CARBON CAPTURE AND STORAGE STRATEGIC ROADMAP

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VANACHAI GROUP

Carbon Capture and Storage Strategic Roadmap
Vanachai Group Public Company Limited and Subsidiaries

Over the past decade, the world has faced increasingly severe challenges from climate change, compelling governments, businesses, and society as a whole to accelerate adaptation efforts and strengthen operational approaches. These actions are essential to limit the rise in global temperatures, reduce environmental, economic, and social risks, and support a sustainable transition toward a low-carbon society.

Vanachai Group Public Company Limited and its subsidiaries (the "Company") recognize the role of the wood and wood-based products industry as a renewable resource sector with inherent potential to naturally absorb and store carbon dioxide throughout the wood life cycle—from tree growth and manufacturing processes to end-use applications. Wood-based materials therefore function as a significant carbon sink, playing an important role in reducing atmospheric carbon while enhancing the Company's capability to implement comprehensive carbon management.

To elevate carbon management beyond emission reduction toward a systematic approach to carbon capture, utilization, and storage (CCUS) in support of the Company's Net Zero 2050 target, the Company has developed the Vanachai Carbon Capture and Storage Roadmap 2025–2035. This Roadmap establishes a ten-year operational framework for the development and integration of carbon capture, utilization, and storage technologies, with a strategic focus on biogenic carbon dioxide (Biogenic CO_2) generated from manufacturing processes and biomass energy, which form the core of the Company's business operations. The Roadmap also promotes the development of Bio-Carbon Capture and Storage (Bio-CCS) projects and Bioenergy with Carbon Capture and Storage (BECCS) initiatives, with the objective of delivering measurable, verifiable, and economically scalable outcomes.

This Carbon Capture and Storage Roadmap serves as an Enabling Strategy under the Company's Climate Change and Carbon Management Strategic Plan and constitutes an integral component of the Vanachai Sustainability Framework 2025. Its purpose is to embed carbon management as a concrete element of core business operations and strategic decision-making processes across the organization.

The risks, impacts, and dependencies associated with climate change and carbon management addressed in this strategy are identified, analyzed, and prioritized through the Company's Vanachai Integrated Materiality and Risk Assessment (V-IMRA) process. V-IMRA is an internal assessment framework that considers both impact materiality and financial materiality across the value chain.

The results of V-IMRA are integrated into the Enterprise Risk Management (ERM) system to support strategy formulation, strategic decision-making, the setting of risk appetite, and the creation of long-term sustainable value.

The Company is committed to operating under the vision "Forest I Future I Together – for a Sustainable Living" and the principle of "Growing with Nature," linking business value creation with natural resource conservation, clean technology development, and the advancement of a forest-based circular economy. Through this approach, Vanachai aims to build a sustainable future for the organization, society, and the nation over the long term.

1) Objectives of the Strategic Roadmap

- To support the measurable and tangible reduction of the Company's greenhouse gas emissions.
- With a specific focus on reducing direct greenhouse gas emissions (Scope 1) arising from manufacturing processes and energy use, through the deployment of carbon capture and storage technologies, particularly targeting biogenic carbon dioxide (Biogenic CO_2), in parallel with renewable energy initiatives and energy efficiency measures.
- To advance the Company's carbon management approach from "emission reduction" toward "carbon capture and storage."
- To elevate carbon management from emission control and mitigation to a systematic framework encompassing carbon capture, utilization, and storage (CCUS/BECCS), thereby strengthening the Company's long-term potential to achieve net-zero or net-negative carbon emissions.
- To create economic value from carbon (Carbon Value Creation).
- To promote the economic utilization of captured carbon, including its conversion into raw materials, additives, or value-added products, as well as the development and use of carbon credits under recognized carbon market mechanisms and certification systems.
- To support the development of the Company's negative-emission technologies and carbon innovation capabilities.
- To encourage research, pilot testing, and collaboration with external partners to develop Bio-Carbon Capture and Storage (Bio-CCS) and Bioenergy with Carbon Capture and Storage (BECCS) technologies that are suitable for the Company's wood-based manufacturing and biomass energy operations, and scalable to industrial application in the future.

- To integrate carbon capture and storage (CCS) operations into the Company's management systems and strategic decision-making processes.
- To align CCS implementation with the Company's environmental, energy, and sustainability management systems, ensuring that carbon management is embedded within core business operations, target-setting, performance monitoring, and stakeholder reporting.

