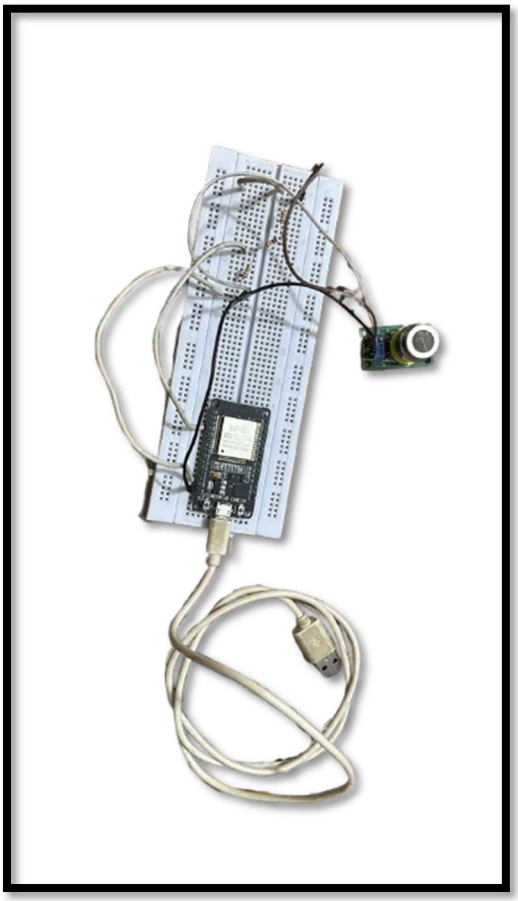
Final Year Project Showcase Batch 2022
Year 2026

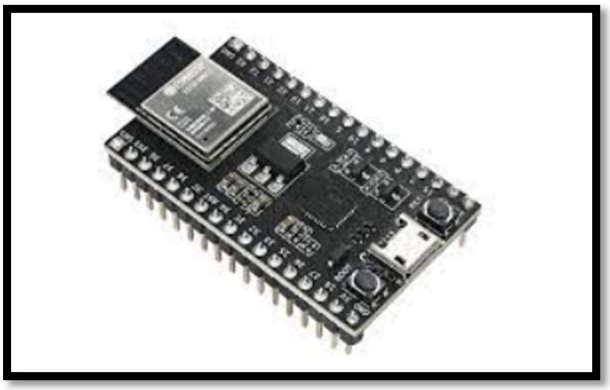
Department: Software Engineering Programme: BE Software Engineering	
1	**Project Title** **Climavert: A Blockchain-based Carbon Credit Ecosystem for Emission Tracking, Verification and Offset Monetization**
2	**Project Idea** Climavert is a digital platform that combines the power of IoT, AI, and Blockchain technology to track carbon emissions in real-time, automate carbon credit generation and enable transparent carbon credit trading. The platform allows industries, landowners, individuals and government authorities to join trusted carbon management ecosystem.
3	**Process** • Build CO_2 monitoring hardware based on the Arduino microcontroller and CO_2 sensor, to monitor and measure emissions in real time. • Write backend code, design APIs for system communication. • Use smart contracts on the blockchain for issuance and trading of carbon credits. • Create a hash functionality for transactions based on ERC-20 tokens. • Build mobile application for individuals. • Create industry, landowner and government dashboards. • Integrate a model to detect anomalies and forecast emissions using AI.
4	**Outcome** • Carbon emission monitoring system in real time. • Clear and trustworthy carbon credit trading platform. • Automated carbon credit generation and verification. • Individuals and households in carbon markets. • Proactive environmental decision making with AI insights.
5	**Evidence (Theoretical Basis)** The main driver of climate change is greenhouse gas emissions, more specifically carbon dioxide (CO_2). There are some difficulties with current carbon credit market mechanisms, including: limited participation, delayed verification, fraud, lack of transparency. Blockchain's immutability and transparency coupled with AI's predictive analytics and anomaly detection creates a powerful synergy.The combination of blockchain's immutability and transparency with AI's predictive analytics and anomaly detection forms a formidable alliance. Climavert integrates all these technologies and introduces IoT monitoring, creating a secured and trustworthy solution for carbon emission management and carbon credit trading.
6	**Impact on Sustainability of Urban Regions or SDG-11 "Sustainable Cities and Communities"** By facilitating transparent emission monitoring, encouraging carbon reduction programs, supporting green investments, and encouraging environmentally responsible industry and citizen behaviour, Climavert can help drive sustainable urban development. The system helps

