

SOLAR MODULE RECYCLING

PRESENTED BY

Chris Stearns

National Sales Director

Cascade Eco Minerals



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Cascade Eco Minerals

- Solar Division of **Dlubak Specialty Glass**
- Unique proprietary processes to handle solar modules
- Dlubak Glass is family owned since 1932
- Started in the family garage in Natrona Heights, PA
- Constantly innovating and improving efficiency
- ISO 14001:2015 Certified
- R2 Recycling Certified





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CEM NATIONWIDE LOCATIONS



LAWRENCEBURG , KENTUCKY
 BALTIMORE , MARYLAND
 NATRONA HEIGHTS , PENNSYLVANIA
 HARDEVILLE , SOUTH CAROLINA
 WAXAHACHIE , TEXAS
 UPPER SANDUSKY , OHIO
 OKMULGEE , OKLAHOMA
 PORTLAND , OREGON - COMING SOON
 PHOENIX , ARIZONA

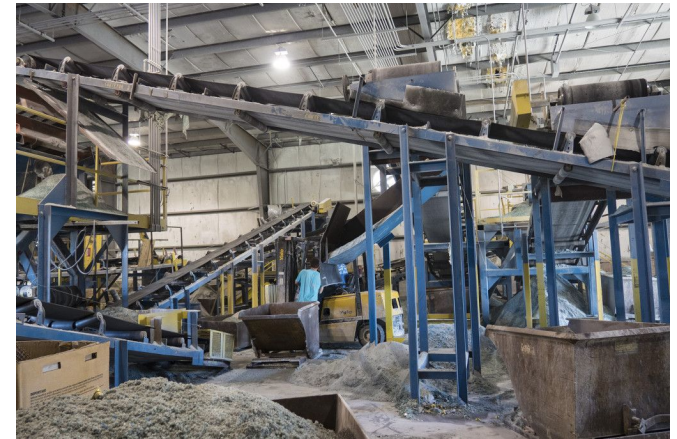
Solar Module Recycling

The Last Stop

Recycling a solar module requires specialized equipment and a crew with the expertise to handle the process

The commodities that the process yields have financial value, but this value does not exceed the cost of processing

As a result, recycling does have a cost that must be passed on to the consumer





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The Recycling Process

MODULE EVALUATION

MARKED FOR RECYCLING

RECYCLED TO RAW MINERALS

MATERIALS USED TO CREATE NEW PRODUCTS



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END MARKETS

WHERE RECYCLED MATERIAL GOES NEXT

One example is glass road beads, which are used to make highway lines reflective



Road beads are sprayed on to the lines as they are applied



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END MARKETS

WHERE RECYCLED MATERIAL GOES NEXT

Specialty mineral blends are sold to customers who use them to manufacture fiberglass



Fiberglass is used in insulation, manufacturing, aerospace and other industries

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END MARKETS

WHERE RECYCLED MATERIAL GOES NEXT

Aluminum, tin, copper, lead and other metals are smelted into raw commodities



These metals are purchased and used in new products by several industrial partners



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REUSE IN NEW MODULES

- In many ways we already reuse solar glass. ***Our downstream customers*** are the likes of Guardian, a national float glass plant, as well as Corning and other industry giants.



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Processing Capacity

In 2020 our facilities processed over 500,000 tons (one billion pounds) of material.

Our facilities are already actively processing modules today, and additional facilities are being updated to include the appropriate machinery to process modules

Our capacity is essentially unlimited as we can scale to meet demand



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The Future of Solar Recycling

As modules approach end of life, we are working to get the infrastructure in place to collect them effectively

As volumes increase and advances are made in processing capabilities the cost of the process will inevitably decrease

Solar recycling is new in the USA and must be utilized if it is to grow

Educating the industry about the benefits of this process is our path forward



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THANK YOU

Questions?

www.cascadeecominerals.com