Roundtable for

Co-designing Beckn-enabled Open Network for Carbon Markets (ONCM)

Consultation Paper

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By

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NFH NETWORKS FOR HUMANITY

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1. INTRODUCTION

1.1. Background

In a world racing toward net-zero emissions, carbon markets present a remarkable opportunity to turn climate action into measurable impact and inclusive prosperity. By enabling carbon credits, each representing one tonne of carbon dioxide equivalent to be traded across jurisdictions; carbon markets can channel finance toward emissions reductions, nature-based solutions and low-carbon innovation. More than just economic mechanisms, they hold the promise of carbon justice, empowering developing countries and resource-rich communities to participate in global climate cooperation, while delivering measurable benefits for companies, investors and citizens alike (UNDP, 2023; Soezer & Stephen Kansuk, 2022).

The effectiveness of carbon markets hinges on credibility, interoperability, and accessibility- areas where traditional registry-based systems struggle. Recent studies highlight that decentralized; peer-to-peer architectures can overcome these barriers by building transparent and tamper-proof infrastructures for carbon credit trading (Ameni Boumaiza, 2024). Such architectures allow project-level data, verification of outcomes, and transaction records to flow seamlessly across networks, minimizing duplication and ensuring traceable accountability.

An Open Network approach embodies this vision by creating a federated digital infrastructure where carbon projects, registries, and verifiers retain autonomy while interoperating through shared protocols. Unlike centralized exchanges, an open network ensures inclusivity, enabling smallholder and community projects to participate alongside large-scale developers. It democratizes access, reduces entry barriers, and supports verifiable credit lifecycles from issuance to retirement.

By embedding open standards and modular governance, the Open Network for Carbon Markets (ONCM) can transform carbon markets into a trusted, data-rich, and innovation-driven ecosystem. It has the potential to enable carbon markets as a globally connected, adaptive mechanism scaling high-quality climate finance with integrity and transparency at its core.

1.1.1. Current Global Carbon Sector

The global carbon market is growing rapidly. Currently 70+ carbon pricing programs are functioning internationally, which account for around 23% of global carbon emissions (World Bank, 2023). Compliance and Voluntary Carbon Market (VCM) collectively is projected to reach around USD 2 billion in 2021 and approximately USD 50 billion by 2030 while redefining its critical role in global net-zero strategy (World Bank, 2023). While the carbon trading ecosystem has most of the essential components like registries, standards, verification systems, and buyers, it remains inefficient due to the absence of common digital rails that can connect these moving parts into one interoperable system.

Major voluntary and compliance registries, such Verra, Gold Standard, and the Climate Action Reserve often function as siloed, private ecosystems without interoperability. These closed systems act as "walled gardens," restricting the seamless exchange of credits, increasing costs due to recurring verification processes, and limiting the rapid transfer of carbon assets. The EU's ETS is unable to interoperate with voluntary registries, making systems fragmented (ICAP, 2023).

The integrity of carbon credits is strongly based on robust Measurement, Reporting, and Verification (MRV) processes. However, MRV standards vary considerably across sectors, locations, and registrations. This fragmented nature of data systems across the carbon market is the major underlying issue for trust deficits.

Start-ups, small businesses, community-led initiatives, and social impact organizations which often manage some of the most carbon-rich areas face significant challenges of high transaction and verification costs. This enhances the risk of exclusion of these actors from the market ecosystem. Without accessible MRV systems and legitimate certifications, these actors are unable to engage in carbon markets, minimizing the availability of high-quality, community-driven carbon credits.

While compliance markets are driven by regulation, the Voluntary Carbon Market (VCM) represents the next frontier of climate action- an arena where corporations, investors, and communities take initiative beyond mandated targets. The VCM is uniquely positioned to mobilize private capital at scale, financing innovative climate solutions and community-led projects that often fall outside government-led schemes.

Governments' approach to regulate the offset mechanism, taxation, and international transfers vary greatly. Even though Article 6 of the Paris Agreement was designed to standardize international transfer mechanisms, its implementation has been delayed and inconsistent (UNFCC, 2015). The frameworks exist, but they function as isolated islands

rather than a coordinated ecosystem. Countries' readiness for issuing authorizations, implementing amendments, and managing international transfers differs from one another, causing uncertainty for developers, corporate buyers, and investors. This kind of inefficiency affects the market trust and development of sustainable market infrastructure (ICAP, 2023).