	to make cities cleaner, helps to reduce carbon footprint and helps to enhance environmental governance.
7	**Competitive Advantage or Unique Selling Proposition**
a	**Attainment of any SDG** Through responsible carbon management, emission reduction and sustainable climate action, Climavert helps to achieve sustainable development by generating transparent carbon credits and trading them. The platform allows industries, governments and individuals to join sustainability efforts and to help make urban areas cleaner and more sustainable.
b	**Environmental Aspect** The platform allows for the monitoring of emissions in real-time and offers carbon credit incentives to encourage organizations and individuals to reduce their carbon footprint. Climavert encourages farmers to emit fewer greenhouse gases and to be more environmentally responsible by incentivizing accurate emission tracking and reward for environmental responsibility.
c	**Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process** Existing carbon credit schemes are often inefficient and prone to fraud, and involve manual reporting, third-party verification, and late audits. The process becomes enhanced with Climavert with its real-time emission monitoring, blockchain technology verification, automatic carbon credit generation, and clear transaction logs. This helps to minimise administration, improve efficiency and build trust among stakeholders.
d	**Capture New Market** Current carbon credit markets are primarily designed for big industries and organisations, and do not include individuals and households. Climavert brings household and individual carbon credits to life by comparing your electricity usage and completing emission reduction projects. This gives rise to a new carbon trading market segment and widens the scope of carbon trading beyond the use of industrial users.
e	**Transparency and Trust** One of the major features that sets Climavert apart is its incorporation of blockchain technology. All emission records, carbon credits and trading transactions are securely recorded on the blockchain which is immovable, transparent and traceable. This will greatly minimize risk of fraud occurrence and enhance trust among industries, regulators, investors and consumers.
8	**Target Market** • Manufacturing industries • Energy and utility companies • Forestry projects and agricultural landowners • Environmental agencies and government bodies • Carbon credit traders and investors • The apartment offers an ideal space for households and environmentally aware people. The platform can enable these stakeholders to track their emissions, generate carbon credits, exchange credits, and meet environmental regulations.

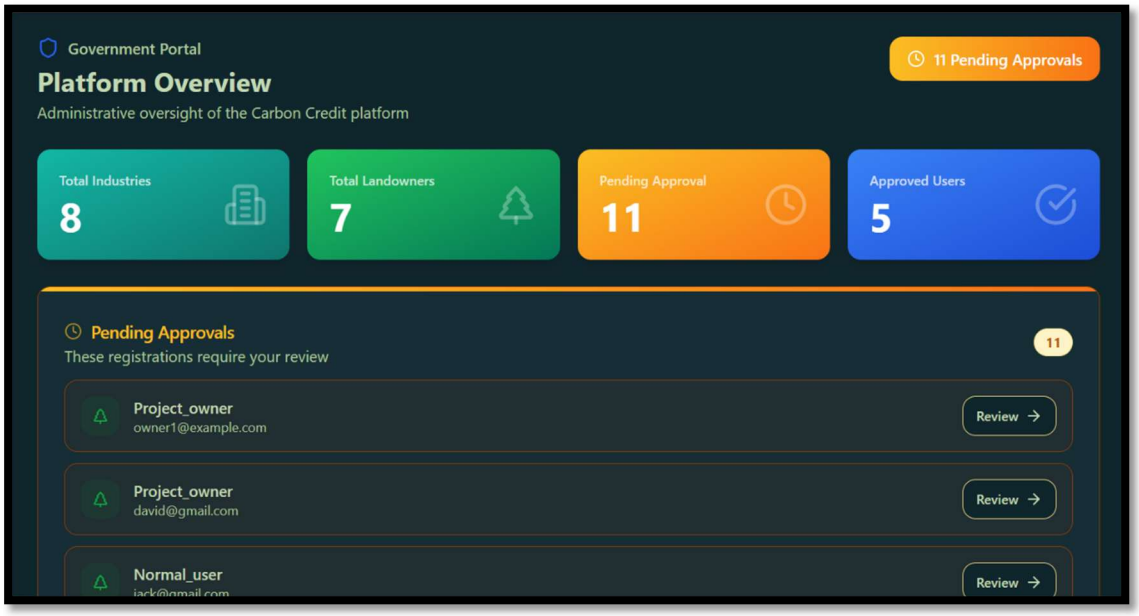
9	**Team Members** (Names along with email address	Aliya Akhtar (aliya10akhtar3a@gmail.com) Eraj Tanweer (erajtanweer2@gmail.com) Tazeen Amir (tazeenamir969@gmail.com)
10	**Supervisor Name** (along with email address)	Prof.Dr.Shehnila Zardari(shehnilaz@cloud.neduet.edu.pk)
11	**Video (If any)**	https://drive.google.com/drive/folders/164wW2NyLvEBBOx-TI4TYLCSp3n4ss7tz?usp=sharing