2) Alignment with Policies and International Standards

The implementation of the Vanachai Carbon Capture and Storage (CCS) Roadmap 2025–2035 has been designed to align with internationally recognized frameworks and standards on environmental management, energy, and carbon management. This ensures that the Company's CCS activities are verifiable, comparable, and internationally credible. The key standards and frameworks adopted by the Company are as follows:

2.1 FTSE Russell ESG Ratings — Environmental Pillar (EPR, ESC, ECC, and EBD Series)

The Company references the FTSE Russell ESG Ratings indicators to assess and enhance its environmental performance, with particular focus on the following areas:

EPR (Environmental Management / Pollution & Resources):

Emphasizes systematic environmental management, greenhouse gas emission reduction, and efficient energy use.

EBD (Biodiversity & Ecosystem Services):

Biodiversity and Ecosystem Linkages: EBD17, EBD05, EBD06, EBD08 and EBD14, where BECCS, biomass sourcing, ecosystem restoration, forest ecosystem resilience or biodiversity-related certification schemes are disclosed.

FTSE Russell Climate Change Indicators: ECC01, ECC08, ECC14, ECC15, ECC31, ECC38, ECC39, ECC41, ECC42, ECC43, ECC44, ECC45, ECC49, ECC50, ECC76, ECC77 and ECC78, where applicable.

Covers emissions data management, progress disclosure on carbon reduction, and the development of negative-emission technologies.

2.2 GRI Standards — Global Reporting Initiative

This Roadmap is aligned with relevant GRI environmental disclosure standards, including:

GRI 102: Emissions 2025

Covers the measurement, reporting, and reduction of greenhouse gas emissions (Scope 1, Scope 2, and Scope 3), including the implementation of BECCS projects to achieve negative emissions.

GRI 103: Energy 2025

Reflects organizational energy management practices, energy efficiency improvements, promotion of renewable energy (e.g., solar rooftop systems), and reduced reliance on fossil-based electricity.

Disclosures under this Roadmap will be reported through the Vanachai Sustainability Move Report and form part of the Company's annual sustainability assurance process.

GRI 3-3: Management of Material Topics

Covers the management approach, governance, targets, actions, effectiveness tracking, and disclosure of climate change and carbon management as material sustainability topics.

and preparation for future alignment with GRI 102: Climate Change 2025, transitioning from GRI 305: Emissions, and GRI 103: Energy 2025, transitioning from GRI 302: Energy, from 1 January 2027 onwards.

2.3 ISO 14064 Series — Greenhouse Gas Accounting and Verification

The Company applies the ISO 14064 international standards to manage and verify carbon data as follows:

ISO 14064-1:

Definition of organizational boundaries, calculation, and reporting of greenhouse gas emissions at the organizational level.

ISO 14064-2:

Quantification and monitoring of emission reductions or carbon removals from specific projects, such as BECCS initiatives and biomass-based CO_2 capture systems.

ISO 14064-3:

Third-party verification and validation to ensure data accuracy and credibility.

These standards enable internationally recognized verification of CCS performance and support the registration of carbon credit projects under Thailand's carbon market mechanisms.

2.4 T-VER Methodology — Thailand Voluntary Emission Reduction Program

To enable the economic utilization of captured and stored carbon, the Company will operate under the Thailand Voluntary Emission Reduction Program (T-VER), developed by the Thailand Greenhouse Gas Management Organization (Public Organization: TGO).

T-VER Bio-CCS / BECCS Methodology:

Used to certify the quantity of biogenic carbon captured and stored within the system.

T-VER Registry System:

Supports project registration and domestic carbon credit trading through the FTIX Carbon Exchange.

Implementation under this framework allows the Company to generate verified carbon credits, which may be used for internal offsetting or traded in the carbon market.

2.5 IFRS S2 Climate-related Disclosures and TCFD Recommendations for climate governance, strategy, risk management, scenario analysis, metrics and targets, financial planning, and capital allocation.

2.6 Alignment with the United Nations Sustainable Development Goals (UN SDGs)

This Roadmap also contributes to the achievement of several United Nations Sustainable Development Goals (SDGs), including:

SDG 7: Affordable and Clean Energy

SDG 9: Industry, Innovation, and Infrastructure

SDG 12: Responsible Consumption and Production

SDG 13: Climate Action

SDG 15: Life on Land

2.7 GHG Protocol

The roadmap already uses Scope 1, Scope 2 and Scope 3 language. Therefore, adding GHG Protocol Corporate Standard and Scope 3 Standard will make the roadmap more complete and technically defensible.

3) Scope of Implementation

The Vanachai Carbon Capture and Storage (CCS) Roadmap 2025–2035 defines the scope of implementation as a structured framework for the development and execution of the Company's carbon capture, utilization, and storage initiatives. The scope covers the organizational level, operational activities, technologies, and collaboration with relevant stakeholders, ensuring a systematic and scalable approach to CCS deployment.

