

Carbon Footprint Italy: how blockchain technology supports innovation in tackling climate change

Daniele Pernigotti

Aequilibria S.r.l. – SB

Abstract. Climate change is the most pressing challenge human beings must face in the present and the near future. In a growing need for increasingly ambitious mitigation actions, Carbon Footprint Italy is the national Programme Operator specifically dedicated to communicating the results of greenhouse gas emissions quantification for both products and organisations. This paper explores the innovative Carbon Footprint Italy experience, showing how blockchain technology helped to enhance the program reliability and transparency.

Keywords. climate change, carbon footprint, programme operator, blockchain, innovation

Introduction

Climate change is broadly recognised as the main challenge human beings will need to cope with in the present and near future. The awareness of this urgency is not only widespread among the scientific community but within all sectors of our society.

On the part of industries, this implies a new deal between producers and consumers in jointly promoting a low carbon market and effectively communicating the efforts undertaken. Consumers and clients, in fact, often face difficulties in recognising reliable products, and therefore risk falling into the so-called greenwashing – either consciously or not.

These challenges led to the development of specific subjects, known as Programme Operators (POs), dedicated to the communication of carbon footprints with the purpose of ensuring the effective transmission of commitments.

1. The importance of quantification

The first step for any greenhouse gas (GHG) emissions mitigation action is a solid and transparent quantification of GHG related to products and organisations. It should be noted that not always companies adopt robust and internationally recognised standards within solid verification systems, undermining their public statements. For this reason, it is notable to observe the establishment of Carbon Footprint Italy (CFI), the national Programme Operator that aims at closing this gap and at demonstrating companies' com-



Fig. 1
Carbon
Footprint
Italy logo

mitment to reducing their GHG emissions effectively.

CFI is the only Programme Operator in Italy, affiliated to the international network Carbon Footprint International, specifically dedicated to communicating the results of the quantification of GHG emissions, known as Carbon Footprint (CF) of products and organisations, their reductions, and the attested Carbon Neutrality claims.

2. CFI's values

Based on third parties' verification statements, CFI has been created to ensure proper and reliable communication of the efforts undertaken to provide low-carbon solutions on the market. To do so, CFI is based on four core values: its main strengths are to be credible, guaranteed, flexible, and effective (CFI, 2021).

2.1. Credibility

CFI exclusively provides for the use of internationally recognised standards for the quantification of GHG emissions or their reduction.

ISO, the International Organisation for Standardisation, is the leading worldwide independent organisation to set up of internationally recognised standards (ISO, 2021). In this case, the two most relevant ISO standards recognised by CFI are ISO 14067, for the Carbon Footprint of Product (CFP), and ISO 14064-1, which refers to the Carbon Footprint of Organisations (CFO).

In addition, for what regards the achievement of Carbon Neutrality and the use of its relative mark, CFI takes as reference the standard PAS 2060:2014, which regulates the demonstration of carbon neutrality, defining requirements for quantification, reduction, and offsetting of GHG emissions in specific areas. Although CFI exclusively recognises ISO standards, the PAS 2060 – issued by the British Standards Institution – is commonly recognised at the international level, up to the future development of ISO 14068.

2.2 Guarantee

All products and organisations registered in CFI report values of GHG emissions, or their reduction, supported by verification statements issued by independent third-party verification bodies, accredited by Accredia – the Italian national accreditation body – or equivalent international accreditation bodies.

2.3 Flexibility

CFI is flexible because companies and products registered in the Programme Operator may employ specific marks to disclose their participation in CFP or CFO. Moreover, CFI presents a Carbon Reduction mark, specifically dedicated to demonstrating the reduction of GHG emissions of products and organisations.

Furthermore, to prove the achievement of Carbon Neutrality, a specific mark is available for organisations or products already registered in CFI that have offset the residual GHG emissions: they can do so by purchasing recognised carbon credits after the implementation of mitigation actions.

2.4 Effectiveness

When it comes to effectiveness, transparency and accountability are essential. Concerning transparency, CFI developed a dedicated page for each product and organisation participating in the Programme. These dedicated pages have several background information to share key data related to every single CF. CFI also introduced the innovative blockchain technology to make companies accountable for their CF claims, thanks to unmodifiable information on the participants in the Programme.

3. The innovative blockchain technology

According to several authors, blockchain technologies enable actors to verify and audit transactions and track them in ledgers (Saber et al., 2018). Once the transactions are approved, they can be added as a new block in the blockchain. Smart contracts then increase the credibility of transactions. In this way, values are assigned to the original information, and the system tracks them over time. Blockchain technologies are increasingly helpful to implement climate action.

Considering this need, CFI is the first Carbon Footprint Programme worldwide to use blockchain technologies to guarantee the accurate tracking of GHG emissions and any reductions that can occur due to mitigation actions.

3.1 Overview of the benefits of the blockchain technology applied

There are many benefits related to the implementation of blockchain technology. Firstly, it leads to publicly available unmodifiable high-quality records and information regarding CF data (e.g., t CO₂e, verification statements, and so on), both at product and organisation level.

Secondly, this technology makes unmodifiable CF data available over time: this allows for the accurate tracking of the committed mitigation targets and improves the targets' reliability for the transition towards a low-carbon economy.

The project's development, including the direct integration of data collected in the blockchain, will further increase the transparency of the assessment of GHG emissions, eliminating the risk of fraud and greenwashing.

4. Conclusions

CFI decided to introduce blockchain technology to make companies accountable for their CF claims through unmodifiable information on who participates in the Programme. Blockchain allows for transparent and reliable control over time of the reported information by any stakeholder and addresses progress that may be quickly and easily evaluated. At the same time, the open-access platform can be consulted by everyone, which means that the information can be shared with all relevant stakeholders, including policymakers. Thus, information disclosed by the companies and verified by an accredited third-party body cannot be modified over the years when registered in CFI.

Overall, CFI represents a concrete example of how digital tools can support the adoption of reliable carbon tools that promote the transition towards a low carbon economy.

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Author



Daniele Pernigotti dpernigotti@aequilibria.com

Daniele Pernigotti is the Director of Carbon Footprint Italy. He is in addition the CEO of Aequilibria S.r.l – SB, Chair of CEN/TC 467 and of the Italian mirror group of ISO/TC 207 on climate change. He also coordinated the development of the standard ISO 14067:2018 on the Carbon Footprint of Product (CFP), and coordinates the ISO/TC 207 TG2 on Circular Economy. He is external technical expert on GHG for Accredia and is also qualified as Lead Assessor on GHG for ANAB (USA) and ONAC (Colombia).