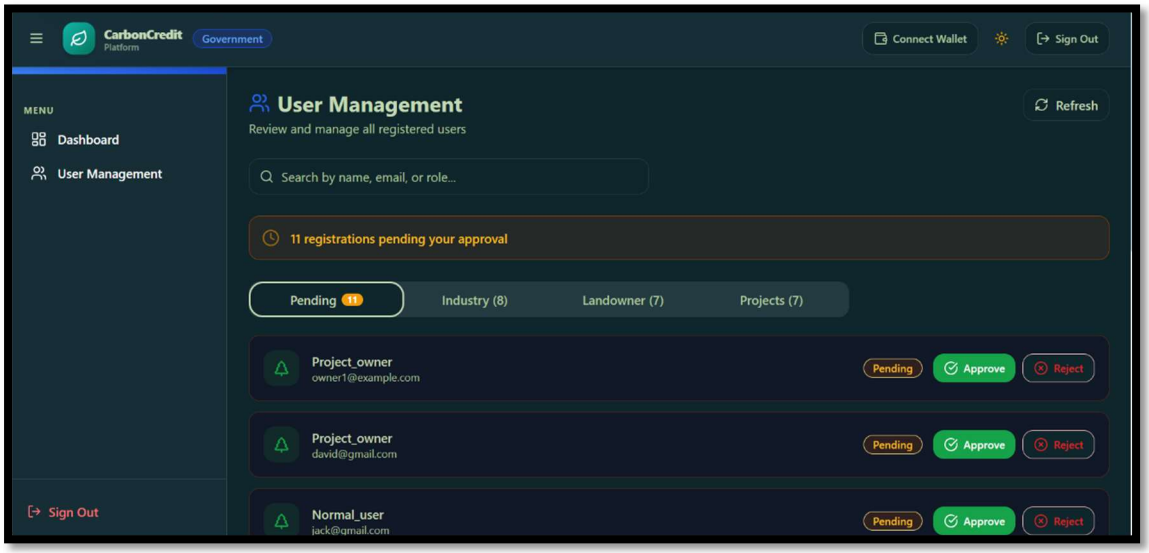
Hardware Circuit

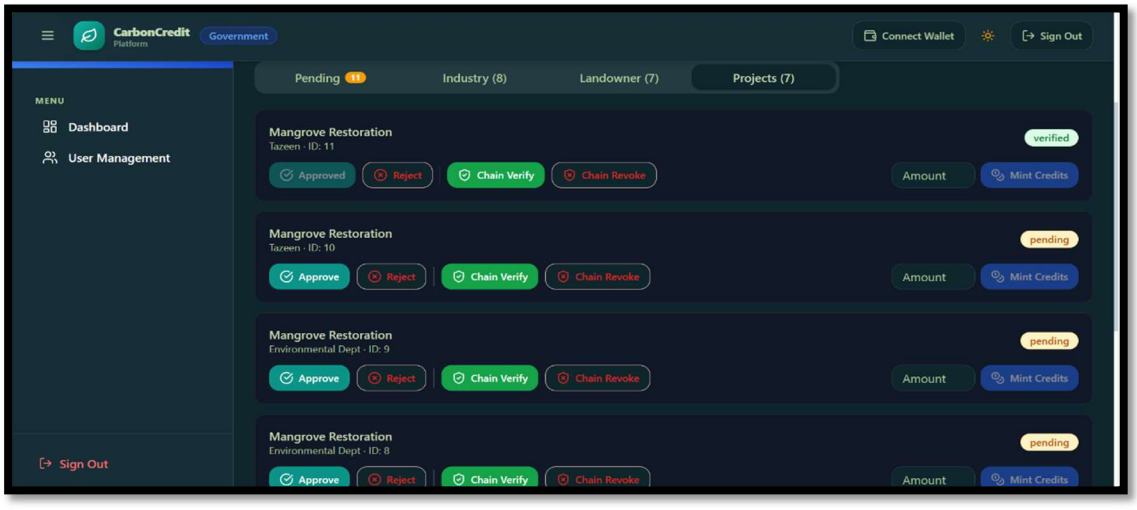