3.1 Organizational Scope

- Covers the operations of Vanachai Group Public Company Limited and all subsidiaries in Thailand.
- Includes business units involved in manufacturing, energy use, and the management of residual materials that serve as sources of carbon dioxide emissions.
- Encompasses collaboration with business partners and external organizations participating in CCS pilot projects or scale-up initiatives, under the Company's established cooperation frameworks.

3.2 Operational and Activity Scope

- Direct greenhouse gas emissions arising from manufacturing processes and the combustion of biomass fuels.
- Electricity and thermal energy consumption within production operations.
- Management of wood-processing residues, such as wood dust, sawdust, and bark, used as biomass fuel sources.
- Capture, utilization, and storage of carbon dioxide (CO_2) from high-concentration emission sources, with a particular focus on biogenic carbon dioxide (Biogenic CO_2).
- The operational scope prioritizes the application of Bio-CCS and BECCS technologies that are suitable for the Company's business profile and scalable to industrial deployment over the long term.

3.3 Technology Scope

- Carbon capture technologies applied to exhaust stacks or waste gas streams.
- Carbon utilization technologies integrated into manufacturing processes or value-added products.
- Long-term carbon storage solutions, including geological storage and mineralization.
- Monitoring, measurement, and reporting systems for carbon capture and storage performance.

3.4 Applicability and Limitations

- This Roadmap serves as a strategic framework for the development of the Company's CCS and BECCS initiatives.
- It does not constitute a detailed engineering design document or a project-specific investment plan.
- All projects implemented under this Roadmap must undergo project-level assessments covering technical feasibility, economic viability, environmental impacts, and regulatory compliance prior to execution.

4) Definitions and References

4.1 Definitions

Carbon Dioxide (CO_2):

A greenhouse gas generated from fuel combustion, energy production, and industrial activities, and a major contributor to global warming.

Carbon Capture:

The process of separating carbon dioxide from industrial exhaust gas streams or flue gas for the purpose of utilization or permanent storage, using technologies such as amine scrubbing, adsorption, membrane separation, or calcium looping.

Carbon Utilization:

Carbon Utilization: The process of using captured carbon dioxide in technically feasible, safe, and approved applications, including potential conversion into raw materials, mineralized products, carbonate additives, or other value-added products, subject to technical feasibility, product quality requirements, safety standards, environmental impact assessment, and applicable regulatory approval.

Carbon Storage:

The process of permanently storing captured carbon dioxide in forms that prevent its release back into the atmosphere, such as:

- Geological storage in subsurface rock formations;
- Storage in saline aquifers;
- Mineralization or conversion into stable carbonate compounds.

BECCS (Bioenergy with Carbon Capture and Storage):

A technology that combines biomass-based energy production with carbon capture and storage, enabling negative emissions, as biomass absorbs CO_2 during growth and the carbon is permanently stored after combustion.

Direct Emissions (Scope 1 Emissions):

Greenhouse gas emissions released directly from sources owned or controlled by the organization, such as fuel combustion, boilers, and biomass power plants.

Indirect Emissions (Scope 2 Emissions):

Greenhouse gas emissions resulting indirectly from the consumption of purchased electricity, heat, or steam.

Negative Emissions:

A condition in which the amount of carbon dioxide captured and permanently stored exceeds the amount emitted, resulting in net-negative carbon emissions at the organizational or process level.

Carbon Credit:

A tradable carbon right issued to projects that reduce or remove greenhouse gas emissions in accordance with recognized standards, which may be used for internal offsetting or traded in carbon markets.

Renewable Energy:

Energy derived from naturally replenishing sources, such as solar, wind, hydropower, and biomass, which plays a critical role in reducing greenhouse gas emissions.

Thailand Voluntary Emission Reduction (T-VER):

A voluntary greenhouse gas reduction certification program administered by the Thailand Greenhouse Gas Management Organization (Public Organization: TGO),

under which verified emission reductions or removals may be registered as carbon credits.

Vanachai Integrated Materiality and Risk Assessment (V-IMRA):
An internal assessment framework used by the Company to identify, assess, and prioritize sustainability-related impacts, risks, and opportunities across its operations and value chain. V-IMRA integrates both impact materiality and financial materiality considerations and provides structured inputs to the Enterprise Risk Management (ERM) system, strategic planning, and management decision-making.

