

Carbon Credits & ACI Standards

John Lo
Founder, Asia Carbon Institute
johnlo@asiacarboninstitute.org

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John Lo

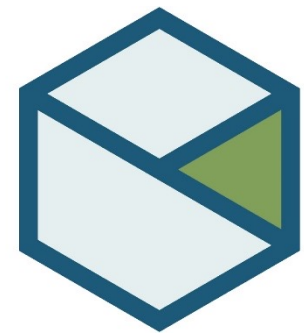
Founder, Asia Carbon Institute

30 years in the energy and trading industry

Responsible for the development of sustainable aviation fuel standard

Experience in decarbonisation, energy transition and sustainability projects

Holds a Degree in Chemical Engineering, University of Toronto



Asia Carbon Institute

A non-profit organisation that aspires to become a leading standards organisation for the voluntary carbon market, focusing on technology-based and urban solutions in Asia since 2022





Asia Carbon Institute

MISSION

To accelerate the transition towards a climate neutral economy by creating a creditable, transparent and financially inclusive carbon credit certification standard for Asia

VALUES

- Scientific Basis, Independence, and Transparency
- Inclusivity and Collaboration with International Specialists and Peer Organisations
- Technology Leverage for Improved Efficiency in the Verification Process
- Protection Against Corruption and Greenwashing

Our Work



01

Issue Carbon Credits

We set standards, certify and issue Carbon Credits with high quality and integrity.

02

Offer a Trustworthy Platform for Carbon Credits

We setup a blockchain based registry to ensure full carbon credit lifecycle is being tracked.

03

Conduct Research & Development

We foster carbon credit markets' ecosystem in collaboration with key stakeholders.

04

Capacity Building and Training of Carbon Talents

We work with higher education institutes and NGOs to upskill and grow the carbon talent pool in Asia.

Agenda

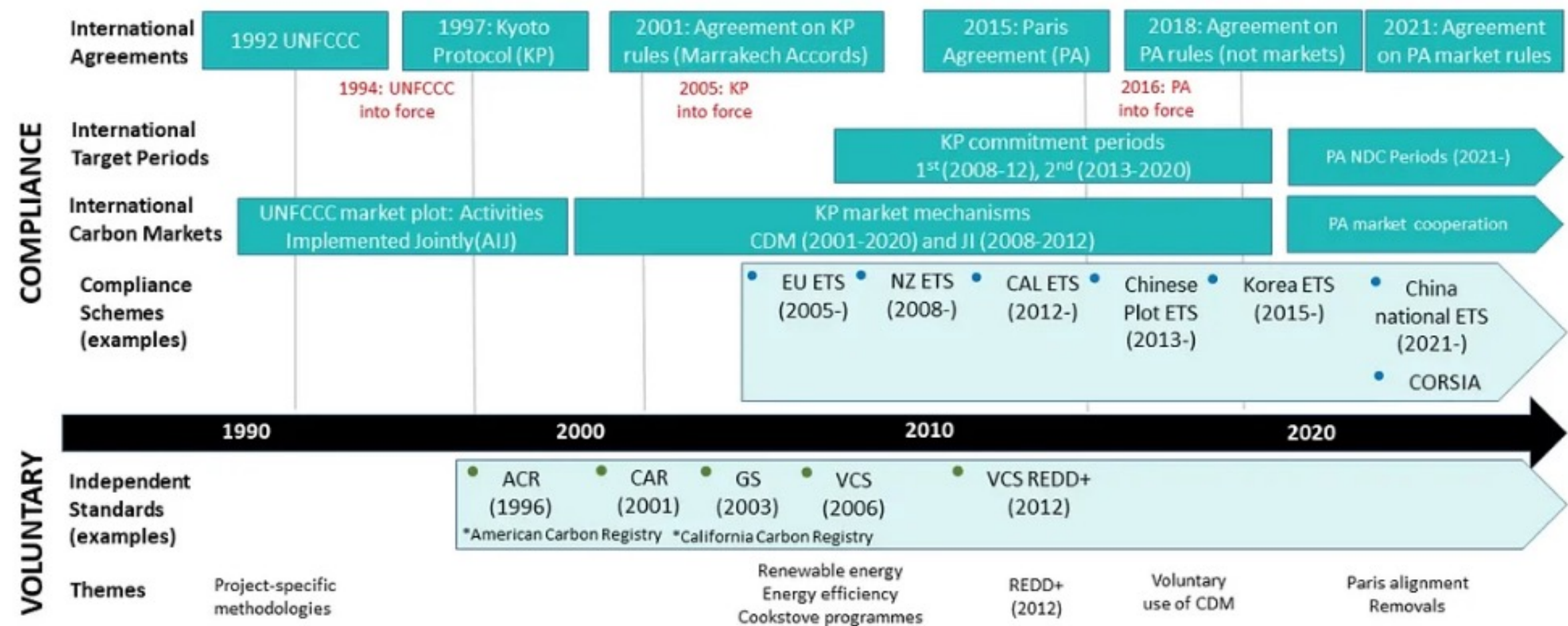
1. Market Overview: Voluntary Carbon Market (VCM)
2. Carbon Credits
3. ACI Standards
4. Role Play & Discussion
5. Case Study – E-bikes and Biochar
6. Q&A

1. Market Overview

- Voluntary Carbon Market (VCM)

