



Review

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Abstract: Carbon dioxide (CO₂) and other greenhouse gases are the main causes of global climate change. This phenomenon impacts natural and human systems around the world through the rising global average surface temperature, extreme weather, changes in precipitation patterns, rising sea levels, and ocean acidification. However, this concept is alien to most people in developing countries. They are also unaware of the connection between energy efficiency and climate change. This dearth of knowledge makes them opt for highly inefficient appliances. Internet of Things (IoT)-based visualisation platforms for tracking household carbon footprints (CFs) have been seen as a good concept for combating this global phenomenon; however, there are potential challenges and ethical restrictions that must be addressed when implementing platforms for tracking household CFs. It is also vital to consider the user's viewpoint and current technological state to ensure successful implementation and adoption. As the literature in this area is rapidly developing, it is crucial to revisit it occasionally. This paper presents a systematic review of IoT-based visualisation platforms for household CFs, including their definitions, characteristics, decision-making processes, policy development, related services, benefits, challenges, and barriers to implementation. Finally, it offers suggestions for future research.

Keywords: carbon footprints; climate change; Internet of Things (IoT); visualisation platform; energy efficiency



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1. Introduction

The Internet of Things (IoT) refers to a network comprising numerous physical devices, buildings, vehicles, and other objects. These objects are equipped with electronics, software, and sensors, allowing them to collect and share data [1]. There is significant interest in using IoT technology to detect and reduce household carbon footprints (CFs) due to the need to minimise greenhouse gas (GHG) emissions and the growing concerns about climate alteration. A household CF is the amount of GHG emissions produced by the activities of a household, including energy use, transportation, and waste generation [2–4]. By tracking household CFs, individuals can identify areas where they can reduce their emissions and change their daily behaviours to mitigate their environmental impacts [3].

A visualisation platform based on IoT technology can provide real-time feedback on household energy use and CFs [5]. The platform can generate visualisations showing