GreenAudit

An Automated Framework for SME Sustainability Reporting using Python and Cloud Computing

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Preprint for ResearchGate

December 19, 2025

Abstract

As global financial regulations shift towards mandatory sustainability disclosure (IFRS S2), Small and Medium-sized Enterprises (SMEs) face significant challenges in calculating and reporting their carbon footprint due to the high cost of consultancy and technical complexity. This paper introduces **"GreenAudit"**, an open-source, automated ESG (Environmental, Social, and Governance) reporting tool developed using Python and Streamlit. The proposed framework allows non-technical accountants to input utility data and instantly generate compliant reports on Scope 1 and Scope 2 emissions. This solution bridges the gap between complex climate data and financial accounting, offering a scalable model for automated environmental auditing.

Keywords: ESG Reporting, Python, FinTech, Carbon Footprint, Scope 1 & 2, IFRS S2, Streamlit.

1 Introduction

The intersection of Finance and Technology (FinTech) is no longer limited to banking transactions; it now extends to "Green Finance." With the introduction of the International Sustainability Standards Board (ISSB) standards, specifically **IFRS S2**, companies are required to disclose climate-related risks. However, while large corporations have dedicated ESG teams, SMEs lack the tools to perform accurate carbon accounting. This paper proposes a digital solution to automate this process using cloud-based Python scripting.

2 Problem Statement

Current methods for calculating a company's carbon footprint rely heavily on manual Excel spreadsheets or expensive proprietary software. These methods are prone to:

- **Human Error:** Inaccurate manual conversion of emission factors.
- **Lack of Visualization:** Difficulty in communicating impact to stakeholders.
- **Static Reporting:** Inability to monitor emissions in real-time.

3 Proposed Solution: The GreenAudit Architecture

"GreenAudit" is designed as a web-based application that simplifies the environmental audit process into three stages:

3.1 Stage 1: Data Ingestion

The system accepts user inputs regarding direct fuel consumption (Scope 1) and purchased electricity (Scope 2).

3.2 Stage 2: The Computational Engine

The backend, built with **Python 3.9**, utilizes the `Pandas` library for data processing. It applies standard emission factors ($kgCO_2e$ per unit) based on the **GHG Protocol Corporate Standard**.

$$Emission = ActivityData \times EmissionFactor \tag{1}$$

3.3 Stage 3: Visualization & Reporting

Using the **Streamlit** framework, the system renders a dynamic dashboard that visualizes the carbon intensity. It classifies the company's performance into three tiers (Low, Moderate, Critical) using conditional logic algorithms.

4 Technical Implementation

The prototype was developed using the following stack:

- **Language:** Python (Backend Logic)
- **Frontend:** Streamlit (Interactive UI)
- **Data Handling:** Pandas & NumPy
- **Deployment:** Streamlit Cloud

5 Conclusion

"GreenAudit" demonstrates that complex environmental auditing can be democratized using accessible programming tools. By empowering accountants with Python-based tools, we can accelerate the transition to a sustainable economy.

References

[1] World Resources Institute. *GHG Protocol Corporate Accounting and Reporting Standard*.

[2] IFRS Foundation. *IFRS S2 Climate-related Disclosures*.

[3] Streamlit Inc. (2025). *Streamlit Documentation*.