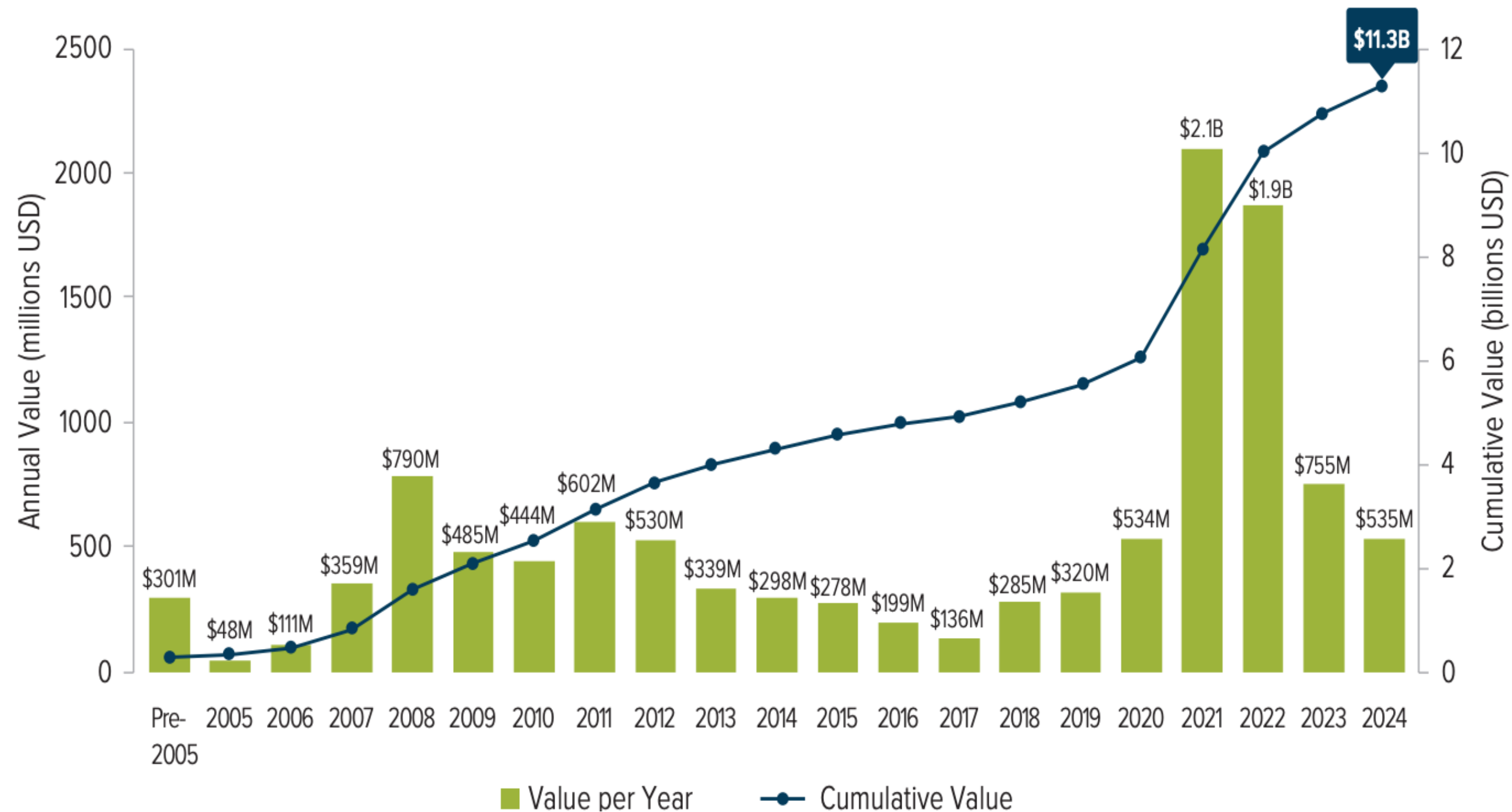


Timeline of Carbon Markets' Development



Source: <https://www.sustainability101.in/post/understanding-carbon-market>

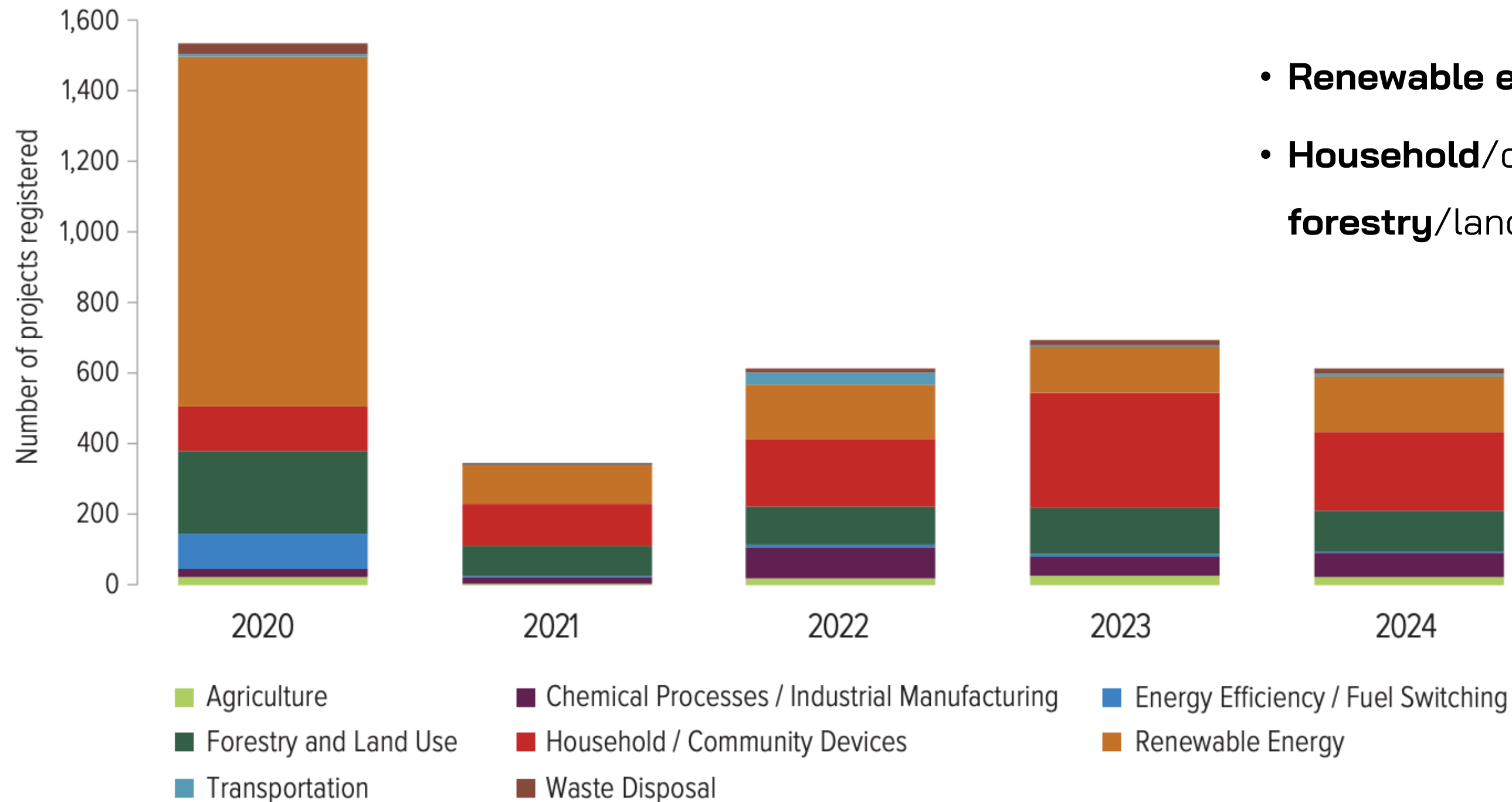
VCM Size (by Value of Traded Carbon Credits)



- 2021 - over **\$2 billion**
- Cumulative - **\$11.3 Billion**

Source: Forest Trends' Ecosystem Marketplace. 2025. State of the Voluntary Carbon Market 2025. Washington DC: Forest Trends Association.

Carbon Credit Project Registrations (by Category)

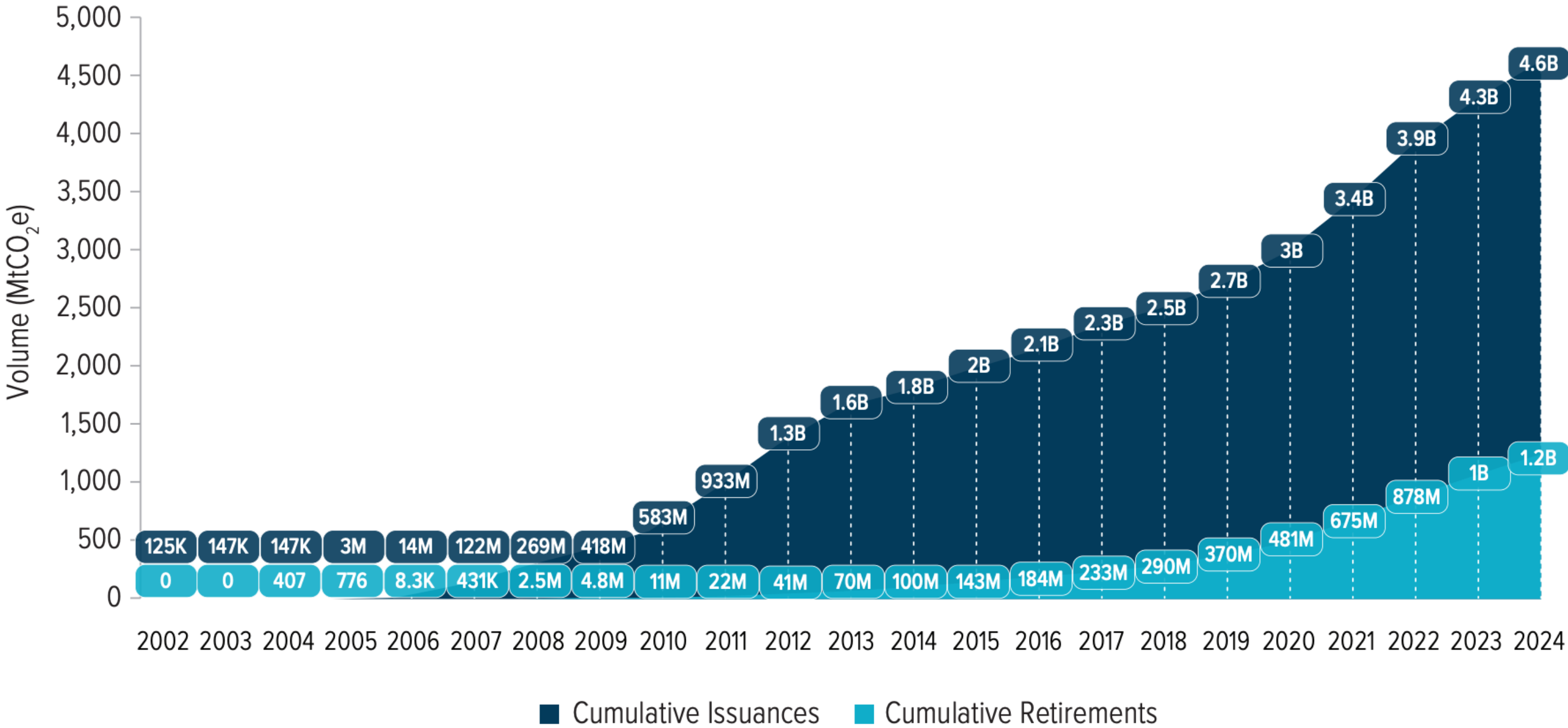


- **Renewable energy** had a huge growth in 2020.
- **Household**/community devices and **forestry**/land use are steadily growing.

Note: This figure includes data on project registrations from ACR, ART, BioCarbon, CAR, CDM, Cercarbono, Global Carbon Council, Gold Standard, Plan Vivo, and VCS registries.

Source: Forest Trends' Ecosystem Marketplace. 2025. State of the Voluntary Carbon Market 2025. Washington DC: Forest Trends Association.

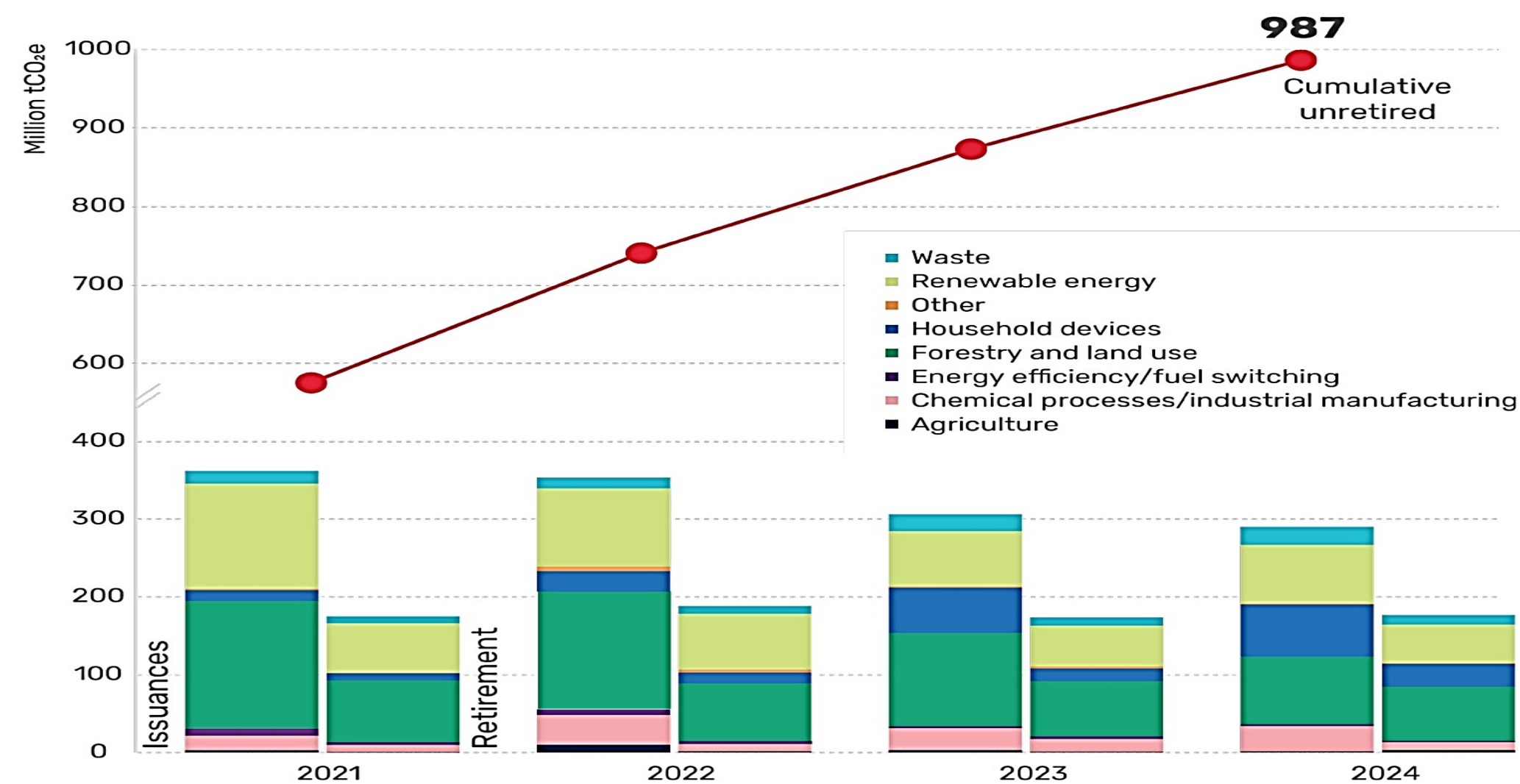
Cumulative VCM Issuances and Retirements



Note: This figure includes data on credit issuances and retirements from ACR, ART, BioCarbon, CAR, CDM, Cercarbono, Global Carbon Council, Gold Standard, Plan Vivo, and VCS registries.

