BPREG

Impact Report

This impact report has been prepared with the consultancy of BCtA, under the **imece impact Accelerator Program** that took place in November 2020 - September 2021. imece impact Accelerator Program is an Accelerator Program run by **imece**. The program takes place with the main partnership of **Zorlu Holding**, the knowledge consultancy of **Business Call to Action** supported by UNDP, the strategic partnership of the **Business Council for Sustainable Development Turkey (BCSD Turkey)**, and the investment partnership of **Startup Wise Guys**.

Main Partner

Knowledge Partner

Strategic Partner

Investment Partner

BPREG Impact Report

Country : Turkey
Sector : Manufacturing

Business Model

Composite materials are widely used in industrial applications because of their reliable mechanical properties, machinability, and durability. Almost %90 of the composite materials market is composed of carbon and glass fiber, in other words synthetic conventional materials. However, these materials produce huge quantities of waste and CO2 emissions making them an unsustainable option. Waste management and CO2 emission problems are at the peak of all times.

Manufacturing industries are looking for advanced material solutions to overcome this core problem: lack of sustainable, high-performing, cost-efficient material. None of the existing composite materials in the market can provide an all-in-one solution. BPREG through its innovative use of technology brings a material solution that addresses this gap.

Under its brand, EcoRein®, BPREG provides advanced natural fiber composite material solutions developed from plant fibers. The company's technological solution allows the manufacture of low-eco impact, lightweight, yet strong end-products by replacing synthetic materials with natural fiber composites. Traditionally, plant fibers are mostly used for textile purposes. This traditional method de-value natural fibers and turns them into household textiles, fabrics etc. On the other hand, BPREG's method engineers and re-values natural fibers and turns them into strong, yet lightweight composite structures ready to be applied in industries such as automotive, boat manufacturing, consumer goods, interiors, and furniture, etc.

BPREG's process of producing advanced natural fiber composite material solutions developed from plant fibers is carbon-neutral. As the growth of plants results in sequestration of CO2 from the atmosphere, BPREG's process achieves net zero carbon emissions. Additionally, the plant fibers that BPREG uses are renewable, and thus prevent depletion of natural resources. Furthermore, compared to the production of alternative composite materials, BPREG's process consumes less energy in production. Overall, BPREG, with its environmentally friendly materials, is committed to decarbonization and climate action. Reduction of the environmental impact of industries and manufacturing is an urgent need. BPREG's goal is to reduce humanity's carbon footprint, not by replacing but by offering alternative solutions to composite materials.

A: Planning for Impact

BPREG, through its operations, is mitigating harm generated from products manufactured with conventional synthetic composite materials. Several problems have been identified in analyzing the existing synthetic composites in the market. For example, carbon-fiber composites offer the utmost lightweighting and mechanical performance, but they have extremely high cost and limited recyclability. On the other hand, Glass-fiber composites dominate the market with affordable price and a moderate weight reduction. However, the extreme energy consumption in glass fiber production and recycling at their end-of-life bring concerns on their sustainability.

To mitigate the harm, BPREG engineers plant fibers (flax/hemp), combine them with recyclable polymers and form materials having unidirectionally aligned natural fibers inside. The material solutions of BPREG are lightweight, low-eco impact and high-performing bio-composites that can replace conventional materials.

The direct result of this process is represented in reducing the quantities of synthetic materials used in end-product manufacturing. This leads to increasing the recyclability of end-products manufactured and hence, decreasing total carbon emissions resulting from this process. In the long-term, the company's impact goal is to decrease the environmental footprint of manufacturing industries through its business model. The diagram below shows BPREG's impact value chain, outlining the outputs, outcomes and the overall impact of their project.