1.2. Roundtable Objectives:

We intend to bring together multiple stakeholders and interested sectors to brainstorm and co-design the Open network for carbon markets. We specifically intend to:

- Establish governance & market architecture
- Design interoperable technical infrastructure
- Build inclusive supply-side participation
- Create a robust demand ecosystem

1.3. Roundtable Agenda:

Time	Session
09:30-10:30	Welcome & ONCM Vision (Plenary)
10:45-13:00	Working Groups (Parallel)
13:00-14:00	Networking Lunch
14:00-15:00	Pilot Synthesis & Prioritization
15:15-16:30	Roadmap Commitments & Next Steps

1.4. Invitation to Comment:

The Center for Digital Public Goods (CDPG) at the Indian Institute of Management Bangalore (IIMB), through this round table and consultation paper, hereby seeks comments/ views/ suggestions/ proposal of pilots from various market participants, technology providers, academicians, domain experts and other public stakeholders on certain questions pertaining to this proposed Open Network for Carbon Markets (ONCM).

IIMB CDPG's approach for this Beckn protocol-enabled open network for carbon markets (ONCM) design are laid out in the upcoming sections of this consultation paper.

You are requested to submit their responses vide email to Ms. Chaitrali Bhoi, Project Orchestrator – ONCM & Research Associate, Center for Digital Public Goods, Indian Institute of Management Bangalore at chaitrali.bhoi@iimb.ac.in with a copy to Prof. Srinivasan R., Project Mentor – ONCM & Chairperson, Center for Digital Public Goods, Indian Institute of Management Bangalore at srini@iimb.ac.in and cdpg@iimb.ac.in latest by March 31st , 2026 in the format specified below. You are also requested to indicate the organization or interest you represent and include your contact details. In case you wish to remain anonymous, please explicitly state the same.

<Name and details of the organization represented>

Sr. No.	Working Group	Response/ Proposal
1		
2		
3		
4		
5	General comments	

<Contact details of the respondents>

2. PROBLEM STATEMENT & PROPOSED APPROACH

2.1. Problem Statement

An open, interoperable network that facilitates smooth discovery, verification, pricing, and settlement across many actors and registries is urgently required for voluntary carbon markets. Today's systems are siloed, data is inconsistent, and MRV processes lack transparency, resulting in high transaction costs, weak trust, and exclusion of small business, communities. A protocol-enabled open network is needed to standardize interactions, allow multiple registries and MRV providers to coexist, ensure end-to-end credit traceability, and support modular sector-specific methodologies.

2.2. Intent of Proposed Approach

A resilient carbon market has to operate as a decentralized transaction network, with carbon credits flowing between independent systems through standardized interactions rather than centralized platforms. The Beckn Protocol, with its decentralized design and **DOFP (Discovery-Order-Fulfilment-Post-Fulfilment)** interaction mechanism, is envisaged by the Open Network for Carbon Market (ONCM) as the foundation for this architecture as illustrated in figure 1 (Beckn Protocol, 2022). Beckn's digital grammar will enable carbon credits to be published, discovered, confirmed, exchanged, and retired without requiring a single centralized registry.

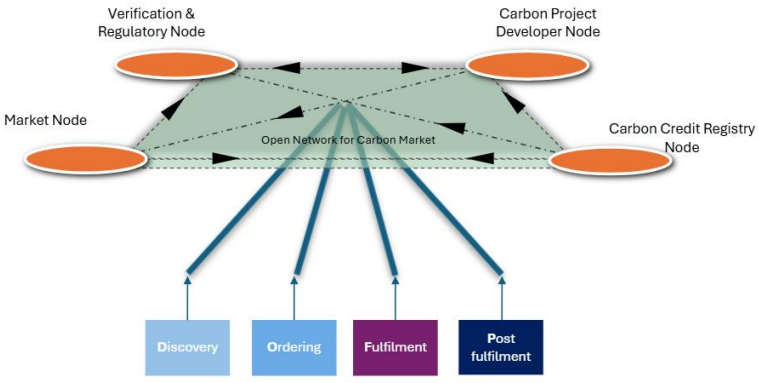

Figure 1: DOFP interaction on Open Network for carbon Network (ONCM)

(Source: Adapted from the IIMB case study on Beckn Protocol)

Beckn protocol provides a foundational template for federated market systems. Its principles directly address carbon market challenges:

Beckn Design Principle	For Scalability & Autonomy	For Data Federation	For Multi-Country Scaling	For Carbon Market as a Global Commodity (FX-like Pricing)
Openness	Allows plural participation without gatekeepers	APIs expose credit metadata for transparent access	Portable standards enable replication across borders	Open access to cross-jurisdictional price signals and reference rates
Interoperability	Sectoral ontologies connect forestry, renewables, agriculture	Prevents double counting through harmonized schemas	Connects Global North–South supply and demand	Enables interoperability of pricing benchmarks, credit equivalence, and FX-style valuation
Redundancy	Multiple verifiers prevent single-point failure	Distributed MRV increases data integrity	Independent networks co-exist across countries	Parallel pricing engines and decentralized market makers enable FX-like liquidity
End-to-End Principle	Full lifecycle traceability (issuance>>retirement)	Ensures integrity of credit data across systems	Ensures credits recognized globally with verifiable provenance	Provides trusted provenance for cross-border trades, supporting floating/fixed pricing
Layered Design	Separates identity, registry, MRV, payment layers for autonomy	Federation at each layer prevents centralization	Enables local customization with global alignment	Supports jurisdiction-specific pricing layers aligned to global clearing mechanisms
Modularity	Plug-and-play sector modules scale independently	Allows multiple registries and MRV modules to co-exist	Supports country-specific modules within a global ecosystem	Enables floating/fixed carbon pricing models, credit baskets, and FX-style trading structures

In this paradigm, carbon credits begin their digital journey during the **Discovery phase**. Project developers provide structured, machine-readable listings of credit qualities such as vintage, methodology, baselines, geolocation, and co-benefits. These listings are published via Beckn-compliant APIs, making them searchable throughout the network. Any ONCM-integrated application can query the ecosystem by geography, credit kind, certification standard, and expected issuance. This sets up a search layer which makes credits from various registries universally discoverable without the need to centralize data.

The **Order phase** negotiates and validates credit attributes using Beckn's atomic transaction feature. Applications allow users to seek bids, compare prices, view historical performance data, and review technique documentation. Importantly, this stage incorporates MRV systems into the transaction flow. Satellite feeds, sensor data, drone footage, and computational verification models can all be used to corroborate environmental claims during order formulation. Instead of keeping MRV as a separate audit step, Beckn's order interactions can enable real-time data retrieval, which can instantaneously confirm the emission reductions before closing the transaction.

Once an order is accepted, the process progresses to the **Fulfilment phase,** where Beckn manages payment, contractual execution, and registry-level lifecycle modifications. Settlement workflows, digital signatures, and verifiable credential issuance are all initiated automatically. This stage additionally synchronizes credit status with appropriate registries using registry-federation APIs, ensuring that issuance, transfers, and retirements are reported in a secured way across dispersed systems. Beckn's fulfilment interactions enable financial settlement and carbon asset transfer to take place as a single, integrated digital event.

The final **post-fulfilment phase** addresses auditability, transparency, and compliance. Beckn interactions produce immutable logs, registry confirmations, digital certificates of credit, and data packets for corporate ESG reporting. These post-transaction datasets provide support for downstream integrations such as disclosure systems, rating engines, and multi-year project MRV updates. This ensures that each carbon credit transaction generates a complete, machine-verifiable trail of evidence.

ONCM relies on a **technology stack** that is compatible with Beckn's decentralized digital architecture as shown in Figure 2:

- An identity layer provides encrypted verified identities to projects, verifiers, registries, and transaction terminals.

- A registry federation layer reveals lifecycle metadata through Beckn bridges, ensuring each registry's sovereignty while allowing ecosystem-wide synchronization.
- An MRV integration layer includes pluggable connectors for GIS, IoT, sensor-based, and model-driven verification pipelines.
- A discovery layer specifies how credits are indexed and queried.
- A settlement layer combines digital payment systems with programmable contracts.
- Finally, a protocol governance layer coordinates ontology updates, version control, and protocol evolution across all participants.

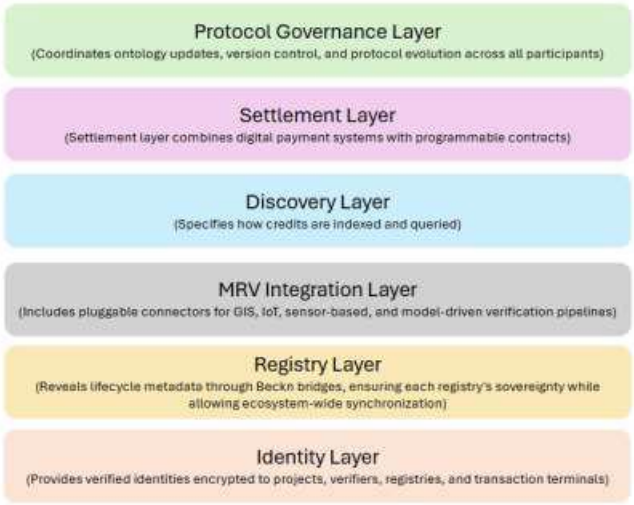

Figure 2: Layered Technology Stack for Open Network for Carbon Markets (ONCM)

The Beckn Protocol uses **DOFP-based interactions** to convert carbon credits into digitally verifiable, programmable assets that can flow with complete transparency and integrity across independent systems. Discovery is decentralized, negotiation is standardized, MRV is integrated into the transaction, settlement is automated, and registry synchronization is smooth. Instead of fragmented markets and siloed registries, ONCM creates an interconnected transactional network in which carbon credit lifecycles are coordinated using open digital standards. Beckn, in this perspective, does not serve as a marketplace, but rather as the transactional infrastructure which enables carbon markets to function as a globally discoverable, verifiable and interoperable digital system.

