



# Organic Photovoltaics – Truly Green Energy “Critical Raw Materials (CRMs)”

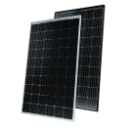
## Rising demand of Critical Raw Materials (CRMs)

The rising demand for renewable energy solutions is driven by an increase in the supply of raw materials, many of which are susceptible to supply chain volatility, as evidenced in recent years of pandemic and geopolitical unrest. The European Union has identified more than 50 materials as ‘Critical Raw Materials’ (CRMs), a significant number of which are dominated by China as the origin of the supply chain. This emphasizes the need for a more independent supply chain to secure the transition to renewable energy, including an acceleration in the implementation of solar energy solutions.

### EU Critical Raw Materials (CRMs)

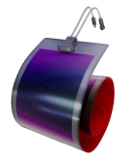
- |                                |                               |    |
|--------------------------------|-------------------------------|----|
| Aluminum (Bauxite)             | Lithium                       | 51 |
| Antimony                       | Light Rare Earth Elements (5) |    |
| Arsenic                        | Magnesium                     |    |
| Baryte                         | Manganese                     |    |
| Beryllium                      | Natural Graphite              |    |
| Bismuth                        | Nickel                        |    |
| Borate                         | Niobium                       |    |
| Coking Coal                    | Phosphate Rock                |    |
| Copper                         | Phosphorus                    |    |
| Feldspar                       | Platinum Group Metals (5)     |    |
| Fluorspar                      | Scandium                      |    |
| Gallium                        | Silicon Metal                 |    |
| Germanium                      | Strontium                     |    |
| Hafnium                        | Tantalum                      |    |
| Helium                         | Tungsten                      |    |
| Heavy Rare Earth Elements (10) | Titanium Metal                |    |
| Cobalt                         | Vanadium                      |    |

### CRMs in PV Industry



- |               |   |
|---------------|---|
| Aluminum      | 7 |
| Borate        |   |
| Copper        |   |
| Gallium       |   |
| Silicon Metal |   |

### CRMs in HeliaSol\*



- |          |   |
|----------|---|
| Aluminum | 2 |
| Copper   |   |

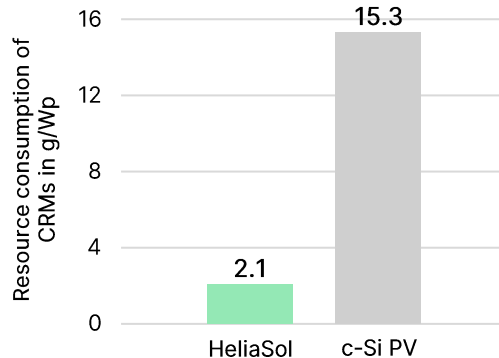
\*Only accounted for materials with a mass percentage per module >0,01%

## The Sustainable Choice

Renewable technologies depend on a variety of CRMs to facilitate their functionality. Conventional PV systems require 7<sup>A</sup> out of 51<sup>B</sup> identified CRMs. In contrast, HeliaSol streamlines the material usage to only Aluminum and Copper. These two CRMs are essential in all renewable energy devices due to their exceptional electrical properties, wide availability, and cost-effectiveness.

## Preserving CRMs

It is crucial to preserve CRMs due to their limited availability, geographical distribution and strategic importance. In comparison to conventional c-Si modules, HeliaSol achieves a remarkable reduction in the amount of CRMs by a factor of 7<sup>C</sup> per Wp. Therefore, HeliaSol not only minimizes the use of CRM elements but also requires a significantly lower quantity of CRMs. This makes HeliaSol the most CRM preserving solar solution.



**7x**  
Less CRM consumption of HeliaSol compared to conventional c-Si modules

### Dominating CRM share per country

- China: 67%
- South Africa: 10%
- DR Kongo: 4%
- Turkey: 4%
- USA: 4%
- Australia: 2%
- Brazil: 2%
- Chile: 2%
- France: 2%
- Iran: 2%
- Russia: 2%



## Minimizing Dependencies

Conventional PV technologies are strategically dependent on imports from China, dominating over 67%<sup>B</sup> of CRMs and about 90%<sup>A</sup> of silicon solar cells. Through our careful material selection and usage for HeliaSol we enable diversified sourcing dependencies, promoting supply chain resilience while improving the sustainability goals of renewables.

<sup>A</sup> EU Commission & JRC, Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU (2023)

<sup>B</sup> EU Commission, Study on the critical raw materials for EU – Final Report (2023)

<sup>C</sup> IEA PVPS Task 12, LCI & LCA of PV Systems (2020) | Refers to module including aluminum frame

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