4.2 References:

- **FTSE Russell ESG Ratings Methodology**: Environmental Pillar, including Environmental Management and Biodiversity & Ecosystem Services (EBD) indicators.
- **Global Reporting Initiative (GRI) Standards**:
  - **GRI 102**: Climate Change (2025)
  - **GRI 103**: Energy (2025)
- **ISO 14064 Series — Greenhouse Gas Accounting and Verification**:
  - **ISO 14064-1**: Specifications and guidance for the quantification and reporting of greenhouse gas emissions and removals at the organizational level;
  - **ISO 14064-2**: Specifications and guidance for the quantification, monitoring, and reporting of greenhouse gas emission reductions or removals at the project level;
  - **ISO 14064-3**: Specifications and guidance for the verification and validation of greenhouse gas statements.
- **Thailand Voluntary Emission Reduction Program (T-VER)**: Methodologies and certification frameworks administered by the Thailand Greenhouse Gas Management Organization (Public Organization: TGO).
- **Thailand Carbon Credit Exchange (FTIX):** Frameworks for carbon credit project registration and trading within the domestic carbon market.
- **United Nations Sustainable Development Goals (UN SDGs):**
  SDGs 7, 9, 12, 13, and 15.
- **Environmental Policy** (Document Code: VNG-ENV-EVT-PL-02): An internal reference document ensuring alignment of CCS implementation with the Company's environmental policy and overall sustainability strategy.

5) Governance Structure and Responsibilities

The Company has established a clear governance structure and accountability framework for the implementation of the Vanachai Carbon Capture and Storage (CCS) Roadmap 2025–2035 to ensure that carbon capture, utilization, and storage

(CCUS/BECCS) activities are conducted effectively, transparently, and in a verifiable manner.

The governance structure and roles of each responsible body are as follows:

5.1 Board of Directors:

- Approves policies, strategic roadmaps, and target frameworks related to carbon management across the Group.
- Oversees alignment of CCS implementation with applicable laws, international standards, and the Company's ESG framework.
- Reviews progress and performance of carbon capture and storage initiatives at least annually.

5.2 Audit Committee

- Oversees, monitors, and reviews the accuracy and reliability of data related to emissions, carbon capture, and carbon storage.
- Reviews greenhouse gas emissions data and carbon reduction or removal results prior to public disclosure.
- Ensures the adequacy of internal control systems related to carbon data reporting and oversees third-party verification processes.
- Reports audit findings and provide policy recommendations and improvement proposals to the Board of Directors.

5.3 Sustainability Committee

- Defines the strategic framework and technical implementation plans for carbon capture and storage and related projects.
- Oversees the integration of CCS initiatives with the Company's Net Zero roadmap and overall sustainability strategy.
- Coordinates implementation with internal functions, including engineering, environmental management, energy management, and innovation teams.
- Reviews annual performance, proposes improvement plans, and reports to the Board of Directors.

5.4 Sustainability Development Task Force

- Serves as the central coordinating body for managing and implementing the CCS Roadmap.
- Works with internal units and external advisors to assess, analyze, and select appropriate CCS/BECCS technologies.
- Prepares regular progress and performance reports for submission to the Sustainability Committee.
- Collects greenhouse gas emissions data from all facilities for reporting and verification in accordance with international standards.

5.5 Engineering and Energy Management Units

- Design, install, and develop carbon capture and storage systems at the plant level.

- Measure and monitor CO_2 emissions and captured volumes from each production process.
- Develop approaches to improve energy efficiency in parallel with greenhouse gas emission reduction.
- Coordinate with external technology and innovation partners.

5.6 Environmental and Carbon Reporting Units

- Collect and manage emissions, capture, and storage data in accordance with ISO 14064 and GRI 102.
- Develop and maintain the Company's carbon data management and monitoring systems.
- Review data completeness and accuracy prior to disclosure and submission for third-party verification.
- Support project registration and carbon credit certification processes.

5.7 Plants and Subsidiaries

- Implement the CCS Roadmap at the operational and facility level, applying consistent monitoring, measurement, and reporting practices.
- Appoint a CCS Project Focal Point at each facility.
- Ensure safety management, maintenance, and quality control of carbon capture and storage systems.

5.8 External Partners and Organizations

- Collaborate with energy companies, academic institutions, research organizations, and the Thailand Greenhouse Gas Management Organization (TGO) as technical partners.
- Support the development of BECCS technologies, performance verification, and carbon credit certification in accordance with applicable standards (T-VER / ISO 14064-2).
- Promote national knowledge-sharing networks related to Bio-CCS and BECCS.

5.9 Reporting and Performance Monitoring

- All CCS-related activities are integrated into the Vanachai Sustainability Framework reporting system.
- Progress and performance are disclosed annually in the Vanachai Sustainability Move Report under the section "Climate Action & Carbon Management."
- The Sustainability Committee reviews CCS performance every six months and updates implementation approaches as appropriate.

6) Strategic Roadmap and Timeline

To ensure that the Company's carbon capture, utilization, and storage initiatives are implemented in a systematic, well-directed, and continuous manner, the Company has established a ten-year strategic roadmap (2025–2035). The roadmap is structured into

three key phases, reflecting different levels of data readiness, technological maturity, and business integration, as outlined below.