2.3. Bringing Everyone Together

The Open Network for Carbon Market (ONCM) will be a federated digital infrastructure that preserves the autonomy of many stakeholders while enabling them to engage in a unified carbon economy (see figure 3). Its value will lie in transforming fragmented systems into one with seamless coordination, transparent data flows, and verifiable transactions. Each stakeholder group will uniquely benefit from this ONCM architecture as shown in figure 4.

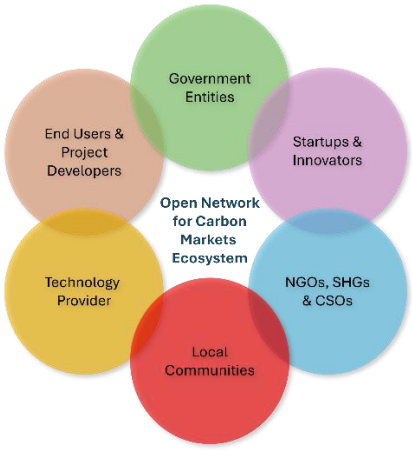

Figure 3: Open Network for Carbon Network (ONCM) Ecosystem Stakeholders

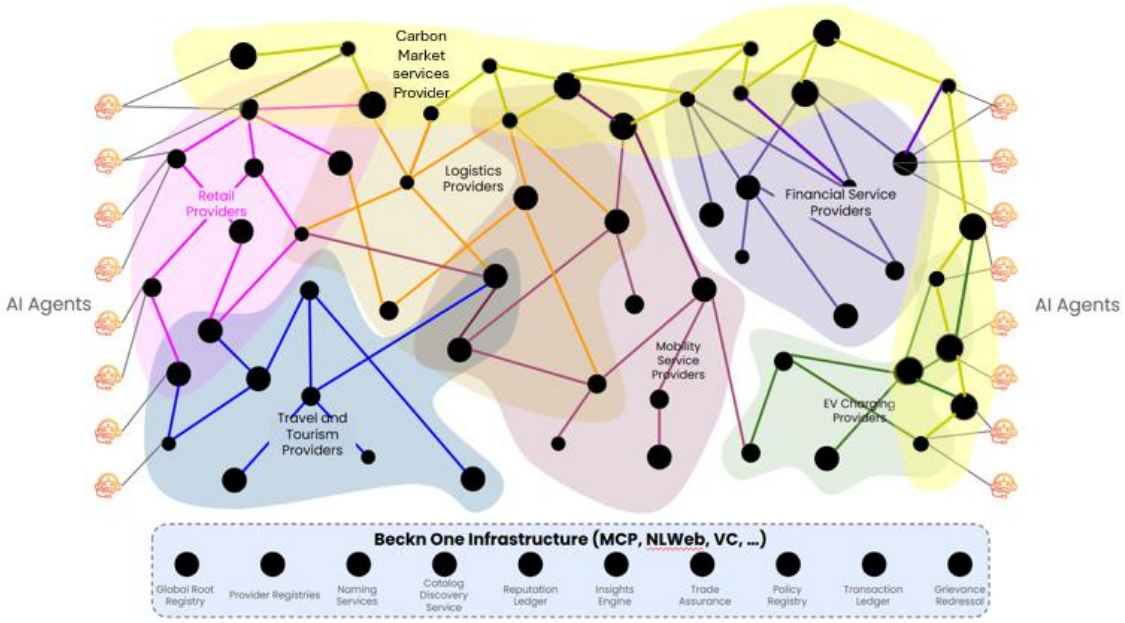

Figure 4: Beckn Ecosystem Architecture

(Source: Beckn Documents and Author's Representation)

For governments, ONCM will give a real-time, secure overview of the carbon credit lifecycle, from project registration to issuance, transfers, and retirements, without the need for centralized data control. This will improve national inventory management, eliminate double-counting hazards and improve the credibility of domestic and international climate reporting as suggested in Article 6 of the Paris Agreement (UNFCC, 2015). Government agencies will have a transparent framework for monitoring carbon credit transactions while aligning incentives and ensuring trust in the market.