Impact Value Chain

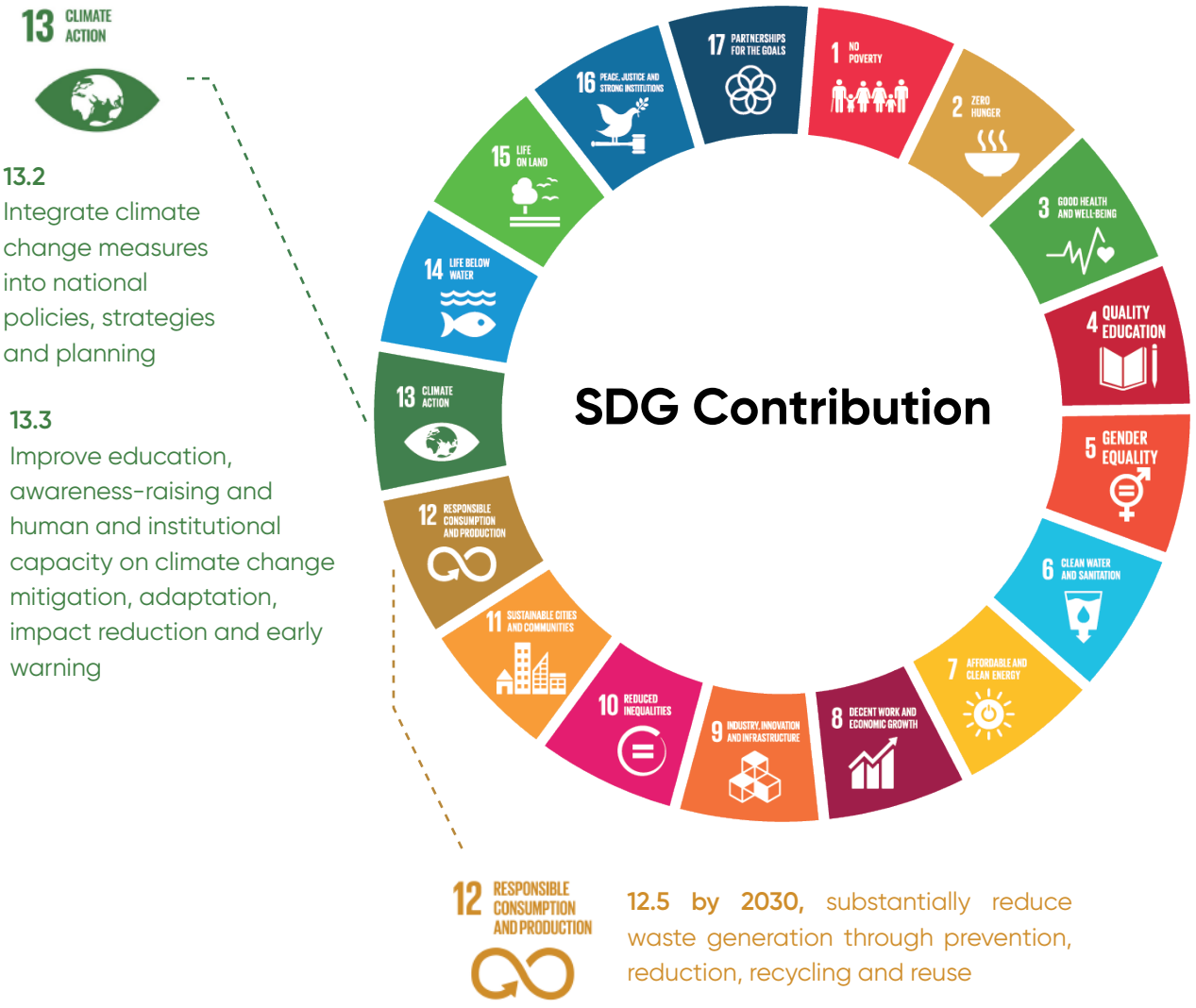
PROBLEMS & OPPORTUNITIES	INPUTS/ACTIVITIES	OUTPUTS	OUTCOMES	IMPACT
High environmental impact of products manufactured with synthetic composite materials	Develop and manufacture lightweight, high-performance, low eco-impact biocomposites from plant fibers to replace synthetic materials	Reduction in use of synthetic materials in end-product manufacturing	Increased recyclability of end-products manufactured Lower carbon emission in end-product manufacturing	Decrease the environmental footprint of manufacturing industries