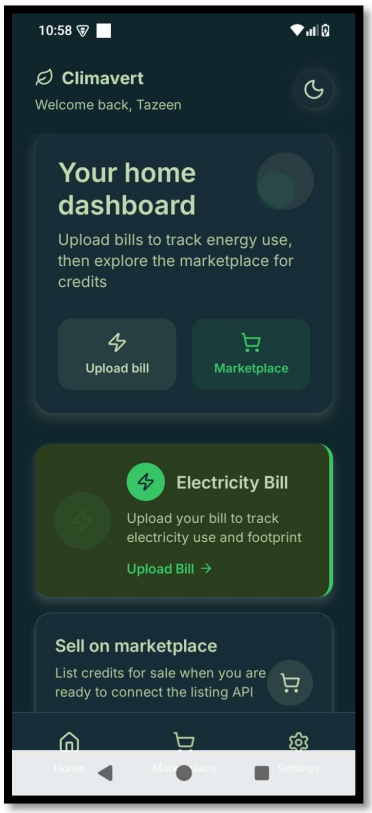
Government Dashboard

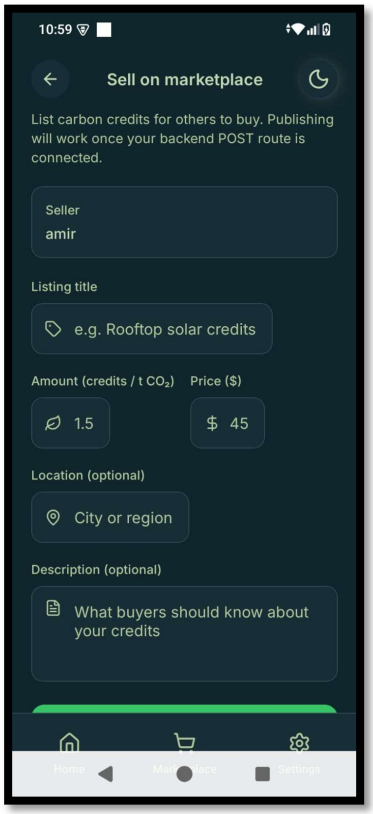




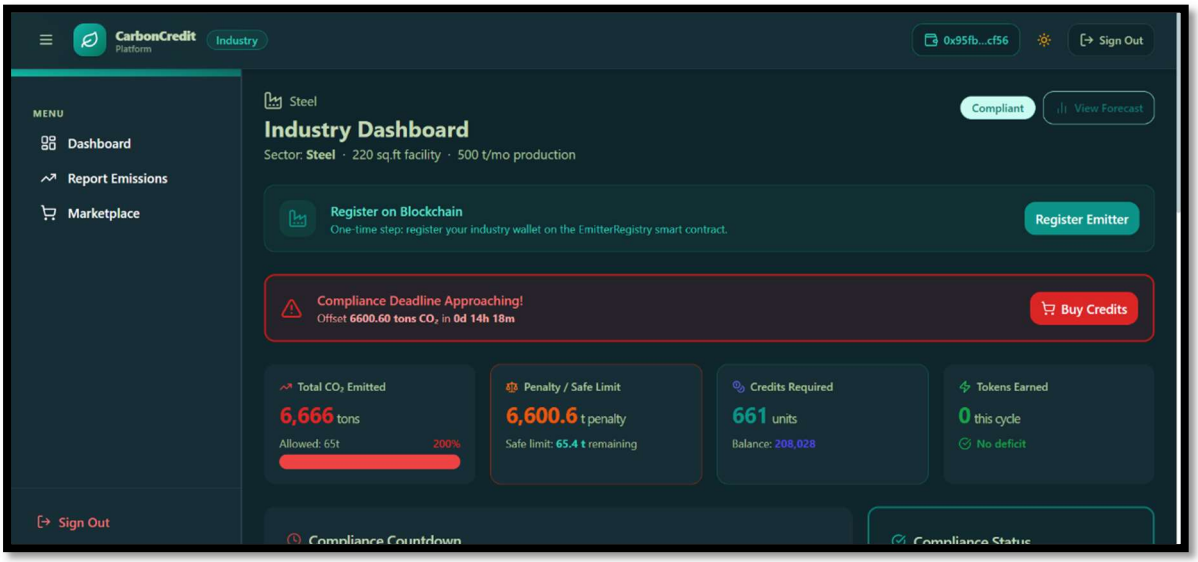