- **Phase 1 — Foundation (2025–2026): "Measure and Map"**
  Strategic Approach: Develop robust data systems and technical understanding of carbon emission sources to establish a strong foundation for the effective development of carbon capture and storage technologies.
  Objectives:
  - Identify greenhouse gas emission sources within production facilities.
  - Assess the feasibility of deploying CCS and BECCS systems at an industrial scale.

  Key Actions:
  - Develop facility-level greenhouse gas emission maps (GHG Mapping), distinguishing between biogenic carbon and fossil carbon sources.
  - Assess the concentration and quality of CO_2 from key emission sources, such as biomass boilers and energy systems.
  - Conduct CCS/BECCS feasibility studies in collaboration with academic institutions and technology partners.
  - Develop a Carbon Capture Opportunity Map (CCOM) to identify high-potential capture points.

  Expected Outcomes:
  - A greenhouse gas emissions database verified in accordance with ISO 14064-1.
  - A feasibility study report with recommended pilot sites for subsequent phases.
  - Establishment of technical teams and CCS focal points at the plant level.

- **Phase 2 — Pilot Implementation (2027–2029): "Capture and Reuse"**
  Strategic Approach: Initiate pilot projects to demonstrate the technical and economic feasibility of biogenic carbon capture and utilization at the plant level, supported by real operational data.
  Objectives:
  - Demonstrate carbon capture and utilization processes from biomass-based operations in pilot facilities.
  - Generate operational and economic performance data to inform scale-up decisions.

  Key Actions:
  - Install pilot-scale CO_2 capture systems at selected facilities with high readiness.
  - Test the utilization of captured CO_2 in manufacturing processes, raw materials, or internal applications.

- Register pilot projects under relevant carbon certification and crediting mechanisms.
- Systematically collect data on costs, performance, and environmental impacts.

Expected Outcomes:

- Pilot systems capable of capturing and utilizing CO_2 at measurable and verifiable levels.
- Empirical data to support economic feasibility assessments.
- Pilot projects prepared for future scale-up and replication.

Key Performance Indicators (KPIs):

- Percentage of CO_2 captured relative to total facility emissions.
- Number of technical and commercial partners engaged (≥ 3 organizations).
- At least one T-VER–certified project.

- **Phase 3 — Scale-Up (2030–2035): "Store and Monetize"**

Strategic Approach: Scale up carbon capture and storage from pilot projects to become an integral component of the Company's core operations and long-term low-carbon business strategy.

Objectives:

- Expand CCS and BECCS deployment across all production facilities.
- Integrate carbon capture and storage data into the Company's environmental management systems and sustainability reporting frameworks.

Key Actions:

- Expand the deployment of carbon capture and storage systems across major emission sources within the Group.
- Develop long-term carbon storage solutions in collaboration with external partners.
- Utilize CCS performance data to support Life Cycle Assessment (LCA) and the development of low-carbon and carbon-negative products.
- Link CCS performance outcomes with carbon market mechanisms and structured disclosure to stakeholders.

Expected Outcomes:

- Significantly increased industrial-scale CO_2 capture and storage capacity.
- Enhanced positioning of the Company as a low-carbon and carbon-negative organization.
- Long-term business value creation from integrated carbon management.

Key Performance Indicators (KPIs):

- CO_2 captured and stored ≥ 20,000 tonnes per year by 2035.

- Biomass energy contribution, biomass fuel quality, avoided emissions from biomass substitution, boiler efficiency, and renewable energy share shall be monitored and disclosed annually.
- Number of priority wood-based product groups with LCA/EPD readiness, verified product carbon data, or product-level environmental information increased progressively.
- Economic value from carbon credits, avoided costs, carbon-related partnerships, or carbon value creation shall be tracked and disclosed where measurable and verifiable.

Summary Overview:

Timeframe	Core Strategy	Key Outcomes	Key Indicators
2025–2026	Establish data foundations and technical understanding	Facility-level GHG Mapping, biogenic and fossil carbon separation, CCS/BECCS feasibility studies, pilot site identification, and Carbon Capture Opportunity Map development	ISO 14064-1 verified emissions inventory, GHG Mapping coverage, CCOM Map, number of assessed high-potential capture points
2027–2029	Demonstrate CO_2 capture and utilization system	Pilot Bio-CCS/BECCS projects, initial T-VER or other recognized certification readiness, first measurable captured CO_2 data, and pilot-stage economic feasibility evidence	1,000-3,000 tCO_2 captured or utilized per year, number of pilot sites, number of technical and commercial partners, MRV readiness, at least one project prepared for certification
2571–2578	Scale up commercial and strategic deployment	Industrial-scale CCS/BECCS readiness, carbon storage or utilization pathway confirmed, carbon market participation where feasible, and integration with LCA/EPD and product carbon data	CO_2 captured and stored at least 20,000 tCO_2/year by 2035, verified captured or stored CO_2 volume, certified carbon credits where applicable, CCS data integrated into sustainability reporting

7) Targets, Performance Indicators, and Measurement

The Vanachai Carbon Capture and Storage (CCS) Roadmap 2025–2035 establishes clear strategic targets and performance indicators to reflect the Company's commitment to greenhouse gas (GHG) emission reduction, carbon capture and

storage, and the development of carbon-negative technologies with measurable and verifiable outcomes.