For the private sector, ONCM will provide access to a credible and readily discoverable marketplace for high-quality carbon credits. Buyer Corporations will be able to evaluate projects across methodology, locations, and co-benefits to mitigate the reputational risks associated with greenwashing. Automated verification and synchronized registry updates will ensure that purchased credits contain verifiable claims. Financial institutions and purchasers will benefit from unambiguous pricing signals, decreased due diligence expenses, and less reliance on intermediaries.

For innovators and technology providers, ONCM's open APIs will facilitate the development of next-generation climate-tech applications such as MRV engines, rating tools, satellite-integrated verification systems, credit analytics dashboards, and community-level monitoring platforms. Its protocol-driven design will minimize entry barriers and foster innovation by allowing plug-and-play solutions that are compatible throughout the whole ecosystem, rather than being restricted to a particular registry or platform.

For End users and project developers, ONCM will improve market access by making credits more discoverable and verifiable. Small businesses, community groups, and independent developers can publish project information in a standardized manner, save money on MRV, and conduct direct transactions with buyers. Transparent pricing model and automatic settlement increase revenue and participation. ONCM brings all stakeholders together to create a unified, high-integrity carbon economy through shared digital rails that encourage trust, interoperability, competition, and equitable access.

2.4. Open Network for Carbon Markets in Nutshell

The Open Network for Carbon Markets (ONCM) is an important perspective for the creation, orchestration and expansion of voluntary carbon markets beyond time and borders. It enables project developers, registries, certifiers, MRV providers, government agencies, private buyers, and application developers to operate on shared digital rails while maintaining autonomy. This approach aligns with the most successful Digital Public Infrastructure models, where interoperability and decentralization stimulate efficiency, trust, and innovation.

Looking ahead, the ONCM protocol lays the way for a global network of networks for voluntary carbon markets. National systems can interconnect using open, portable specifications rather than being unified under a single global orchestrator. This lays the groundwork for cross-border credit recognition and globally accessible high-integrity carbon assets. ONCM enables carbon markets to evolve into a decentralized global infrastructure that is scalable, interoperable, future-proof, and capable of supporting climate aspirations of countries worldwide.

3. WORKING GROUPS FRAMEWORK

3.1. Working Group 1: Market Mechanism & Regulatory Framework

- Focus Areas: Activity-level regulation, pricing benchmarks, arbitration, BEE/CCTS alignment, CBAM/Article 6mechanisms, governance

- Key Discussion Questions:
    - Define activity-level regulation covering issuance, MRV, brokerage, retirement to enable compliant credit lifecycle
    - Develop CBAM/Article 6 cross-border protocols ensuring corresponding adjustments and NDC alignment
    - Establish FX-like pricing benchmarks, governance structures, and dispute arbitration mechanisms
    - Align with BEE/CCTS while creating regulatory sandbox for Q2 2026 pilot testing
    - Propose MoEFCC/ BEE exemptions for forestry, Agroforestry/ Energy sector credits inclusion

- Targeted 2026 Deliverables:
    - Activity regulation framework (issuance, MRV, brokerage, valuation, retirement)
    - Arbitration & dispute resolution mechanisms
    - CBAM/Article 6 integration protocols
    - Pricing benchmark methodology
    - Governance structure (regulators, standard-setters, appellate authority) integration protocols

- Participant Roles & Expected Contributions:
    - Share specific CM/VCM roadblocks you've encountered in your working group domain while contributing to the discussion led by your working group coordinator.
    - Contextualize and frame challenge within your WG focus to develop pilot solutions.
    - Propose concrete pilot solutions or its components design which can be developed in Q2 2026 and further deployed by Q3 2026.
    - Define your role preference (lead/co-lead/advisor) and future contribution for proposed/ assigned pilots
    - Express your interest and requirements for potential pilot development commitments

3.2. Working Group 2: Technology Enablers

Focus Areas: Beckn schemas, MRV infrastructure, registry APIs, digital credentials, payment/settlement protocols, satellite/IoT integration

- Key Discussion Questions:
    - Adapt Beckn DOFP for full credit lifecycle (search > settlement > registry sync)
    - Design Carbon Metadata schemas, registry federation APIs, digital credential formats
    - Standardize MRV data protocols (satellite/IoT/GIS) for interoperability
    - Implement payment settlement protocols and schema versioning for future-proofing
    - Build Q2 transaction prototype demonstrating end-to-end Beckn flows