Source: Forest Trends' Ecosystem Marketplace. 2025. State of the Voluntary Carbon Market 2025. Washington DC: Forest Trends Association.

Cumulative VCM Unretired

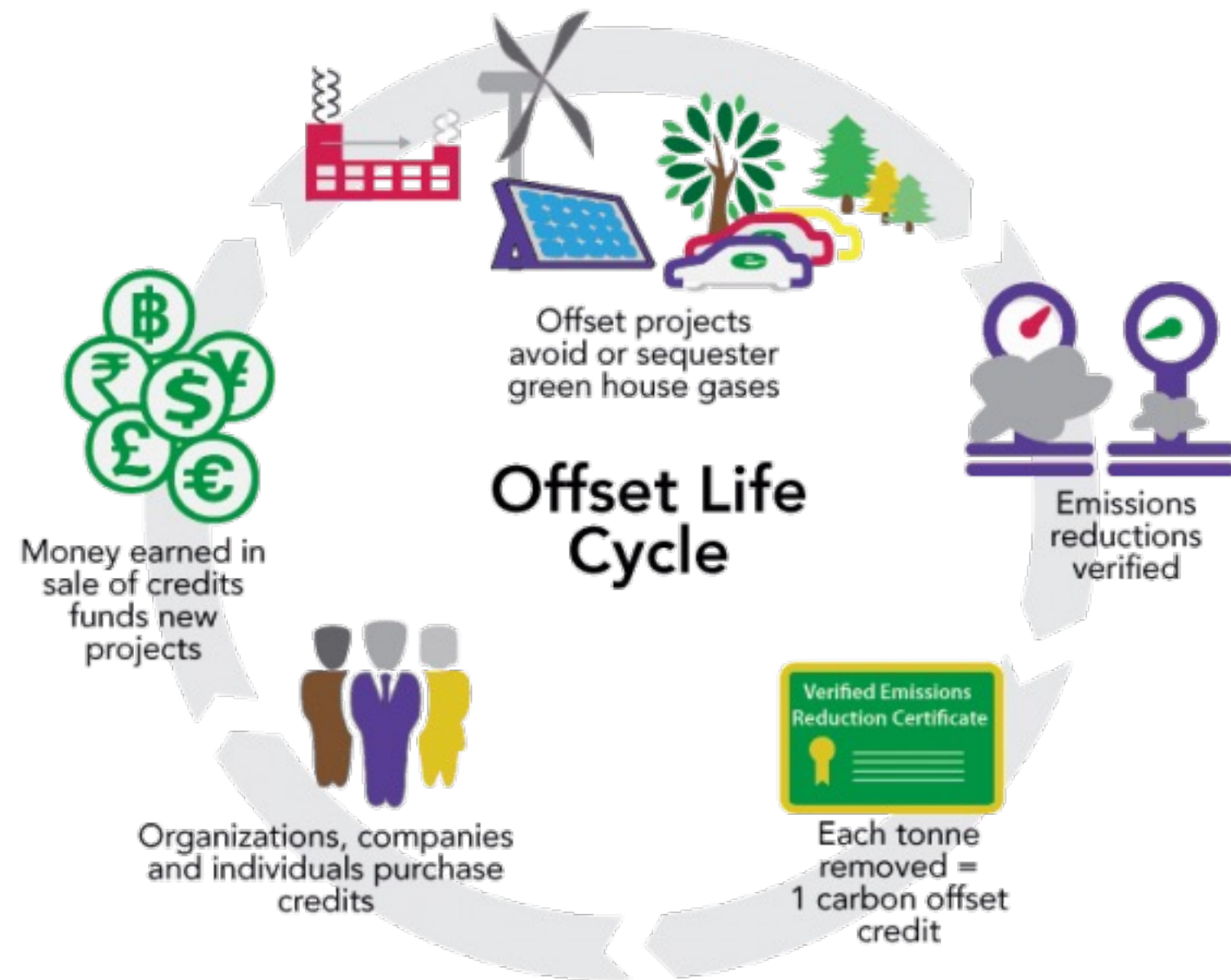


Source: State and Trends of Carbon Pricing, World Bank, 2025

2. Carbon Credits



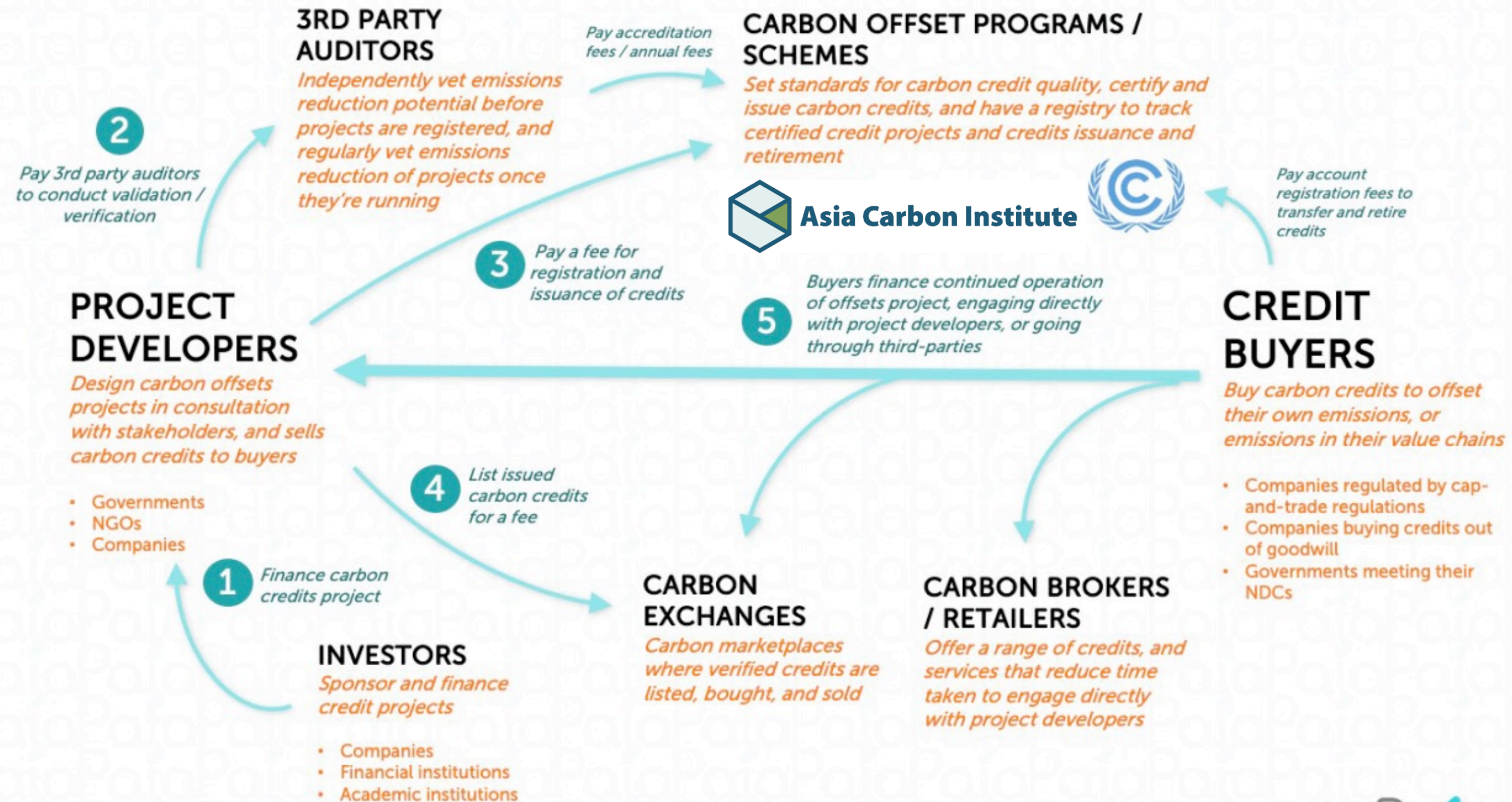
What are Carbon Credits?



Source: <https://carboncredits.com/the-carbon-credit-lifecycle/>

- Carbon credits are **measurable and verifiable emission reductions** from certified projects, that reduce, avoid or remove GHG emissions.
- Companies can **compensate for their GHG emissions** by buying carbon credits.
- Who needs them?
 - Corporates that need to offset emissions to meet **net-zero targets**
 - Companies in the **compliance market**
 - **Traders** that want to make profits

Carbon Credit Ecosystem



Source: <https://paiiconsulting.com.sg/carbon-offsets-and-credits-explained/>

Paia

Article 6.2

What is Article 6.2 of the Paris Agreement?