These targets are aligned with relevant international reporting frameworks and standards to ensure transparency, credibility, and comparability.

Strategic Targets and Performance Indicators

Category	Target by 2030	Target by 2035	Indicators/Standards
Greenhouse Gas Emission Reduction	Support the Group's broader target to reduce emissions by approximately 50% by 2030, using 2024 as the base year, through at-source reduction, renewable energy, energy efficiency, and CCS/BECCS pilot readiness	Support progress toward more than 65% operational emissions reduction and scale CCS readiness to at least 20,000 tCO_2/year by 2035	GRI 102, GRI 103, GRI 3-3, FTSE Russell Climate Change, ISO 14064-1
CO_2 Captured, Utilized, and Stored	Capture or utilize approximately 1,000-3,000 tCO_2/year through pilot Bio-CCS/BECCS activities, subject to technical, financial, environmental, and verification feasibility	Expand carbon capture and storage to at least 20,000 tCO_2/year across priority facilities, subject to feasible storage, utilization, certification, and MRV pathways	ISO 14064-2, ISO 14064-3, T-VER or other recognized carbon certification mechanism, third-party verification
Carbon Credits and Market Mechanisms	Prepare eligible pilot projects for registration under applicable carbon certification mechanisms where methodologies are available and suitable	Generate verified carbon credits or recognized carbon removal outcomes where technically and commercially feasible	T-VER Registry, FTIX records, recognized carbon registry, MRV documentation
Technical and Policy Collaboration	Collaborate with at least three domestic technical, academic, or commercial partners to assess CCS/BECCS feasibility	Expand collaboration with at least five national, regional, or technology partners to support scale-up, storage, verification, and market readiness	Stakeholder engagement report, partnership records, project feasibility reports
Renewable Energy and Energy Efficiency	Maintain a high share of renewable electricity and heat energy, building from 71.6% in 2025, and improve energy intensity through biomass optimization, boiler efficiency, heat recovery, and process controls	Maintain high renewable energy contribution and integrate energy efficiency performance with CCS/BECCS readiness and Net Zero 2050 implementation	GRI 103, GRI 102, ISO 50001, FTSE Russell ECC31
Disclosure and Assurance	Disclose CCS roadmap progress, pilot readiness, MRV development, and key carbon performance indicators in the	Disclose verified CCS/BECCS performance, captured or stored CO_2 volume, carbon credits or	GRI 2-3, GRI 2-5, GRI 3-3, GRI 102, FTSE ESG, external assurance

Category	Target by 2030	Target by 2035	Indicators/Standards
	annual Sustainability Move Report	removals, and assurance outcomes	
Carbon Innovation and Technology	Conduct pilot R&D projects on technically feasible CO_2 utilization, storage, mineralization, or carbon value creation pathways	Scale technically and commercially viable carbon innovation into core operations or product development where feasible	Innovation KPIs, CCS Roadmap KPIs, feasibility studies, LCA/EPD readiness

Additional Notes:

- The base year for all comparative targets is 2024.
- GHG quantification and measurement are conducted in accordance with ISO 14064-1 and the IPCC 2006 Guidelines.
- Verification of CO_2 capture and storage outcomes follows ISO 14064-2, conducted by independent third-party verifiers accredited by TGO or internationally recognized accreditation bodies.
- Performance results and progress updates are publicly disclosed in the Vanachai Sustainability Move Report on an annual basis to ensure transparency and accountability.

Strategic Summary

The targets and performance indicators under the Carbon Capture and Storage Strategic Roadmap 2025-2035 demonstrate Vanachai Group's commitment to advancing verified carbon management, including carbon capture, utilization, storage, and carbon value creation. The Roadmap serves as an enabling strategy under the Climate Change and Carbon Management Strategic Plan and supports the Company's Net Zero 2050 ambition.

The roadmap prioritizes verified data, MRV readiness, pilot Bio-CCS/BECCS implementation, and scale-up of carbon capture and storage toward at least 20,000 tCO_2 per year by 2035, subject to technical, financial, environmental, regulatory, and verification feasibility. Together with energy efficiency, renewable energy, Scope 3 engagement, product carbon data, and verified removals, the Roadmap supports Vanachai's long-term transition toward low-carbon and carbon-resilient wood-based products.