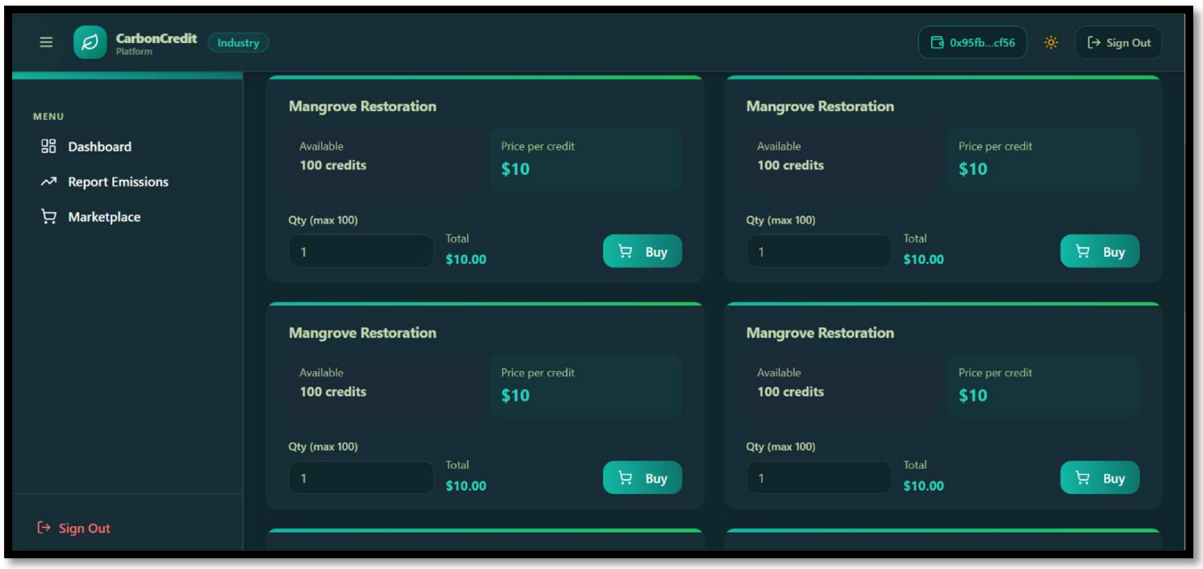
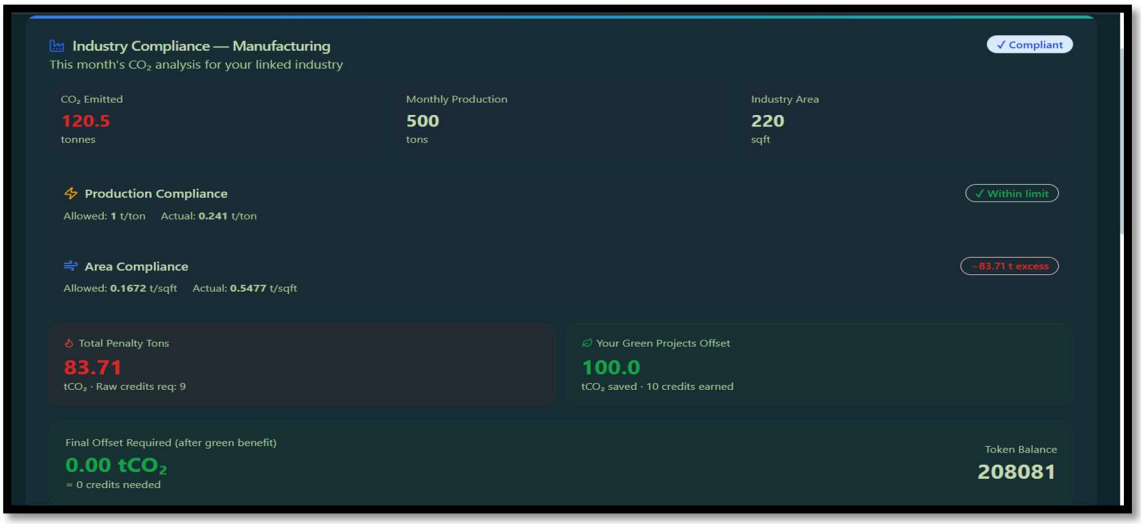
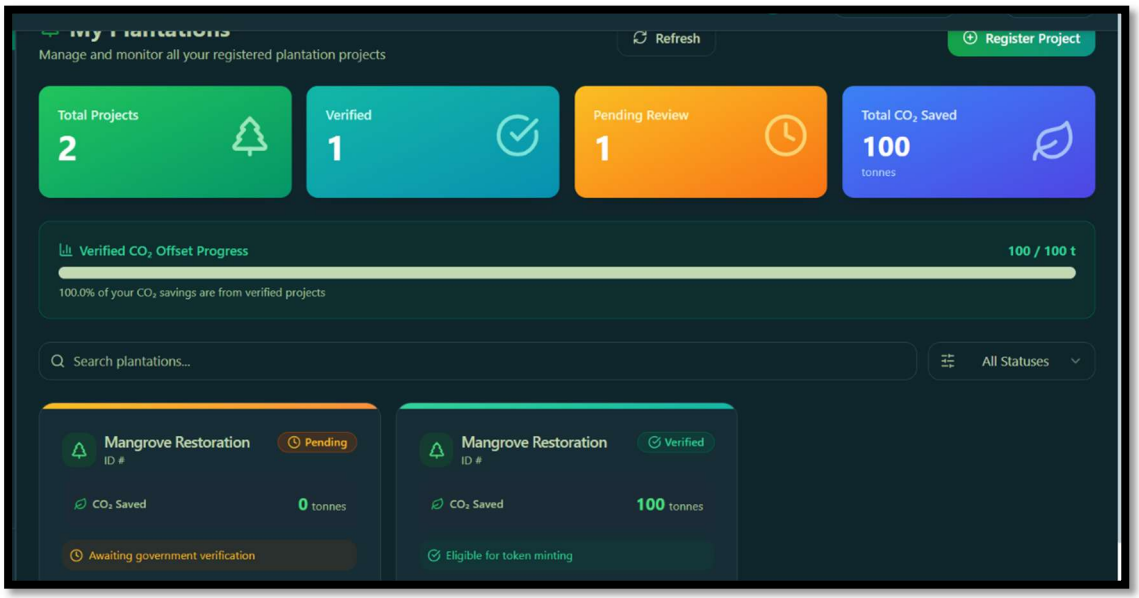