- A framework for country-to-country carbon trading of Article 6 units (ITMOS—Internationally Transferred Mitigation Outcomes) directly



Source: <https://bcp.earth/news-and-press/cop29-all-eyes-on-climate-change-and-its-about-time/>

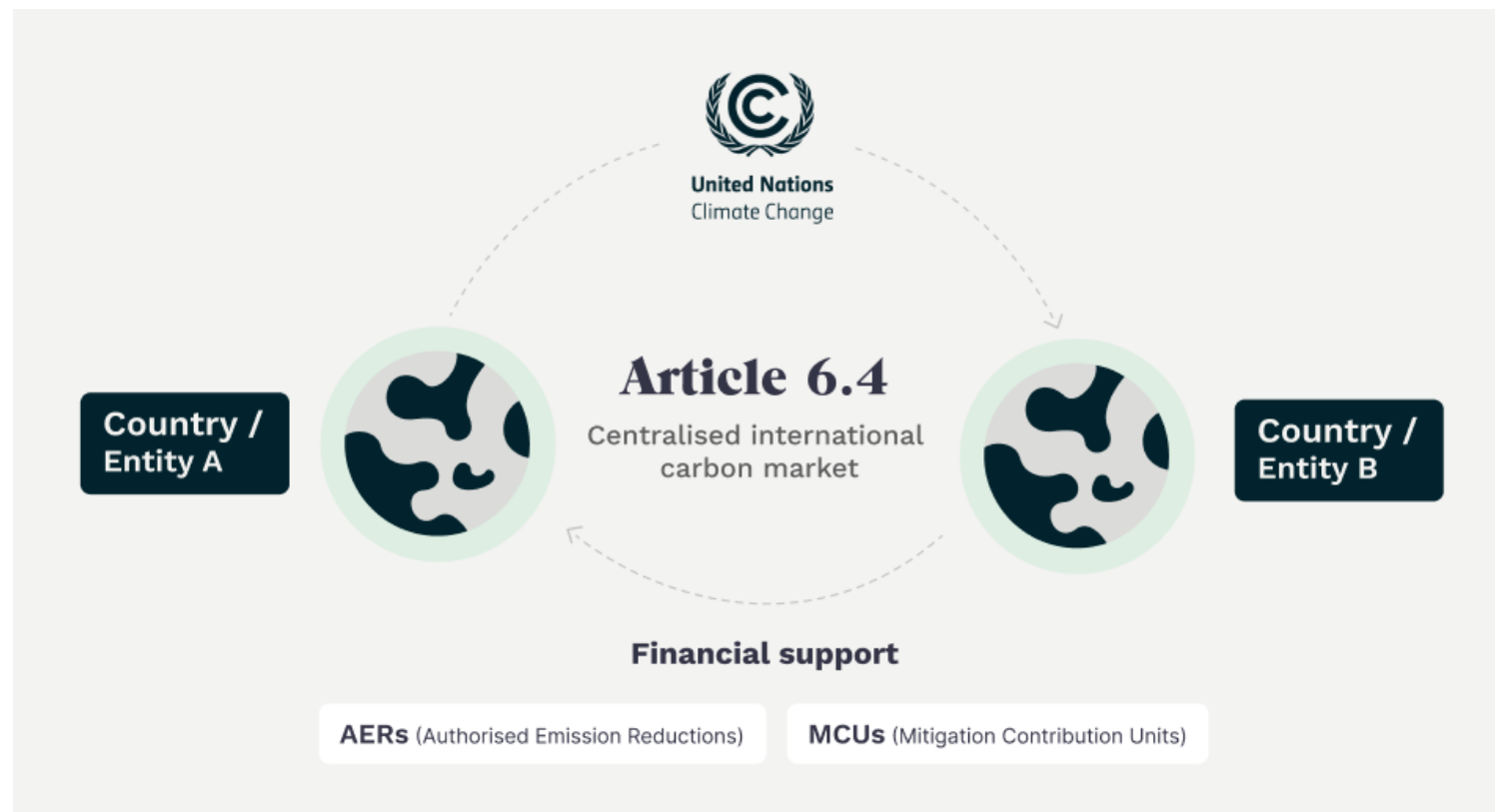
COP29: Decisions were made on

- Authorisation and transfer of carbon credits
- Establishment of a dual-layer registry system for tracking ITMO trades and revocation terms for credits
- New provisions for transparency and environmental integrity through technical reviews

Article 6.4

What is Article 6.4 of the Paris Agreement?

- Article 6.4 (the Paris Agreement Crediting Mechanism or PACM) allows the trade of carbon credits.
- It is overseen by a centralised United Nations (UN) body - the Article 6.4 Supervisory Body (SBM).



Source: <https://bcp.earth/news-and-press/cop29-all-eyes-on-climate-change-and-its-about-time/>

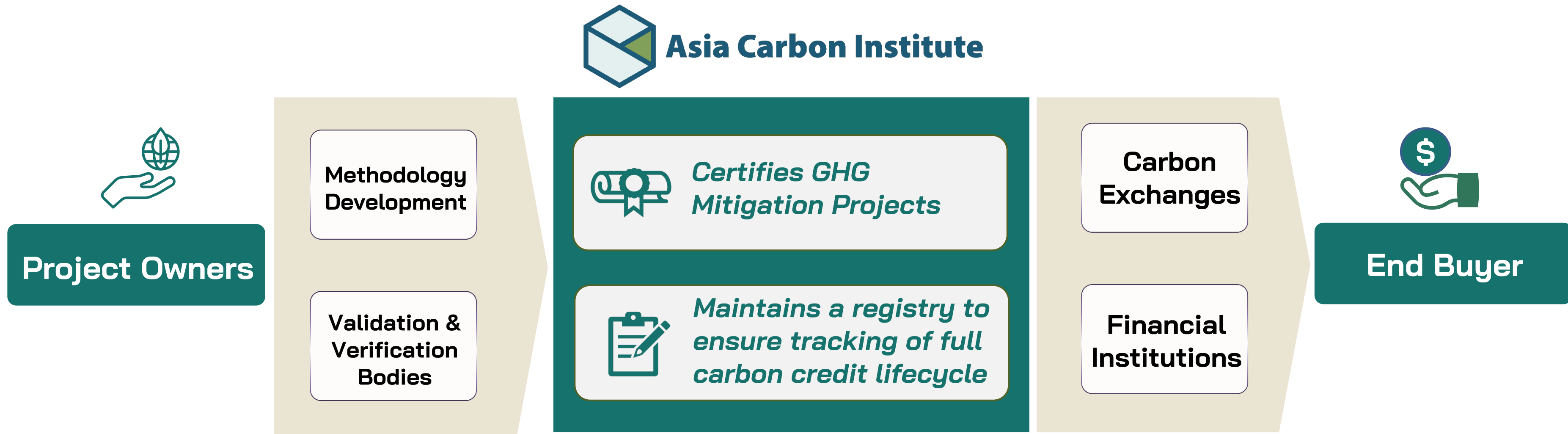
COP29: Consensus was reached on

- Standards for methodologies.
- Rules, modalities, and procedures for the trade and accreditation of credits via the PACM.
- The Supervisory Body:
 - ❖ Responsible for developing and implementing the PACM.
 - ❖ Tasked with creating guidelines in 2025.
 - ❖ Oversight of methodological work related to Article 6.4.

3. ACI Standards



ACI Program Process



Who initiates the project/owns the carbon credits?



Project Owners

Project Developers

Project Proponents

Methodology
Development

Validation &
Verification
Bodies



*Certifies GHG
Mitigation Projects*



*Maintains a registry to
ensure tracking of full
carbon credit lifecycle*

Carbon
Exchanges

Financial
Institutions



End Buyer

Account Opening

Know Your Counterpart (KYC) purposes:

1. Basic information of account owner;
2. Certificate of incorporation;
3. Register of directors and shareholders;
4. Valid personal identification document(s) of the authorised person(s) for the operation of the account;
5. Bank letter as proof of good credit standing;
6. Proof of address for the company; and
7. Tax identification number(s) in relevant jurisdiction(s).

Project Design Document (PDD)

- Description of how the project will achieve GHG emissions reductions/removals;
- Project sectoral scope and project boundary
- Methodology and tool(s) application(s);
- GHG sources;
- Additionality demonstration;
- Baseline determination;
- GHG emission reductions estimation;
- Monitoring plan & QA/QC procedures;
- Environmental and social impact(s);

Methodology Development



Methodology Development

- Develop a **new** methodology
- Utilise **ACI approved** methodology
- **Deviation** of ACI approved methodology or CDM methodology

Steps for Methodology Development

1. Define the Project Scope & Objectives

- Define **project type**
- Determine **baseline scenario**
- Establish **additionality**

Scope No.	GHG Sectoral Scope
1	Energy Industries (renewable/non-renewable sources)
2	Energy Distribution
3	Energy Demand
4	Manufacturing Industries
5	Chemical Industry
6	Construction
7	Transport
8	Mining/Mineral Production
9	Metal Production
10	Fugitive Emissions from Fuels (solid, oil and gas)
11	Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride
12	Solvents Use
13	Waste Handling and Disposal
14	Afforestation and reforestation
15	Agriculture
16	Others (anything other than the above 15 sectoral scopes, such as carbon capture, storage of CO ₂ in geological formations, blue carbon, direct air capture)

Steps for Methodology Development

2. Research on existing methodologies

- Clean Development Mechanism (CDM)
- ACI Standard
- Other Standards

Steps for Methodology Development

3. Key Methodology Components

- **Emission reduction** mechanism
- **Baseline** calculation
- **Leakage** assessment
- **Monitoring plan**
- **Permanence** assurance