8) Integration with Corporate Strategy

The Vanachai Carbon Capture and Storage (CCS) Roadmap 2025–2035 serves as a key mechanism linking Vanachai Group's environmental performance with the

Company's long-term corporate strategy, under the guiding principle of "Growing with Nature" and the vision "Forest I Future I Together for Sustainable Living."

This Roadmap is designed to be fully aligned with and integrated into the Vanachai Sustainability Framework 2025, with the objective of embedding carbon management into core business operations and strategic decision-making processes across the organization.

8.1 Alignment with Low-Carbon and Circular Economy Strategy

- Increasing the share of renewable energy and enhancing the efficiency of biomass energy utilization
- Promoting the use of renewable resources and the management of wood-processing residues in accordance with circular economy principles
- Closing the carbon loop through the capture and storage of biogenic carbon from production processes and energy generation
- These approaches are aligned with the Circular Bioeconomy concept, which Vanachai has adopted as a long-term business framework.

8.2 Linkage with Corporate Policies and Core Frameworks

The CCS Roadmap directly supports and is aligned with the Group's key policies and strategic plans, including:

- **Environmental Policy**: Supporting the use of renewable energy, such as solar rooftop systems, and improving energy efficiency at production facilities to reduce CO_2 emissions requiring capture
- **Biodiversity Policy**: The development of BECCS technologies contributes to carbon sequestration and reduces pressure on natural forests, supporting ecosystem conservation under the concept of "conservation-based economic forestry"
- **Policy on Innovation Management and Value Creation**: Promoting research and development of new technologies, including CO_2 conversion into value-added products and the development of carbon-absorbing wood-based products
- **Vanachai Net Zero 2050 Roadmap**: The CCS Roadmap functions as a key enabler for addressing residual emissions, developing verified carbon removals, and supporting carbon value creation. Any use of carbon credits or removals for residual emissions shall be subject to recognized certification mechanisms, transparent MRV, and alignment with the Company's Net Zero 2050 transition pathway.

8.3 Integration into Management Systems

- Incorporating CCS performance outcomes into the ISO 14001 Environmental Management System and the ISO 50001 Energy Management System

- Utilizing carbon capture and storage data in Life Cycle Assessment (LCA) and Environmental Product Declaration (EPD) processes to enhance products toward carbon-neutral or low-carbon product classifications
- Integrating CCS Roadmap targets into the Key Performance Indicators (KPIs) of engineering, energy, and environmental functions

8.4 Alignment with National and Global Strategies

- Supporting Thailand's BCG Economy Model (Bio-Circular-Green Economy)
- Aligning with Thailand's Nationally Determined Contribution (NDC) and the national Net Zero 2050 target.
- Linking with international frameworks, including:
  - FTSE Russell ESG Ratings (Environmental Pillar: ECC – Climate Change, EPR – Pollution & Resources, EBD – Biodiversity)
  - GRI Standards (102, 103)
  - United Nations Sustainable Development Goals (UN SDGs): SDGs 7, 9, 12, 13, and 15

8.5 Stakeholder Engagement and Communication

- Conducting internal communications to build awareness, understanding, and engagement among employees at all levels in carbon reduction initiatives
- Disclosing CCS performance and progress to external stakeholders through the Vanachai Sustainability Move Report, the corporate website, and ESG-related activities
- Encouraging business partners and relevant external organizations to participate in the co-development and scaling of carbon capture and storage projects with the Company.

9) Monitoring, Reporting, and Transparency

To ensure that the implementation of the Vanachai Carbon Capture and Storage (CCS) Roadmap 2025–2035 is transparent, verifiable, and accurately reflects actual performance, the Company has established systematic monitoring, reporting, and disclosure mechanisms as follows:

9.1 Monitoring System:

The Company will establish a Carbon Performance Monitoring System to collect, analyze, and track data on carbon emissions, carbon capture, utilization, and storage (CO_2) across all production facilities within the Group.

- Data will be consolidated into a Digital Carbon Dashboard, enabling real-time performance tracking and reporting to management.
- Monitoring activities will be jointly undertaken by the following key units:
  - Environment & GHG Reporting Unit

- Engineering & Energy Management Division
- Sustainability Development Task Force

- Monitoring results will be presented to the Sustainability Committee for review at least on a semi-annual basis.

