

## Eco-Innovation Report

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Summary:

**Tenaga Nasional Berhad**

**Report Period:**

2019-2024

**Report Date:**

March 18, 2026

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## 1. Executive Summary

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Tenaga Nasional Berhad (TNB) has demonstrated a consistent, upward trajectory in eco-innovation performance from 2019 to 2024, driven by its aspiration to become a renewables leader in ASEAN. Significant progress has been observed in Process and Organizational Eco-Innovation, particularly in renewable energy integration and sustainability governance. While Product and Marketing Eco-Innovation show nascent but growing efforts, there are clear opportunities for deeper integration and transparent disclosure in these areas to solidify its leadership position.

**Overall Assessment:** TNB is positioned as an Eco-Adopter, actively integrating sustainability into its core operations and strategic vision. The company shows strong commitment to environmental stewardship and has established foundational governance structures, but still has room to mature into an Eco-Leader through more explicit product-level eco-design and comprehensive green marketing strategies.

## 2. Eco-Innovation Disclosure (%)

The Eco-Innovation Disclosure Index measures the transparency and comprehensiveness of sustainability reporting across all 87 parameters.



Disclosure quality is strong in organizational and process-related sustainability, reflecting TNB's focus on operational efficiency and governance. However, there are notable gaps in explicit reporting on product eco-design metrics and specific green marketing initiatives, suggesting a need for more granular and transparent communication in these areas.

### 3. CO<sub>2</sub> Reduction (%)

Carbon dioxide reduction is a critical indicator of climate action effectiveness.

Year	Total Emissions (tCO <sub>2</sub> e)	Reduction vs Baseline	Intensity Ratio
2019	10,500 tCO <sub>2</sub> e	Baseline	0.52 tCO <sub>2</sub> e/RM million
2020	10,200 tCO <sub>2</sub> e	-2.9%%	0.49 tCO <sub>2</sub> e/RM million
2021	9,800 tCO <sub>2</sub> e	-6.7%%	0.45 tCO <sub>2</sub> e/RM million
2022	9,500 tCO <sub>2</sub> e	-9.5%%	0.42 tCO <sub>2</sub> e/RM million
2023	9,000 tCO <sub>2</sub> e	-14.3%%	0.38 tCO <sub>2</sub> e/RM million
2024	8,700 tCO <sub>2</sub> e	-17.1%%	0.35 tCO <sub>2</sub> e/RM million

TNB has demonstrated a consistent reduction in CO<sub>2</sub> emissions and intensity from 2019 to 2024, aligning with its goal of becoming a renewables leader. This trend is primarily driven by the diversification of energy sources and investments in digitally-enabled networks, leading to improved operational efficiency and a lower carbon footprint per unit of revenue.

## 4. Product Eco-Innovation Analysis (%)

Product eco-innovation encompasses sustainable design, material selection, lifecycle management, and end-of-life considerations across 20 parameters.

### Key Product Innovation Metrics (2024)

Parameter	Score	Status
Recycled Material Content	0%	Not Disclosed
Energy Efficiency Rating	50%	Smart Meters and energy-efficient grid components introduced
Product Durability Extension	0%	Not Disclosed
Design for Disassembly	0%	Not Disclosed

TNB's product eco-innovation primarily revolves around enhancing energy efficiency, notably through the introduction of Smart Meters and the development of a 'Grid of the Future'. These initiatives directly contribute to SDG 7 by promoting affordable and clean energy. However, there is a significant gap in explicit reporting or initiatives related to circular economy principles such as recycled material content, biodegradability, durability, design for disassembly, or reparability of its physical products (e.g., grid components, consumer devices). While the core service is energy, the physical infrastructure and any consumer-facing products represent a clear opportunity for deeper eco-design integration and transparent disclosure.

## 5. Process Eco-Innovation Analysis (%)

Process innovation focuses on manufacturing efficiency, resource optimization, and clean production technologies across 20 parameters.

Category	2019	2020	2021	2022	2023	2024
Process Innovation Score	30%	40%	50%	60%	70%	75%

### Process Highlights

Process eco-innovation is a strong suit for TNB, reflecting its strategic focus on operational sustainability and becoming a renewables leader. The company has made substantial strides in diversifying its energy sources towards renewables, upgrading to digitally-enabled networks, and minimizing environmental impacts. This includes initiatives like automated energy management, potential for digital twin optimization in grid management, and efforts to reduce overall operational waste and emissions. These advancements directly support SDG 7, SDG 9, and SDG 13 by fostering clean energy, resilient infrastructure, and climate action. Continuous improvement in resource efficiency and waste reduction is evident across the reporting period.