Steps for Methodology Development

4. Submit to a Carbon Standard for Approval

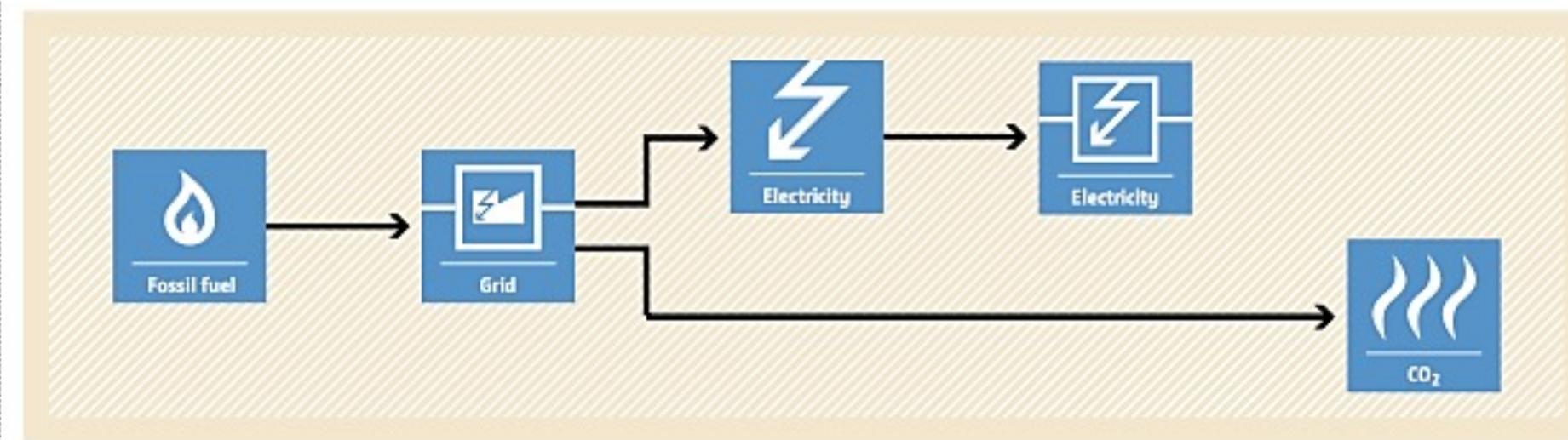
- Methodology Concept Paper
- Review and comment by a Carbon Standard
- Undergo a public consultation
- Engage an accredited third-party validator or specialist to review the methodology (Optional)

Methodology Examples

ACM0002: Grid-connected electricity generation from **renewable sources**

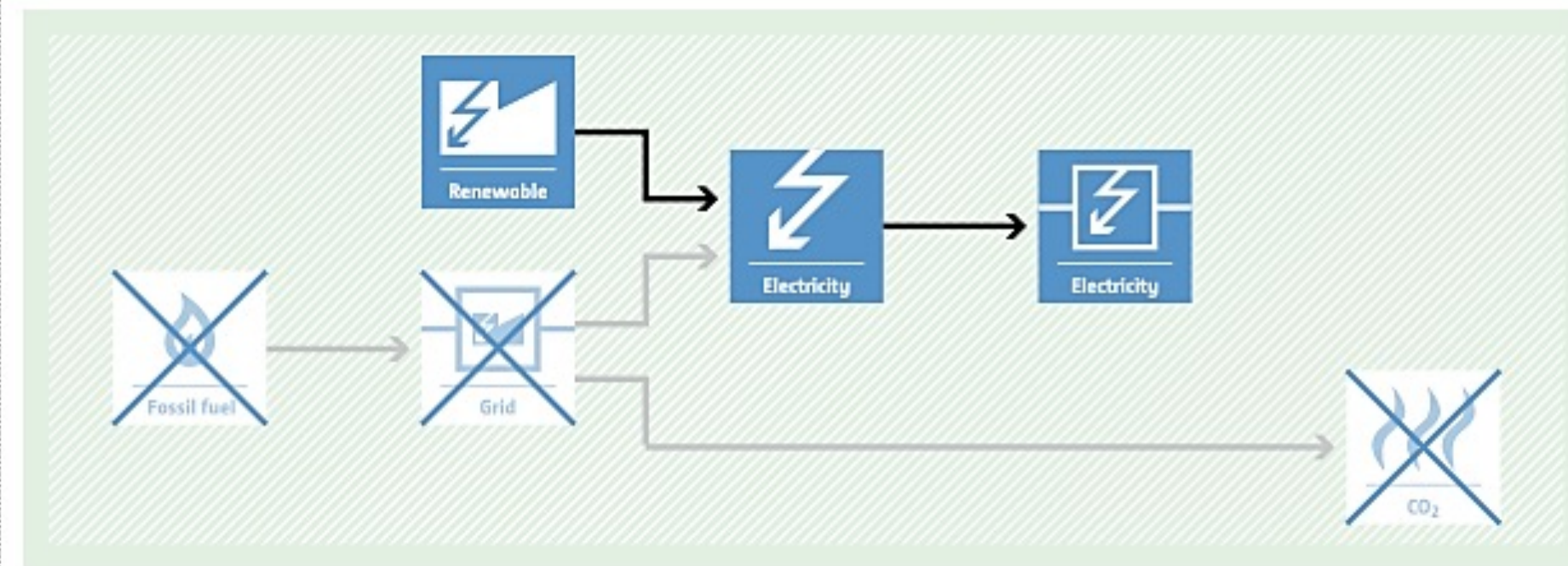
BASELINE SCENARIO

Electricity provided to the grid by more-GHG-intensive means.



PROJECT SCENARIO

Displacement of electricity provided to the grid by more-GHG-intensive means by installation of a new renewable power plant or the retrofit, replacement or capacity addition of an existing renewable power plant.



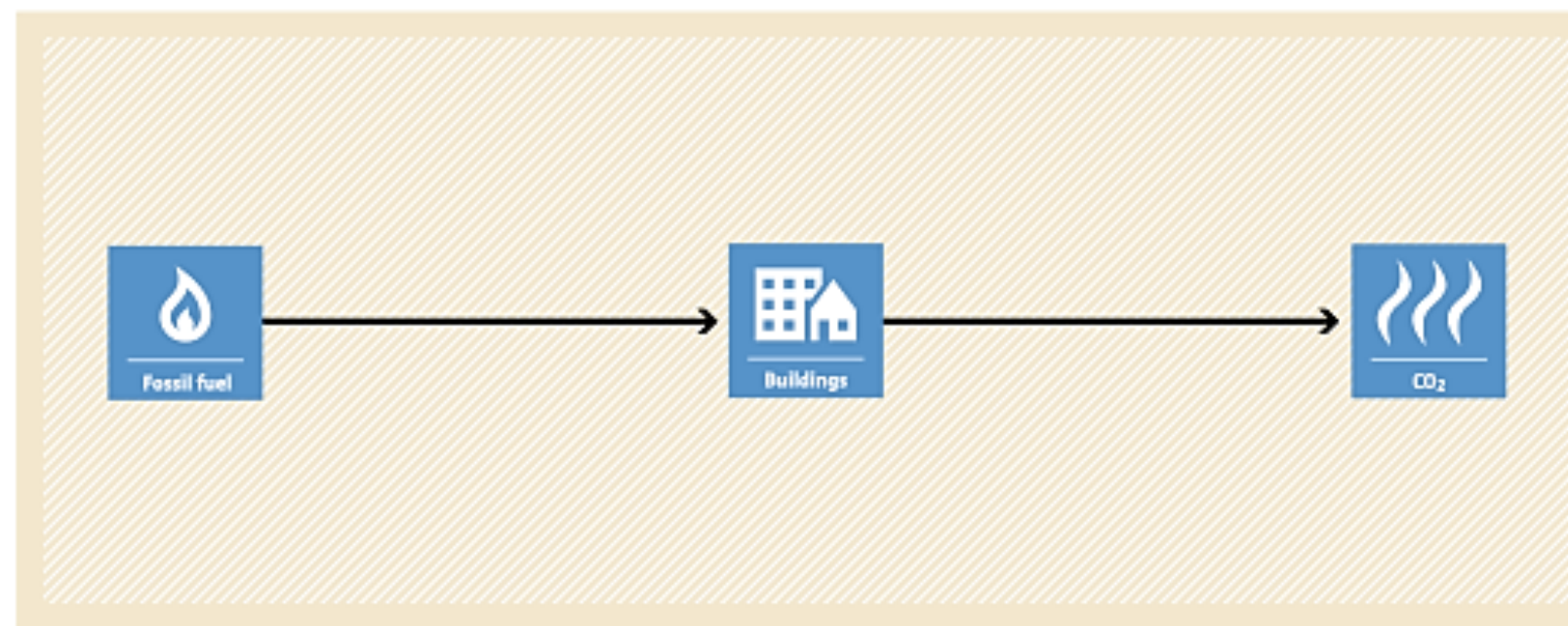
Source: UNFCCC (2022): CDM Methodology Booklet