B: Framing Impact

Indicator	Target for 2022	Stakeholders	Data Collection Method	Indicator Source	Data Source	Linked SDG Targets
Amount of carbon dioxide emission avoided in manufacturing by the replaced synthetic material in the organization's production during the reporting period.	10000	Planet	Primary	Custom Indicator	Interviews	12.2 12.5 13.3
Amount of recyclable materials used in the organization's production during the reporting period	3000	Planet	Primary	Custom Indicator	Interviews	12.2 12.5 13.3
Change in the amount of synthetic material use	2000	Planet	Primary	Custom Indicator	Interviews	12.2 12.5 13.3
Number of students residing in urban areas that were clients of the organization during the reporting period	225,000	Students	Administrative	Custom Indicator	Amazon, Digital Ocean, Turk Telekom, Microsoft	4.1 4.2 4.4 8.2 8.6

C: Measuring Impact

BPREG is contributing to positive outcomes by increasing recyclability of products that contribute to the circular economy. It is essential for their business to see the "planet" as a stakeholder that is benefited through responsible consumption of water and less usage of synthetic materials. After focusing on two SDGs, Climate Action and Responsible Consumption and Production, and framing a strategy developing an impact value chain, BPREG started to work on developing an internal process on impact-related data collection. BPREG started to collect data from its clients about applications of its material solutions to understand the impact. The amount of synthetic material avoided / replaced / reduced is defined as the critical metric. Following a successful commercial application of its natural-fiber composites; BPREG deep-dive into the impact of the application together with its client. This approach also enhances the responsible production and environmental impact of its clients.



Besides being a green material itself and produced with minimal environmental impact, BPREG's natural material solutions [EcoRein®]offer mobility industry great advantages in terms of sustainability and circularity through less fuel or electricity consumption due to around 50% weight reduction in vehicle parts, less energy consumption in production by 60% due to faster process cycle time and less waste production due to 100% recyclability and dematerialization due to high performance.

There are different fields of applications for BPREG's materials, and impact should be assessed application by application but in order to emphasise the positive environmental impact by numbers, we can focus on sustainable mobility applications and deeply investigate the outcomes of BPREG's passenger car parcel-shelf case study. It should be noted that a weight reduction of 1 kilograms reduces 0.1 gram of CO2 per kilometer driven, a decrease in energy consumption of 1kW/h reduces 0.94 g CO2 emission. Therefore, replacing only the parcel-shelf of 100.000 cars driven 20.000 km/year will result in almost 590 tonnes of CO2 saving / year. Considering that EcoRein®h as a potential to be used in at least 10 different vehicle parts, the commercial utilization of EcoRein® within the automotive industry promises a great impact on the decarbonisation of the road transportation industry.

Lessons Learned

The impact measurement study led to the conclusion that measuring the impact and the amount of environmental damage prevented by the use of BPREG's plant-based fiber composite materials instead of alternative composite materials is a multilateral and complicated process. Through the impact measurement process, BPREG was able to identify several indicators and has outlined methods to measure the environmental impact of its products. There are several categories including, but not limited to the weight, product life cycle, energy consumption and recyclability of the different composite materials.

Way Forward

This impact assessment has provided BPREG with a better understanding of the key issues that the company should focus on.
It is crucial for BPREG to analyze to what extent their material solutions use less energy in production and put much less environmental stress on natural resources and carbon emissions compared to synthetically produced materials. Currently BPREG is only measuring their impact in certain settings however, BPREG will keep working on measuring its total life cycle environmental impact while serving to green-transformation of major manufacturing industries by replacing/reducing synthetic material in their client organizations' productions.
Finally, to strengthen its business and impact model, BPREG will measure the linear economy or conventional productions as the reference case to show the impact generated by BPREG's material solution that encourages transformation towards a circular economy.

> ***"We are committed to the green transformation of major industries by enabling advanced natural fiber composites. Our impact on global sustainability keeps us motivated in pioneering this transformation."***
>
> Semih ERDEN

For more information

B-PREG

bpreg.com

imece

imece.com