

Secure Carbon Management System

Workshop Participant Information Leaflet

***DEĞERLİ KATILIMCILAR, ÇALIŞTAY TÜRKÇE YAPILACAKTIR, ANCAK PROJENİN ULUSLARARASI YAPISI GEREĞİ, MATERYALLER İNGİLİZCE HAZIRLANMIŞTIR. BİLGİ NOTUNUN SONUNDA SIK KULLANACAĞIMIZ TERİMLERİN HER İKİ DİLDEKİ KARŞILIKLARI KOLAYLIK İÇİN SUNULMUŞTUR.**

Lead Institution: Aston University (UK)

Partner Institutions: Abdullah Gül University (Türkiye) & Bodrum Institute (Türkiye)

Funder: British Council - Going Global Partnerships (GGP), TNE Exploratory Grants 2025

Module Title (TR): *Güvenli Karbon Yönetim Sistemi*

1. Introduction

It is a pleasure to welcome you to the introduction of our project, “Secure Carbon Management System”, a collaborative education and capacity-building initiative between Aston University in the UK, Abdullah Gül University in Türkiye, and Bodrum Institute.

This project has been developed in response to a very timely and important transition. Türkiye has recently (July 2025) introduced its first comprehensive Climate Law, creating the legal basis for a national emissions trading system and a more structured carbon management framework. At the same time, the European Union’s Carbon Border Adjustment Mechanism, or CBAM, is becoming increasingly important for manufacturers that export to the EU, especially in sectors such as steel, aluminium, cement, fertilisers, electricity, hydrogen, and related supply chains.

For businesses, this means that carbon is no longer only an environmental concern. It is becoming a matter of compliance, competitiveness, export readiness, financial risk, data governance, and digital trust.

2. Project Purpose

The core idea behind this project is simple: carbon management systems must be understood as socio-technical systems.

On one side, companies need to understand climate policy, carbon accounting, carbon credits, emissions trading, CBAM, and green business strategy. On the other side, they need digital systems that can collect reliable emissions data, use AI to support monitoring and forecasting,

and protect carbon data from cyber risks such as manipulation, ransomware, registry fraud, and supply-chain attacks.

Therefore, our project does not treat sustainability, AI, and cybersecurity as separate subjects. Instead, it brings them together into one integrated learning experience.

The aim is to co-develop a 30-credit micro-credential module titled “Secure Carbon Management System”, designed for postgraduate students, mid-career professionals, and SME representatives. The module will be delivered through a blended model, including an open-source MOOC, co-creation activities, and summer school formats.

By the end, participants will be able to design, operate, secure, and audit a corporate carbon management system that is:

- Compliant with Turkish climate legislation, ETS(emissions trading scheme) and MRV (monitoring, reporting, and verification) expectations,
- Interoperable with EU CBAM requirements and embedded-emissions reporting logic,
- AI-enabled for monitoring, forecasting, anomaly detection and evidence quality,
- Cyber-resilient against attack and manipulation risks affecting industrial sustainability data pipelines.

At a glance on learning design:

Total: 30 credits (3×10 -credit units) = 300 learning hours, with 30 contact hours delivered via an intensive summer school week.

Target learners: postgraduate students, mid-career professionals, and rural/SME representatives.

Blended delivery model:

- *MOOC pre-work (asynchronous):* foundational knowledge and guided tasks to prepare for in-person synthesis.
- *Summer school (in-person intensive):* applied workshops, labs, case debates, co-creation and integration sessions.

Pedagogical commitments: blended learning for readiness; stakeholder-responsive design through co-creation and expert panels; inclusive access via flexible MOOC engagement.

3. Sustainable Development Goals (SDGs) contribution

The module explicitly contributes to:

- SDG 4 (Quality Education) via open MOOC and blended summer schools,

- SDG 8 (Decent Work & Growth) by building workforce readiness for CBAM/ETS realities,
- SDG 9 (Industry, Innovation & Infrastructure) by coupling digital transformation with decarbonisation,
- SDG 13 (Climate Action) by operationalising firm-level carbon capability aligned to Türkiye’s trajectory.

4. The curriculum structure (3 units)

4.1. Unit 1 — Sustainability Policy & Business Strategy (10 credits)

Focus: Carbon policy literacy, and firm strategy under Turkish Climate Law/ETS and EU CBAM pressures, turning compliance into competitive advantage.

Learners can analyse Turkish carbon legislation & supply chain implications; map carbon exposure and abatement levers; evaluate green strategy under CBAM; design stakeholder engagement plans in SME contexts.

Indicative topics: climate policy foundations; Turkish ETS architecture and MRV; EU ETS/CBAM concepts (embedded emissions, default values, authorised declarants); GHG accounting boundaries & value-chain mapping; offsets/market integrity; green finance and disclosure; SME barriers and adoption.

Summer school sessions (Day 1–2, 10 hours): climate policy landscape; supply chain mapping workshop; SME strategy case debate; stakeholder co-design sprint; assessment clinic with peer/tutor feedback.

Assessment contribution: 1,500-word supply chain carbon strategy report (40% of capstone weighting).

4.2. Unit 2 — AI for Carbon Management (10 credits)

Focus: AI methods and governance for scalable, auditable carbon monitoring and reporting.

Learners can explain AI/ML techniques for monitoring and forecasting; evaluate AI carbon platforms; design data architecture for AI-enabled carbon tracking; assess limitations, bias, and trustworthiness of AI-generated carbon data.