- Targeted 2026 Deliverables:
    - Registry integration APIs (issuance, transfer, retirement)
    - Digital credential formats (project IDs, verification attestations)
    - Payment & settlement protocols (tokens, escrow, multi-party reconciliation)
    - MRV data standards (satellite, IoT, field verification)
    - Sandbox environment for pilot testing

- Participant Roles & Expected Contributions:
    - Share specific CM/VCM roadblocks you've encountered in your working group domain while contributing to the discussion led by your working group coordinator.
    - Contextualize and frame challenge within your WG focus to develop pilot solutions.
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3.3. Working Group 3: Supply-Side Actors

Focus Areas: Project developers, forestry/nature-based solutions, MRV providers, cost reduction strategies, community pilots, vendor onboarding

- Key Discussion Questions:
    - Enable friction free market access to forestry/NBS developers, MRV providers, and communities
    - Design grants/advance payments and co-benefits monetization for smallholder viability
    - Develop aggregation models for small land holders/ farmers and FPO onboarding protocols
    - Identify pilot sites (JFMC/FPO) targeting 2500-35000 CCCs by Q3 issuance
    - Encode co-benefits (soil/water/biodiversity) for premium pricing, Transparency/ Good quality Data

- Targeted 2026 Deliverables:
    - Supply-side cost reduction strategy (grants integration, digital MRV, advance payments)
    - Project developer & vendor onboarding playbook
    - Co-benefit monetization framework (biodiversity, livelihoods, SDGs)

- Participant Roles & Expected Contributions:
    - Share specific CM/VCM roadblocks you've encountered in your working group domain while contributing to the discussion led by your working group coordinator.
    - Contextualize and frame challenge within your WG focus to develop pilot solutions.
    - Propose concrete pilot solutions or its components design which can be developed in Q2 2026 and further deployed by Q3 2026.
    - Define your role preference (lead/co-lead/advisor) and future contribution for proposed/ assigned pilots
    - Express your interest and requirements for potential pilot development commitments

3.4. Working Group 4: Demand-Side Actors

Focus Areas: Project developers, forestry/nature-based solutions, MRV providers, cost reduction strategies, community pilots, vendor onboarding

- Key Discussion Questions:
    - Map corporate net-zero pathways to ONCM credit usage and ESG reporting
    - Design exchange platforms, scrap/legacy markets, and RE supply-demand bridges
    - Establish pricing transparency mechanisms and buyer dashboard analytics
    - Secure anchor buyers + MCX/ IEX pilot for 2,500 CCCs ONCM liquidity
    - 10 live projects, domestic and cross-border transactions
- Targeted 2026 Deliverables:
    - Supply-side cost reduction strategy (grants integration, digital MRV, advance payments)
    - Project developer & vendor onboarding playbook
    - Co-benefit monetization framework (biodiversity, livelihoods, SDGs)
- Participant Roles & Expected Contributions:
    - Share specific CM/VCM roadblocks you've encountered in your working group domain while contributing to the discussion led by your working group coordinator.
    - Contextualize and frame challenge within your WG focus to develop pilot solutions.
    - Propose concrete pilot solutions or its components design which can be developed in Q2 2026 and further deployed by Q3 2026.
    - Define your role preference (lead/co-lead/advisor) and future contribution for proposed/ assigned pilots
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4. ONCM ROADMAP

Timeline	Phase	Key Milestones	Working Groups Active
Q1: 2026 (Jan-Mar)	**Foundation**	- March roundtable consultation - ONCM Concept & Roadmap v1.0 published - Working group themes & leads finalized	All 4 groups convene
Q2: 2026 (Apr-Jun)	**Architecture Design & Pilot Preparation**	- Beckn schemas for carbon credits (WG2) - Activity regulation framework (WG1) - Forestry pilot design (WG3) - Corporate demand assessment (WG4) -carbon credits pilot prep (WG2, WG4) - Community forestry pilot prep (WG3) - MRV infrastructure testing (WG2) - Regulatory sandbox setup (WG1)	WG1, WG2, WG3, WG4 (monthly sprints) & (Implementation oversight)
Q3: 2026 (Jul-Sep)	**Pilot Launch**	- carbon credits first transaction - Forestry pilot initiated (Karnataka) - Corporate buyers onboarded - Lessons learned documentation	All groups (monitoring & iteration)
Q4: 2026 (Oct-Dec)	**Scaling & Cross-Border**	- carbon pilots deployed - CBAM/Article 6 mechanisms live - multi-state expansion - ESG market creation	Ecosystem-wide