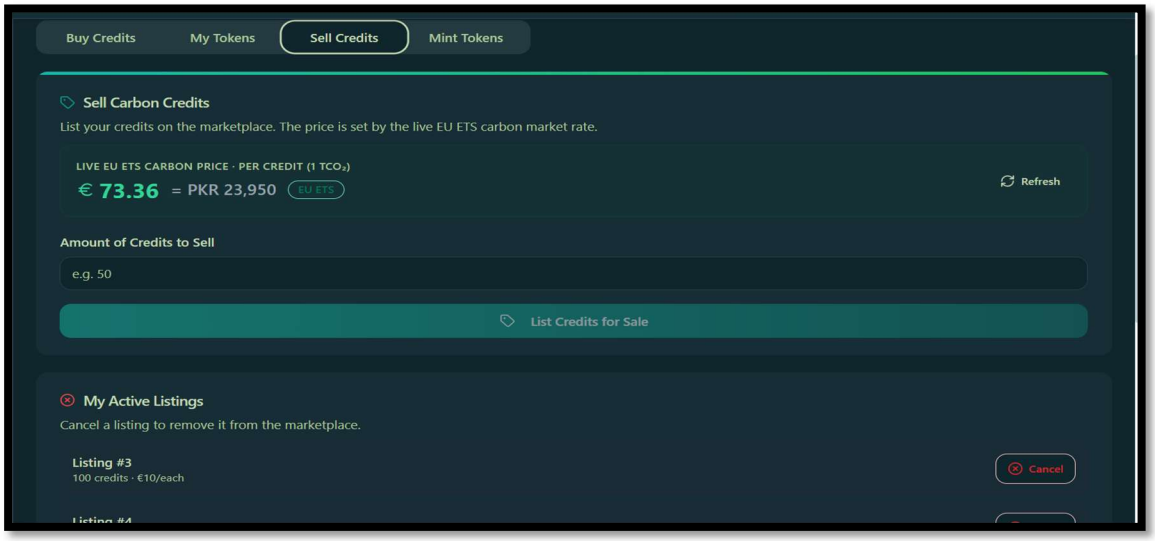
Individual Dashboard





Industry Dashboard





Landowner Dashboard