

Abstract

Project title	"Provision of methodology and analysis services for the purposes of the project "Enhancement of business branding through the development of a carbon footprint evaluation system in the cross border area" (CB CARBONFREE)"
Activity 4	Implementation of carbon footprint reduction protocol
Result no	D 4 .2. 2 of the project
Beneficiary	Haskovo Chamber of Commerce and Industry
Artist	Center for Testing and European Certification Ltd

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The ecological footprint of the food industry and the demands of the bio-based economy lead to the need to deepen the concept of corporate sustainability. CSR provokes the implementation of eco-innovations with high-added value. A major source of added value and sustainability is the integrated application models and practices to reduce the product's carbon footprint. The purpose of its study is to systematize an integrated model for implementing a protocol to reduce the product carbon footprint of SMEs from the food industry, which combines not only industrial and process eco-design, but also the overall organizational and socio-economic context of SMEs in the food industry, reflected in CSR and added value for interested parties.

The methodology for implementing a business model for the sustainability of SMEs in the food industry by implementing a protocol to reduce the product carbon footprint is based on vertical and horizontal integration of well-known standalone environmental, social and economic tools such as corporate social responsibility, life cycle assessment, MET matrix, eco-labelling and a stakeholder approach to the production and marketing of eco-products with high added value. In this regard, in the first part of the study, an algorithm was considered and proposed for the implementation of an integrated business model for the sustainability of SMEs in the food industry, focused on the delivery of high-added value for stakeholders, based on corporate social responsibility, functional innovation and environmental efficiency. The integrated approach to reducing the product carbon footprint, based on the business practice of CSR in the food industry, allows simultaneous optimization of environmental aspects and the structure of the costs of the products in terms of improved quality and functionality. In this way, the integrated approach contributes to the diversification of not only the company's product portfolio but also the opening of new markets and the implementation of new market strategies by increasing added value.

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The analyzes carried out identify the actions that SMEs in the food industry can follow, to achieve a reduction in their product carbon footprint, as well as a redesign of their business and production processes that simultaneously improve product functionality and resource efficiency.

In the second part of the study, specific analyzes of the dairy industry and in particular cheese production are presented, as well as the results of the implementation of a carbon footprint protocol in a small dairy enterprise in the territory of southern Bulgaria. The results are further compared with data from similar studies as representative of several traditional small cheese factories that are scattered throughout the European Union, especially in the southern countries.

The inventory data were obtained directly from the field-investigated facility corresponding to one year of operation, and the main subsystems involved in cheese production was included in the computer program used, i.e. raw materials, water, electricity, energy, cleaning products, packaging materials, transport, solid and liquid waste and gas emissions. The results show that environmental impacts, arising from the production of cheese, mainly arising from the production of raw milk and natural land transformation are the most affected of the considered categories. On the contrary, the production of packaging material and other non-dairy ingredients hardly affects the overall impact. In addition, an average carbon was calculated footprint of the cheese produced in the analyzed facility, as a result of which it was found that the production of milk and the emissions from the pellet boiler are the subsystems with the highest contribution to the generation of the product carbon footprint. Besides, it is reported positive is n effect on the environment, which is evidenced by the direct use of whey as animal feed, which offsets the values of the feed that would be needed for nutrition. A revision was made to the published data literature on the environmental performance of cheese production worldwide and compared with the results obtained in the present work. The analyzed data makes it clear that the content of fat and dry

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extract are determining factors for the carbon footprint of the cheese, while the scale of cheese production and the geographical area has a very weak effect.

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