Adopting a dynamic approach to product carbon footprints at bio-bean

Client's objectives

bio-bean Ltd is an award-winning clean technology company that has industrialised the process of recycling waste coffee grounds (WCG) into advanced biofuels. bio-bean offers a novel solution to WCG disposal, which typically end up in landfill where they degrade and contribute to the UK's greenhouse gas (GHG) emissions. Instead, WCG are collected across the UK and recycled into Coffee Logs™ and biomass pellets at bio-bean's factory in Cambridgeshire.

In 2016, bio-bean carried out a high-level impact assessment of its biomass pellets to understand the carbon emissions associated with their production and provide a comparison against conventional waste disposal methods and fuels. As anticipated for a fast-growing technology company, bio-bean's operations are constantly developing, and this assessment quickly became out of date. With growing stakeholder interest in the environmental benefits of its technology, bio-bean needed a flexible approach to calculating its product carbon footprint that would ensure the stated emissions were an accurate reflection of the company's operations at any given point in time and could model future changes made to its operations and products.

The project

bio-bean sought support from Carbon Smart to overcome this challenge and develop a dynamic product carbon footprint tool that assessed the carbon impact of Coffee Logs and biomass pellets. After kicking the project off by interviewing key members in bio-bean's production, procurement, and logistics teams we took the following steps:

1. **Product carbon footprint tool**

   - **Data collection:** the production of bio-bean's products was mapped out from raw materials sourcing to end use and key production stages identified. bio-bean provided energy, water and waste data for its operations. Visiting bio-bean's factory helped to resolve queries and confirm alternative data sources for those processes where data was incomplete.

   - **GHG emissions calculations:** Carbon Smart's product impact assessment tool was tailored to fit bio-bean's unique requirements and populated with data collected for raw materials sourcing, upstream transportation, manufacturing, product distribution and customer use. The output of the tool gave the emissions ($kgCO_2e$) of recycling WCG into Coffee Logs and biomass pellets.

   - **Waste disposal methods and fuels comparison:** To compare bio-bean's product carbon footprint with alternative waste disposal methods for WCG and fuels, desktop research was carried out to source relevant data and calculate the comparative emissions.

   - **Tool handover and training:** bio-bean received one-to-one training from Carbon Smart on the use of the tool and gained access to training materials. This ensures that bio-bean is able to confidently and independently use the tool to meet its needs going forward.

2. Opinion statement

- The data used to calculate the product carbon footprints was assured by Carbon Smart to ensure that no evidence of misstatements was identified.

- bio-bean received an opinion statement produced by Carbon Smart, an independent and leading sustainability consultancy with extensive experience in GHG reporting to WRI GHG protocol and ISO 14064:1 standards; and verification using ISO 14064:3; and PAS2050:2011 for product carbon footprints.

Positive Impact

Having received assurance for the carbon footprint of its Coffee Logs and biomass pellets, bio-bean is now able to confidently state the GHG emissions associated with its solid biofuel products, and communicate the environmental benefits of its technology over alternative waste disposal methods. Sharing this information with investors, WCG producers and sales customers can be done so succinctly with the issued opinion statement. In addition, bio-bean now has an approach for achieving verification of its product carbon footprints in future years, which is supported by Carbon Smart's product impact assessment tool.

Carbon Smart's product impact assessment tool provides bio-bean with a breakdown of its emissions at a production stage level and gives visibility of its "carbon hot spots", where future efforts should be focused to reduce emissions and improve the overall environmental performance of the products.

The tool gives bio-bean the flexibility to model changes to its existing operations and enhances the company's understanding of the resultant carbon impact that these changes could have. It also supports the company's key decisions with respect to its raw materials, procurement, operations and even new product ranges, aiding bio-bean to consider and explore the environmental impacts of its operations in greater depth and across a wider range of business activities than was initially possible.

Testimonial from client (Alina Bassi)

"The Life Cycle Analysis carried out by Carbon Smart proved that the bio-bean process for the recycling of waste coffee grounds is more environmentally friendly than the alternative disposal options. This has given bio-bean further confidence in the sustainability of our biomass pellets and Coffee Logs. We now know the exact environmental impact of our processes and products and we can use this information to make longer term decisions in respect of future processing changes.

We are glad that the tool produced by Carbon Smart can be a live model which we can update regularly as we continue to improve our processing. This enables us to reduce the environmental impact of future sites and allows us to make a positive environmental statement about our operations."

Alina Bassi, Senior Process Development Engineer

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