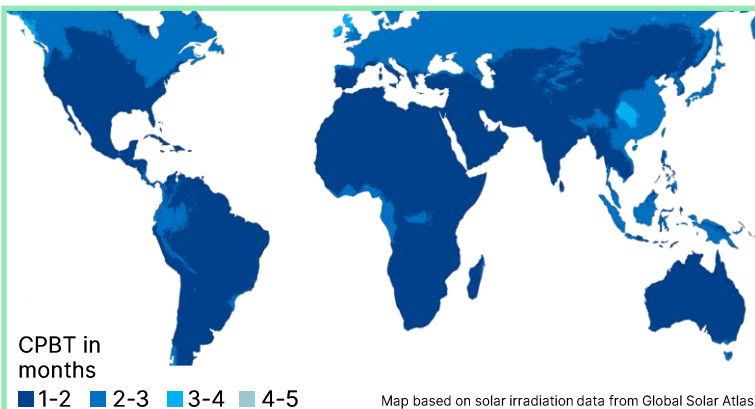
Each product releases GHG emissions during the entire life-cycle (from production to disposal). This is known as the carbon footprint and is quantified by the unit CO₂ equivalent (CO₂e). With a certified carbon footprint for Heliatek’s organic solar film HeliSol of 14.52 kg CO₂e/m², the environmental impact is very low compared to other products.

Avoidance of GHG Emissions

By displacing more emission-intensive energy sources from the grid mix or directly replace the electricity, GHG emissions can be avoided and thus saved. The avoidance of GHG emissions (CO₂e saving potential) can reach up to 1,000-gram CO₂e per kilowatt-hour by replacing other energy sources like brown coal with Heliatek’s organic solar solutions.



Calculation based on values from GEMIS 4,95, 2017 and IEA, 2013



Carbon Payback Time

The ultra-low carbon footprint and the high CO₂e saving potential enable a worldwide CPBT within a short time of 1-5 months. With this low CPBT the released GHG emissions of Heliatek’s OPV can be paid back 10 times faster¹ than for conventional silicon-based PV modules. For the avoidance of GHG emissions, it was assumed that solar power would replace mainly coal-fired and natural gas fired power plants in the electricity mix².

¹ Internal calculation based on values from PEFCR v1.1, 2019 & M.J. de Wild-Scholten 2013

² Umweltbundesamt (2018). Climate Change 23/2018