Indicative topics: data foundations (sensors, ERP/MES extracts, emission factors, quality); forecasting; causal analysis; anomaly detection for MRV; optimisation under ETS; RL for energy/trading; trustworthy AI (bias, explainability, uncertainty); “Green AI”; AI governance frameworks.

Summer school sessions (Day 3–4, 10 hours): AI-enabled carbon data problem (demo); system design lab; AI ethics debate; guest expert panel; prototype pitch and feedback.

Assessment contribution: AI system design specification (1,000 words, annotated diagram) (30% of capstone weighting).

4.3. Unit 3 — Cybersecurity in Industrial Sustainability Systems (10 credits)

Focus: Securing carbon data pipelines, IIoT/OT interfaces, registries, APIs and reporting systems for building trust in compliance infrastructure.

Learners can identify cyber threat vectors (OT/IT convergence, registry fraud, supply-chain compromise); apply security risk frameworks; design security-by-design architectures; evaluate organisational/policy responses to cyber risks in sustainability systems.

Indicative topics: sustainability data threat landscape; OT/IIoT and industrial architectures; zones/conduits thinking; ISO/IEC 27001 and NIST-style risk framing for emissions data; IAM and integrity controls; cloud and registry/API security; AI/ML security threats; privacy and supplier data; incident response and resilience.

Summer school sessions (Day 5–6 morning, 10 hours): threat modeling; security frameworks workshop; trust-by-design redesign session; policy & governance lab; cross-unit integration seminar.

Assessment contribution: Security risk assessment report (1,500 words) (30% of capstone weighting).

5. Summer school schedule (intensive sequence)

- Mon–Tue: Unit 1 — policy landscape, supply chain mapping, SME strategy, co-design sprint
- Wed–Fri: Unit 2 — AI carbon data, system design lab, ethics & governance, panel, prototype pitch
- Sat and the integration day: Unit 3 — attack surface, frameworks, trust-by-design, governance, integration seminar

6. Capstone (Group Project): “Secure Carbon Management Proposal”

Teams of 3–4 design an end-to-end proposal for a realistic Turkish manufacturing SME, integrating 1) Supply chain carbon strategy, 2) AI monitoring architecture, 3) Cybersecurity risk & governance framework.

Deliverables: 15-minute live pitch and 10-page written report, assessed by academics and at least one industry expert, focusing on integration, feasibility, and real-world applicability.

Weights: Unit 1 (40%), Unit 2 (30%), Unit 3 (30%).

7. Key terms (Mini-glossary)

English Term	Turkish Translation
Secure Carbon Management System	Güvenli Karbon Yönetim Sistemi
Emissions Trading System (ETS)	Emisyon Ticaret Sistemi (ETS)
Monitoring, Reporting, and Verification (MRV)	İzleme, Raporlama ve Doğrulama (İRD)
Carbon Border Adjustment Mechanism (CBAM)	Sınırdaki Karbon Düzenleme Mekanizması (SKDM)
Climate Law	İklim Kanunu
Directorate of Climate Change	İklim Değişikliği Başkanlığı
Authorized Declarant	Yetkilendirilmiş Beyan Sahibi
Embedded Emissions	Gömülü Emisyonlar
Accreditation Edict on Verification of Greenhouse Gas Emission Reports and Accreditation of Verifying Bodies	Sera Gazı Emisyon Raporlarının Doğrulanması ve Doğrulayıcı Kuruluşların Akreditasyonu Tebliği
Accredited Third-Party Verification Bodies	Akredite Üçüncü Taraf Doğrulayıcı Kuruluşlar
TÜRKAK (Turkish Accreditation Agency)	TÜRKAK (Türk Akreditasyon Kurumu)
ISO 14064-1	TS EN ISO 14064-1: Sera gazı emisyonlarının ve uzaklaştırmalarının kuruluş seviyesinde hesaplanması ve raporlanması için özellikler ve kılavuz.
ISO 14064-3	TS EN ISO 14064-3: Sera gazı beyanlarının doğrulanması ve onaylanması için özellikler ve kılavuz.
ISO/IEC 17029	TS EN ISO/IEC 17029: Uygunluk değerlendirmesi - Doğrulama ve geçerli kılma kuruluşları için genel prensipler ve gereklilikler.

8. Relevant regulations and Standards

- [Turkish Climate Law \(July 2025\)](#)
- [Turkey Climate Change Mitigation And Action Plan-2030](#)
- [EU CBAM Official Guidance](#)
- [ISO 14064-1 Greenhouse Gases](#)
- [ISA/IEC 62443 \(Industrial Security\)](#)

- [ISO/IEC 27001 \(Information Security\)](#)
- [EU AI Act](#)

9. Relevant regulations and Standards

DAY 1 (17th May 13:30 – 14:00)

- 13:30–14:00 1. Welcome
- 14:00-15:00 2. The ‘Costly Burden’ Wall
- Break
- 15:15-16:00 3. Module Deconstruction
- 16:00-17:00 Icebreaking

DAY 2 (18th May 10:00 – 16:00)

- 10:00–11:00 4. SME Reality Check
- Break
- 11:15–12:30 5. Threat Landscape Analysis
- 11:15–12:30 Lunch Break
- 13:30-14:15 6. AI Practicality vs. Hype
- 14:15-15:30 7. Regulatory Accuracy & The Global Bridge
- 19:30-21:00 Dinner

DAY 3 (19th May 13:00 – 16:00)

- 13:00–14:00 8. Future Collaborations Sandpit
- Break
- 14:15 - 15:30 9. Capstone Rubric Design
- 15:30 – 16:00 Summary and Closure