Methodology Examples

AMS-II.E.: **Energy efficiency** and fuel switch measures for buildings

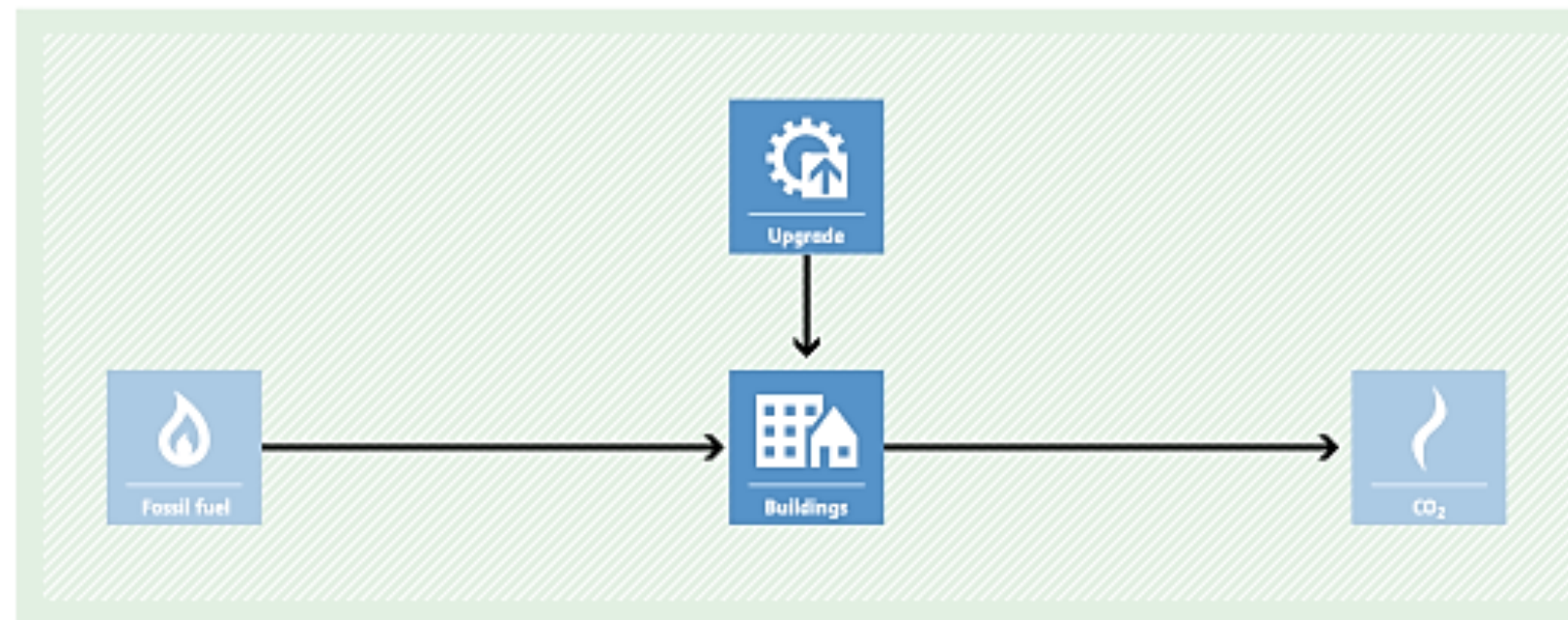
BASELINE SCENARIO

Consumption of electricity and heat due to (i) less-efficient and/or more-carbon-intensive equipment and (ii) less-efficient construction features in buildings.



PROJECT SCENARIO

Consumption of less electricity and heat due to (i) more-efficient and/or less-carbon-intensive equipment and (ii) more-efficient construction features in buildings.



Source: UNFCCC (2022): CDM Methodology Booklet

Public Consultation

- A **30-day review** period for stakeholder consultation
- Relevant stakeholders, including the **Stakeholder Consulting Panel**, are invited to participate.
- All comments are shared with the **project proponent** and **VVB** for review and response.
- The project proponent and VVB must address all comments.

Validation & Verification



Requirements for VVBs

A Validation and Verification Body (VVB) under the ACI Program

- Must be a **legally recognised entity** under applicable national or international law
- Must demonstrate **sound financial standing** to support its performance and functioning on validation and verification activities
- Must be equipped with reasonable manpower, **appropriate management**, and corporate governance structure

Requirements for VVBs

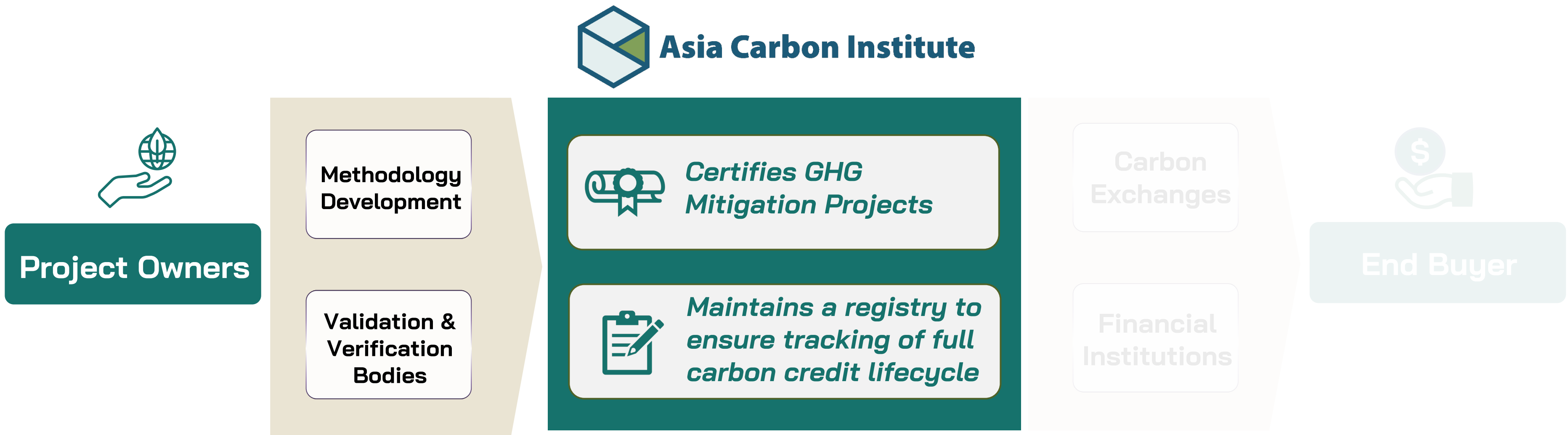
A Validation and Verification Body (VVB) under the ACI Program

- Must have the **technical competence** on the requirements as related to GHG emission accounting
- Valid accreditations by **IAF member(s), UNFCCC**, a recognised international accreditation standard referencing to **ISO/IEC 17029, ISO 14064 and ISO 14065** or per local rules and policies relating to the **UNFCCC CDM** or Paris Agreement Article 6, p.4 Supervisory Board
- Qualified employee who participates in the **validation/verification team** and **technical review for each sectoral scope**

VVB: Validation Report

- **Methods and assessment** basis adopted in the validation process;
- Remedies and conclusion of **non-conforming findings** in the validation process;
- **Technical review** with reference to relevant methodologies; and
 - ✓ Description of how the **monitored data** is being measured
 - ✓ GHG emissions reductions **calculations**
 - ✓ A description of the **monitoring** system
 - ✓ Assessment of **impact(s)** on GHG emissions reductions due to deviation(s) from the registered monitoring plan.
- Sign-off by the VVB's authorised and responsible person(s).

Certification



ACI Framework

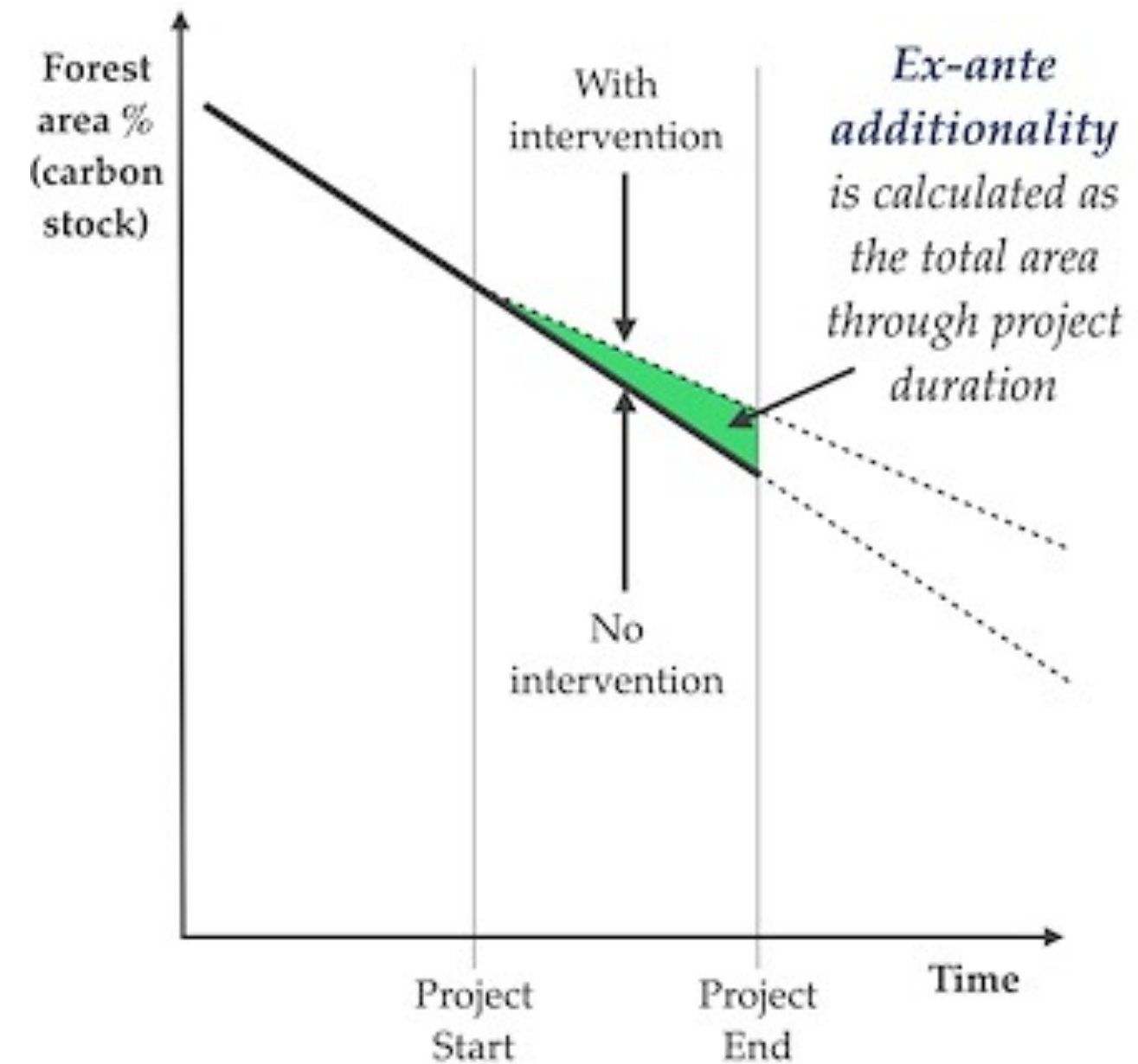
Based on CDM, ICVCM CCP and ISO14000

1. Effective and creditable **governance structure**
2. Robust public and stakeholder consultation and **grievance process**
3. Robust process, **rules and regulatory documents**
4. Effective **registration** on transfer, retirement and addressing erroneous issuance
5. Robust **independent third-party validation and verification**
6. Robust **approval process** to quantify GHG emission reductions or removals
7. Ensure **no double issuance**, no double use and no double claiming (Ref. ACI Program Manual 2.4)
8. Ensure assessment of environment and social risks resulting in **positive SDG impact**

ACI Certification Principles

- **Additionality**

- ☐ Regulatory surplus test
- ☐ Common practice test
- ☐ Implementation barriers test
 - Financial barrier
 - Technological barrier
 - Institutional barrier
- ☐ Performance standard test



Source: <https://4c.cst.cam.ac.uk/about/algorithms-classify-nature-based-projects>

Adopting Accounting/Auditing Best Practices

Third Line of Defence

ACI and IEP's independent reviews on the results of project activities with the assessment of the risk environment and level of assurance provided by the project proponent.