9.2 Performance Reporting

- Carbon capture and storage performance will be disclosed in the Company's annual Vanachai Sustainability Move Report, under the section "Transition to a Low-Carbon Society."
- The report will include key quantitative indicators, such as:
  - Total CO_2 emissions and captured volumes
  - Amount of verified carbon credits obtained
  - Renewable energy utilization and emission intensity reductions
- In addition, CCS performance will be reported through relevant internal and governance documents, including:
  - Environmental Performance Report
  - Audit & Sustainability Committee Report

9.3 Reporting Standards and Disclosure Frameworks

Data collection and reporting will be conducted in accordance with recognized international standards and frameworks, including:

- **GRI 102 – Climate Change**: For measurement and disclosure of greenhouse gas emissions and emission reduction performance
- **FTSE Russell ESG Ratings**: Indicators including EPR06, EPR09, EPR13, EPR15, ESC02–ESC12, EBD17, and ECC indicators (Environmental Management Indicators) for tracking progress against environmental objectives
- **ISO 14064 Series:** For greenhouse gas accounting, reporting, and verification at both organizational and project levels
- **T-VER Methodology:** For certification of emission reductions or carbon removals from BECCS projects under Thailand's voluntary carbon market framework

9.4 Verification and Assurance

- To enhance data credibility, the Company will subject carbon capture and storage performance to verification by an independent third-party verifier accredited under relevant standards.
- Verification will be conducted periodically, as appropriate, and verification outcomes will be reported to the Board of Directors and disclosed publicly through the Company's sustainability reporting.

9.5 Transparency and Stakeholder Communication

- The Company places strong emphasis on transparent communication and will disclose carbon-related information through multiple channels, including:
  - Annual Vanachai Sustainability Move Report
  - Corporate Website (Sustainability Section)
- Participation in FTSE Russell ESG assessment, relevant climate disclosure platforms, and applicable carbon registry mechanisms, where relevant and available.
- Progress updates and good practices will be communicated to all stakeholder groups, including government agencies, industry partners, local communities, and the media, to foster shared understanding and reinforce confidence in Vanachai's role as an organization committed to a low-carbon society.

10) Continuous Review and Improvement

The Company recognizes that effective carbon management is a dynamic process requiring continuity, adaptability, and ongoing improvement to keep pace with evolving technologies, standards, and national policy frameworks. Accordingly, the Company has established transparent, systematic, and verifiable mechanisms for the periodic review and continuous enhancement of this strategic roadmap, ensuring that it accurately reflects actual performance and remains fit for purpose. The key mechanisms are as follows:

- **Periodic Review:** The Carbon Capture and Storage (CCS) Roadmap will be formally reviewed at least once every two years by the Sustainability Committee to assess its alignment with the Company's overall corporate strategy, climate change strategy, and evolving environmental, energy, and regulatory conditions.
- **Updates in Response to Technological and Policy Developments:** The Roadmap will be updated in a timely manner in response to significant changes, such as advancements in BECCS and related technologies, the introduction of new carbon certification standards, or changes in government policies and national or international strategic frameworks related to climate action and carbon management.
- **Learning from Implementation and Pilot Projects:** Performance outcomes from CCS pilot projects will be systematically analyzed to refine investment models, capture system design, and long-term carbon storage approaches. Lessons learned will also be used to support scaling up and replication across other facilities within the Group.

- **Organization-wide Communication and Implementation:** Any revisions or updates to the roadmap will be clearly communicated to all relevant functions and business units to ensure consistent understanding and coherent implementation across all operational levels, enabling continuous and effective execution of the strategy.

11) Statement of Commitment

"Vanachai is committed to becoming a leader in carbon-negative innovation through the development of Bio-Carbon Capture and Storage (BECCS) technologies. By capturing and utilizing biogenic carbon from wood-based manufacturing processes, the Company aims to enhance the value of a forest-based circular economy and contribute to Thailand's transition toward a sustainable low-carbon society."

The Company believes that the implementation of carbon capture and storage is not solely a measure to mitigate environmental impacts, but also a strategic opportunity to create new forms of economic and social value for the country. This commitment reflects Vanachai's strong sense of corporate responsibility toward the planet and future generations.

Vanachai will uphold the principle of "**Forest | Future | Together – for a Sustainable Living**" by integrating business growth with the conservation of natural resources, the advancement of clean technologies, and the promotion of sustainable coexistence among all stakeholders.

12) Revision History of the Carbon Capture and Storage Strategic Roadmap

Version	Date	Policy Owner	Approved by	Key Changes / Remarks
1.0	25 February 2026	Sustainability Committee	Board of Directors	Initial issuance of the Vanachai Carbon Capture and Storage (CCS) Roadmap 2025–2035, defining the 10-year strategic framework, governance structure, strategic objectives, performance indicators, and implementation approach aligned with international standards

This strategic roadmap is approved and issued for acknowledgement and implementation by all relevant parties.