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ONCM Glossary

- **ACVA**: Accredited Carbon Verification Agency
- **AFOLU**: Agriculture, Forestry, Other Land Use - IPCC land GHG category
- **ARR**: Afforestation, Reforestation, Revegetation - Sequestration credits
- **Article 6**: Article 6 of the Paris Agreement enables international cooperation (carbon markets) to meet climate targets, featuring market mechanisms (6.2, 6.4)
- **BEE**: Bureau of Energy Efficiency-statutory body under the Ministry of Power (CCTS administrator)
- **CCTS**: Carbon Credit Trading Scheme- notified by the Government of India in June 2023, establishes a formal Indian Carbon Market (ICM) to facilitate trading of carbon credit certificates.
- **Biochar**: used to sequester carbon into soil.
- **BVCM**: Beyond Value Chain Mitigation: a sustainability strategy where companies fund climate projects outside their direct supply chains to accelerate global net-zero goals, complementing internal emission reductions
- **Carbon Credit**: One ton of CO_2 equivalent (tCO_2e) reduction (or removal) from atmosphere (as per BEE, GoI)
- **CCC**: Carbon Credit Certificate (as per BEE, GoI)
- **Carbon Reduction**: (decarbonization) involves directly lowering greenhouse gas emissions by improving energy efficiency, transitioning to renewable energy (solar/wind), and optimizing supply chains
- **Carbon Removal**: Carbon removal (or Carbon Dioxide Removal, CDR) refers to methods that actively remove from the atmosphere and store it durably in trees, soil, geological formations, or products.
- **Carbon Sequestration**: It is the process of capturing and storing atmospheric carbon dioxide (CO_2) to reduce global warming, acting as a critical tool for climate change mitigation. It involves removing from the atmosphere and storing it in solid or liquid forms via natural sinks (forests, oceans, soil) or engineered technologies

- **CBAM**: Carbon Border Adjustment Mechanism (CBAM) is the EU's tool to put a fair price on carbon emitted during the production of carbon-intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries.
- **CCB Standards**: Climate, Community & Biodiversity (CCB) Standards, managed by Verra, are a set of, third-party validated, requirements for land management projects to ensure they deliver net positive benefits for climate, local communities, and biodiversity
- **CCC**: Carbon Credit Certificate (as per BEE, GoI)
- **CDM**: Clean Development Mechanism- The Clean Development Mechanism (CDM), defined in Article 12 of the Kyoto Protocol (1997), allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol to implement an emission-reduction project in developing countries.
- **CSDDD**: EU Corporate Sustainability Due Diligence Directive- will ensure that companies in scope identify and address adverse human rights and environmental impacts of their actions inside and outside Europe.
- **CSRD**: EU Corporate Sustainability Reporting Directive.
- **EU ETS:** EU Emissions Trading System (ETS) to support the decarbonisation of EU industry.
- **ESRS**: European Sustainability Reporting Standards.
- **EUDR**: EU Deforestation Regulation- EU rules to guarantee that the products EU citizens consume do not contribute to deforestation or forest degradation worldwide (not cultivated on land deforested post 2020)
- **FRA:** Forest Rights Act (2006) in India, which recognizes the rights of forest-dwelling communities
- **FLAG**: Forest, Land, Agriculture emissions- is a Science Based Targets initiative (SBTi) framework launched in 2022, designed for companies to set science-based targets for land-based greenhouse gas emissions.
- **GHG**: Greenhouse Gases ($CO2/CH_4/N_2O$).

- **GHG Protocol** is the world's most widely used international accounting standard for quantifying and managing greenhouse gas emissions from organizations, supply chains, and products.
- **GIS**: Geographic Information System (GIS) is technology used to create, manage, analyze, and map spatial data
- **ICM**: Indian Carbon Market (as per BEE, GoI)
- **ICVCM**: Integrity Council for the Voluntary Carbon Market -multi-stakeholder led independent governance body which establishes and maintains the standards of ethics, sustainability, and transparency for the global voluntary carbon market.
- **IPCC**: The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.
- **ITMO**: Internationally Transferred Mitigation Outcomes, a mechanism under Article 6 of the Paris Agreement for trading greenhouse gas emission reductions between countries.
- **JFMC**: Joint Forest Management Committee (JFMC) is a village-level body in India, comprising local community members and Forest Department officials, aimed at the collaborative protection, management, and restoration of forests
- **JCM**: Japan Joint Crediting Mechanism- The JCM is a system to cooperate with developing countries for reducing greenhouse gas emissions, under which the amount of emission reduction is assessed as contribution by both partner countries and Japan.
- **MCX**: The Multi Commodity Exchange of India Limited (MCX) is India's leading commodity derivatives exchange regulated by SEBI
- **IEX:** Indian Energy Exchange (IEX) is India's premier automated digital marketplace for trading electricity, renewable energy, and energy-saving certificates. It provides a platform for buyers (distributors, industrial consumers) and sellers (generators) to trade electricity in real-time or short-term, facilitating transparent price discovery and physical delivery across India.
- **MoEFCC**: Ministry of Environment, Forest and Climate Change, Government of India.
- **MRV**: Monitoring, Reporting, Verification.