- engage stakeholders' consultation
- accredit qualified VVB for review
- engage IEP in certification process
- engage 3rd party to perform additional works on verification

Second Line of Defence

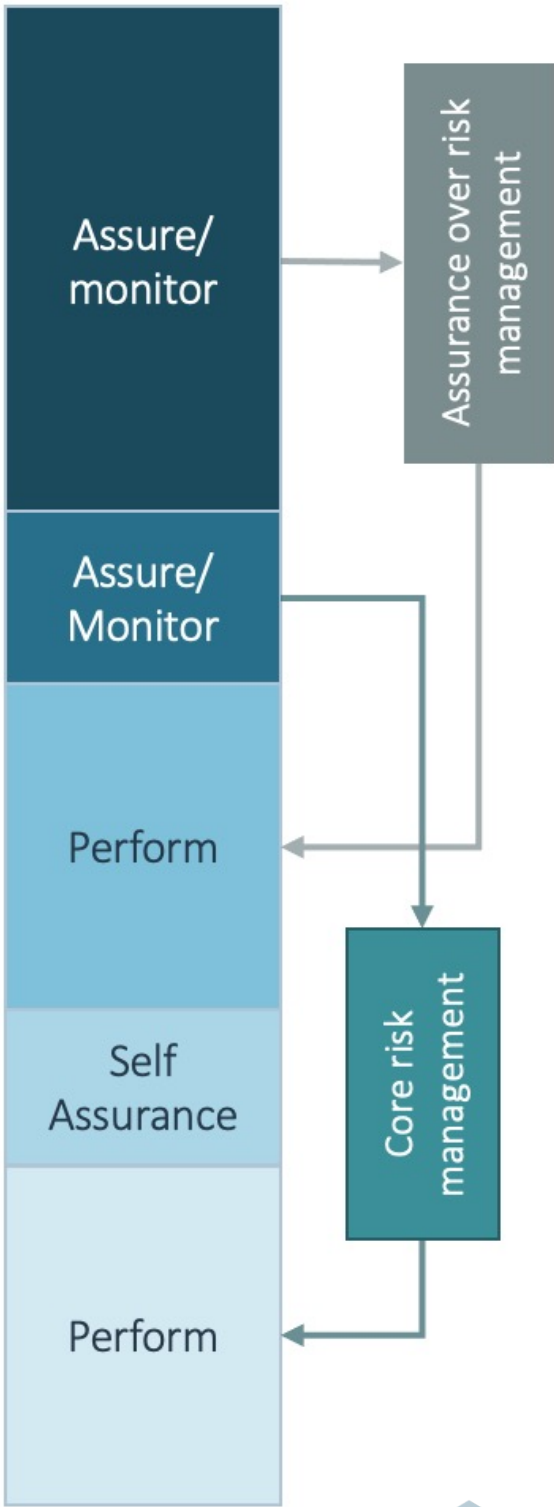
Corporate governance structure of project proponent oversees risk control and management strategy, policy and implementation.

- oversight risk management approach
- set internal policy and procedure
- set & review internal control and audit
- use of technology on monitoring
- engage 3rd parties to validate & verify


First Line of Defence

Project proponent performs day to day risk management activities; setup, controls, reviews and adjusts the risk monitoring and mitigation activities.


- identify possible risks
- suggest and implement risk mitigation
- monitor identified risks and control
- constant review of risk environment



ACI Registry

Asia Carbon Institute

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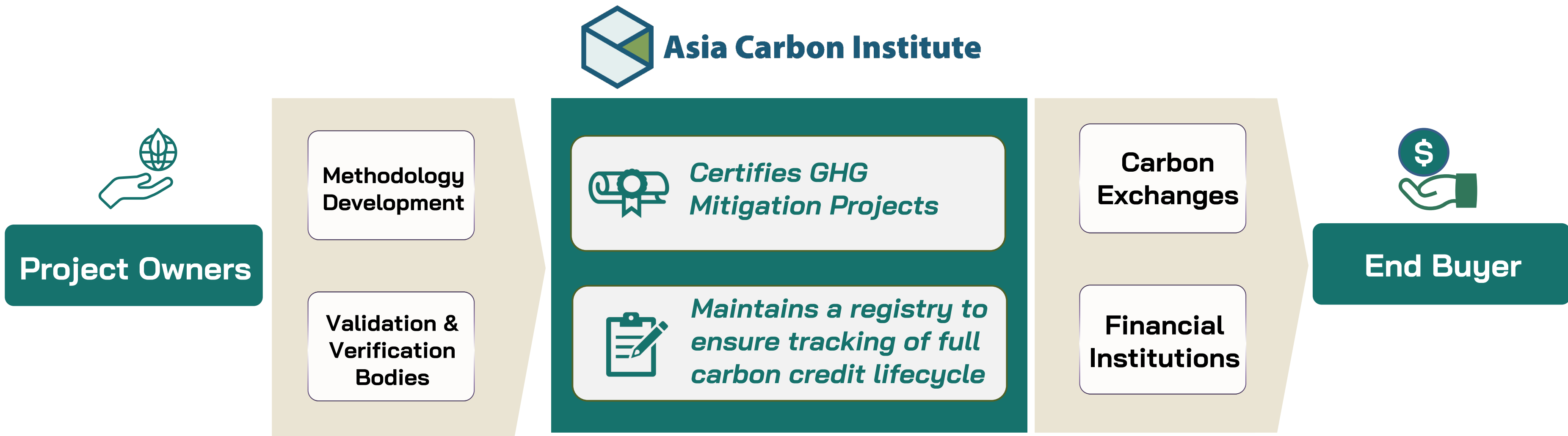
Search by project code, name, country, stage, vvb, project proponent, sector or serial

Code	Name	Country/ Area	Stage	VVB	Project Proponent	Protocol	Sector	SDGs
3	Bike-Sharing in Hong Kong (DMRV Pilot Programme)	China	Public Consultation	Not defined	Locolla Limited	αCC Protocol V.1.1	Transport	
1	Methodology for Early Phaseout of CFPP with Just Transition by Replacing with Clean Energy Sources	India	Public Consultation	Not defined	Sustainability Economics PTE LTD	αCC Protocol V.1.1	Energy demand	

<https://registry.asiacarboninstitute.org/projects>

DMRV-enabled and **blockchain** based system that tracks the creation, ownership, transfer, distribution, retirement and/or offsetting of carbon credits under the ACI Program.

Transfer/Retirement of Carbon Credits



Carbon Exchange Platforms - Examples

Core Climate

launched by HKEX in 2022



Climate Impact X

- Headquartered in Singapore
- Founded by DBS Bank, Temasek, Mizuho Financial Group, Singapore Exchange (SGX), and Standard Chartered Bank



4. Role Play & Discussion



Role Play Example

Generating Carbon Credits with E-Bikes

Overview of E-Bikes

- **Founded:** 2021 (Thailand based startup)
- **Model:** Shared Program
- **Key Market:** Thailand
- **Vision:** Reduce urban congestion and pollution through micro-mobility

Questions

- Does the e-bike project qualify for carbon credit issuance?
- Is the project "additional"?
- What is the baseline scenario?
- How will you measure CO₂ reductions? What methodology will you use?
- What data must be collected?
- Who owns the carbon credits?
- How will you monitor usage continuously?
- Who will verify the data?
- Does the project cause leakage?
- Who are the key stakeholders?

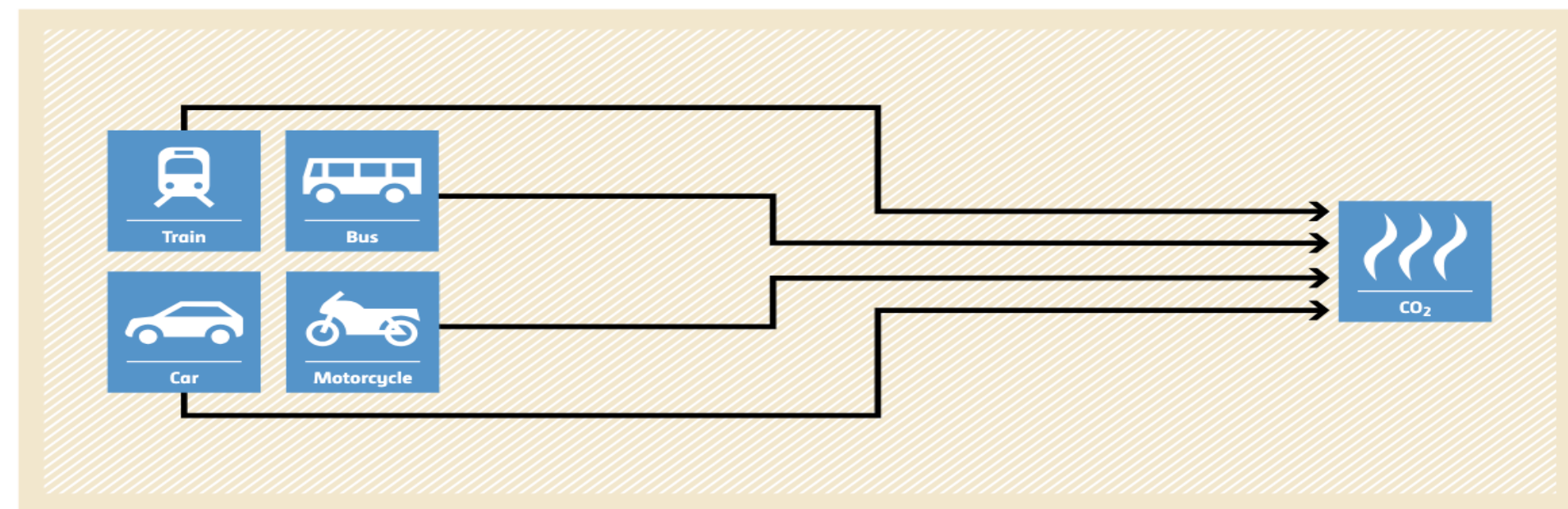
Case Study: E-Bikes

Rationale of Emission Reductions:

An alternative to fossil fuel-powered vehicles for daily commuters

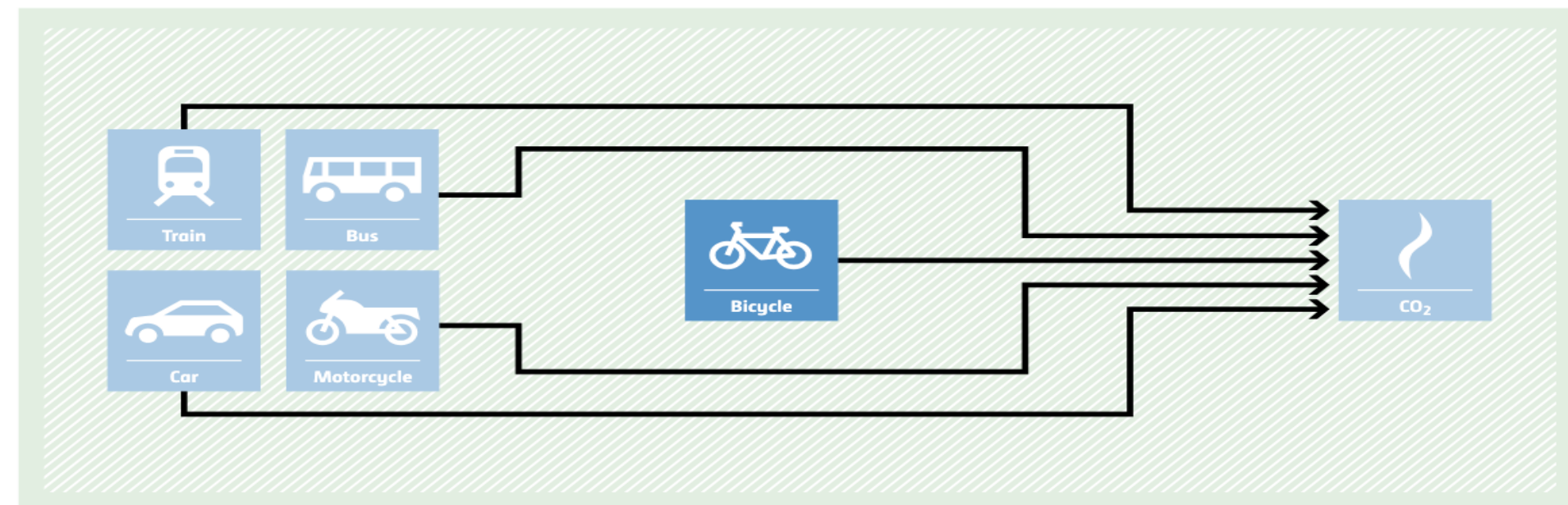
BASELINE SCENARIO

Passengers are transported using a diverse transport system involving buses, trains, cars, non-motorized transport modes, etc. operating under mixed traffic conditions.



PROJECT SCENARIO

Passengers are transported using bicycles, e-bikes or e-tricycles that partially displaces the existing transport system operating under mixed traffic conditions.



Source: UNFCCC (2022): CDM Methodology Booklet

Case Study: E-Bikes

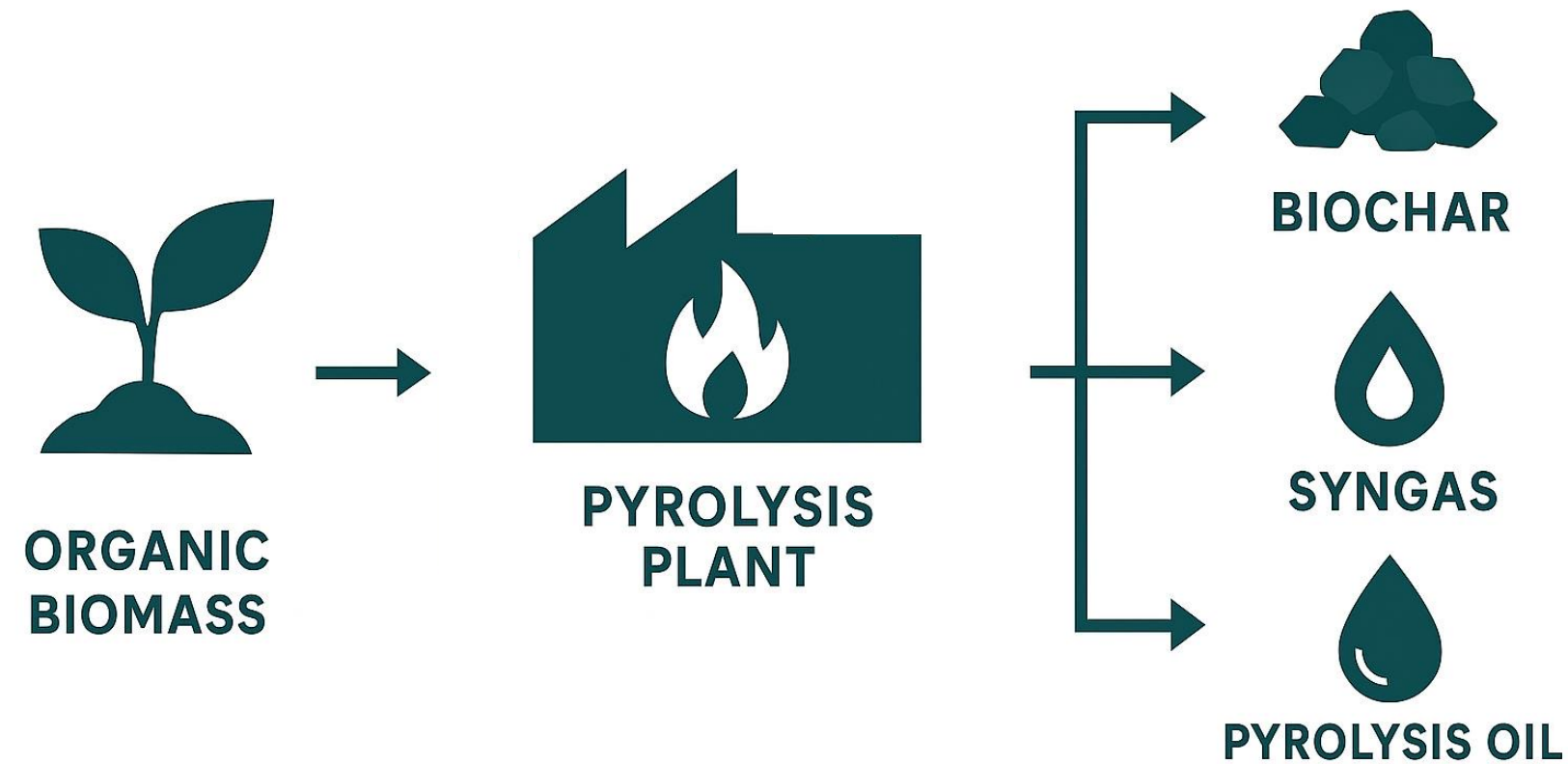
Calculations of Emission Reductions:

Emission Reduction = Baseline Emission – Production Emission – Emission from Electricity for Recharging Batteries – Relocation Emission – Server Emission – End-of-Life Emission

- Baseline Emission: Emission factor x Distance of rides
- Production Emission: Emission factor x Number of active Bikes
- Emission for Recharging Batteries
- Relocation Emission: Emission factor x Distance of relocation
- Server Emission
- End-of-Life Emission: Emission factor x Number of active Bikes

Case Study: Biochar

Biochar Carbon Removal Process:



Source: <https://foundationfar.org/news/producers-and-researchers-agree-scale-up-of-a-sustainable-biochar-industry-is-critical-to-meet-climate-targets-and-build-agricultural-resilience-and-soil-health/>

Case Study: Biochar

Project Development

Define **feedstock** source, pyrolysis **technology**, and biochar **application** (soil, construction, etc.).

Baseline Assessment

Calculate emissions that would occur without the project (e.g., biomass left to decay or burned).

Monitoring & Verification

Track biochar production, carbon content, and application to ensure **permanence**.

Certification & Issuance

VVB verifies carbon sequestration, and **credits** are issued.

Case Study: Biochar

- Long-Term **Permanence**: Carbon storage for **1,000+ years**, outperforming reforestation (vulnerable to fires/logging).
- Scalable & Feasible: Made from **abundant agricultural waste**, enabling large-scale carbon removal with existing technology.
- Verified & Trusted: Backed by **UNFCCC** and rigorous carbon standards, ensuring credibility and transparency.
- Premium Market Demand: Commands **\$100+/ton** (vs. \$5–15 for low-quality offsets) due to corporate preference for durable removal (not avoidance).
- Additional Co-Benefits: Boosts **soil health** (fertility, water retention, crop yields) and **reduces waste** (repurposes agricultural residues); Supports **rural jobs** in farming and biochar production.

5. Q&A



Website: <https://asiacarboninstitute.org/>

Email: info@asiacarboninstitute.org