- **NDC**: Nationally Determined Contribution which are climate action plans submitted by countries under the Paris Agreement
- **PACM:** The Paris Agreement Crediting Mechanism (PACM) is a UN-led initiative under Article 6.4 of the Paris Agreement that creates a standardized, high-integrity carbon market. It allows countries to trade emission reduction credits to meet climate targets (NDCs), promotes sustainable development, and facilitates climate finance for developing nations, with a mandate to avoid double counting
- **SBTi**: Science Based Targets initiative-is a global body enabling businesses to set ambitious greenhouse gas reduction targets aligned with climate science.
- **SBTN**: The Science Based Targets Network (SBTN) is a coalition of over 45 organizations providing science-backed methods for companies and cities to set targets to protect and restore nature.
- **Scope 1 Emissions**: Direct emissions from sources a company owns or controls
- **Scope 2 Emissions**: Indirect emissions from purchased energy (primarily electricity, steam, or heat the company uses)
- **Scope 3 Emissions**: All other indirect emissions across the value chain, not included in Scope 2
- **UN SDG**: Sustainable Development Goals defined by United Nations
- **SEEA**: System of Environmental-Economic Accounting - UN statistical framework linking ecosystems to economic metrics for natural capital valuation
- **TCFD**: Taskforce on Climate-related Financial Disclosures
- **TEEB**: The Economics of Ecosystems and Biodiversity - Global framework quantifying ecosystem service values for policy/business decisions
- **TNFD**: Taskforce on Nature-related Financial Disclosures - Nature/biodiversity risk framework (parallel to TCFD for ESG Scope 3 land risks)
- **UNFCCC**: United Nations Framework Convention on Climate Change - Paris Agreement governing body overseeing NDCs, Article 6, carbon cooperation.
- **VCM**: Voluntary Carbon Market
- **Compliance Carbon Markets:** mandatory, government-regulated market systems

RELEVANT PROJECTS AT IIMB CDPG

1. '**Beckn Protocol: Orchestrating our digital future**'- a case study on Beckn Protocol: a DPG, exploring protocol as a business model
   - (Accepted by Harvard Business School Publishing)
   - Authors: Chaitrali Bhoi (Center for Digital Public Goods, IIM Bangalore), Dr. R. Srinivasan (IIM Bangalore)

2. '**Imagining Digital Integrated Forest Governance and Management: A DPI Approach**' – a paper proposing Forest DPI with National Forest Data Dictionary (NFDD), Digital Forest Standards Framework (DFSF), and Federated Forest Data Registry (FFDR)
   - (under peer review in Forest Policy and Economics Journal: ABDC-B)
   - Authors: Chaitrali Bhoi (Center for Digital Public Goods, IIM Bangalore), Dr. R. Srinivasan (IIM Bangalore)

3. '**Forest Stack as a Digital Public Infrastructure for Digital Forest Management in India**'- a case study on Forest Stack, a Digital Public Infrastructure for sustainable and digital forest governance in India
   - (Under Review in Harvard Business School Publishing)
   - Authors: Chaitrali Bhoi (Center for Digital Public Goods, IIM Bangalore), Dr. R. Srinivasan (IIM Bangalore), Dr. Jyotirmoy Dutta (Centre of Data for Public Goods, IISc)

4. '**Reimagining ESG Reporting through Open Digital Registries as a Digital Public Good**' – research proposing framework for open digital registries for ESG Reporting
   - (Under Review in Strategic Management Society Conference Berlin 2026)
   - Authors: Chaitrali Bhoi (Center for Digital Public Goods, IIM Bangalore), Dr. R. Srinivasan (IIM Bangalore)

5. '**Sustainability Stack: DPI Architecture for India's Sustainability Leap'**- a Practice Paper proposing Sustainability Stack layered architecture, with ecosystem mapping
   - (Published by Forbes India; Academic Paper in Progress for Environmental Sustainability Indicator Journal)
   - Authors: Dr. R. Srinivasan (IIM Bangalore), Chaitrali Bhoi (Center for Digital Public Goods, IIM Bangalore), Ruchi Chaurasiya (IIM Bangalore), Abhishek Chavan (IIM Bangalore) Article in Forbes India Link Here