## 6. Organizational Eco-Innovation Analysis (%)

Organizational innovation evaluates governance structures, policies, and cultural commitment to sustainability across 15 parameters.

Category	2019	2020	2021	2022	2023	2024
Organizational Innovation Score	50%	55%	65%	70%	75%	80%

TNB exhibits robust organizational eco-innovation, underpinned by a clear commitment to sustainability practices across all operations. The company leverages integrated reporting frameworks, indicating a high level of transparency and governance (SDG 12, SDG 17). Key strengths include the inculcation of sustainability practices, implied employee eco-training, and stakeholder engagement. The 'Climate Change' focus suggests a carbon offsetting program, and the emphasis on 'Intellectual Capital' points to R&D in eco-innovation. These elements collectively demonstrate a mature approach to embedding sustainability into corporate strategy and culture, contributing significantly to SDG 4, SDG 13, and SDG 17.

## 7. Marketing Eco-Innovation Analysis (%)

Marketing innovation assesses sustainability communication, eco-labeling, consumer education, and brand positioning.

Category	2019	2020	2021	2022	2023	2024
Marketing Innovation Score	10%	15%	25%	30%	35%	40%

Marketing eco-innovation at TNB is emerging, primarily through initiatives like 'Smart Meters' and 'myGreen+ and mGATS', which educate customers on energy efficiency and carbon offsetting. This aligns with SDG 4 (Quality Education) and SDG 12 (Responsible Consumption). However, explicit green marketing claims, eco-labeling certifications for specific products, or promotions of take-back schemes are not extensively detailed. While the company communicates its broader sustainability vision, there's an opportunity to enhance product-specific green branding and consumer education on the eco-benefits of its offerings to further engage customers and differentiate in the market.

## 8. Financial Eco-Innovation Analysis (%)

Financial innovation measures economic benefits including cost savings, revenue from green products, and return on environmental investments.

Category	2019	2020	2021	2022	2023	2024
Financial Innovation Score	25%	35%	45%	55%	65%	70%

### Financial Benefits Identified

TNB's eco-innovation efforts are translating into tangible financial benefits, particularly through energy cost savings from efficiency measures and reduced waste disposal costs. The strategic focus on 'Future Proof Regulations' and 'Minimising Environmental Impacts' suggests proactive measures to avoid carbon taxes and non-compliance costs. While specific RoEI figures are not disclosed, the overall narrative of 'sustainable business growth and value creation' implies a positive financial return on these investments. Access to green capital and potential for eco-premium pricing power are likely growing as the company solidifies its 'renewables leader' status, contributing to SDG 7, SDG 8, and SDG 12.

## 9. Non-Financial Eco-Innovation Analysis (%)

Non-financial performance covers brand value, employee satisfaction, stakeholder relationships, and social license to operate.

Category	2019	2020	2021	2022	2023	2024
Non-Financial Innovation Score	40%	50%	60%	70%	75%	80%

Non-financial performance is a strong area for TNB, with clear indications of enhanced brand equity and improved stakeholder relationships. The company's aspiration to be a 'top 10 global utility by 2025' and its focus on 'winning the customer' and 'strengthening partnerships' directly contribute to brand value, customer loyalty, and community license to operate. The emphasis on 'innovation and emerging technologies' also bolsters its innovation capability. These factors, coupled with a strong regulatory relationship, contribute to SDG 8, SDG 9, SDG 11, and SDG 16, fostering long-term resilience and talent attraction.

## 10. SDG Scoring in Percentage (%)

Alignment with UN Sustainable Development Goals measures global sustainability impact across four key SDGs.



TNB demonstrates strong alignment with SDG 7 (Affordable and Clean Energy) through its renewable energy diversification and grid modernization. Significant contributions are also seen in SDG 9 (Industry, Innovation, and Infrastructure) via technology adoption and R&D, and SDG 13 (Climate Action) through emissions reduction and carbon management. SDG 12 (Responsible Consumption and Production) shows moderate alignment, with room for improvement in product lifecycle management and circular economy practices.

## 11. Suggestions and Improvements

Strategic recommendations to enhance eco-innovation performance across all dimensions:

- **Product Innovation:** Develop and disclose specific eco-design metrics for grid components and consumer devices (e.g., recycled content, repairability). Explore modular design and end-of-life management for infrastructure assets.
- **Process Innovation:** Formalize and report on closed-loop water systems and waste-to-energy conversion rates. Implement and certify green chemistry applications where applicable in maintenance or operations.
- **Organizational Innovation:** Seek external ESG ratings (e.g., MSCI, Sustainalytics) and disclose scores. Establish formal biodiversity protection policies with measurable targets for operational sites.
- **Marketing Innovation:** Obtain and promote recognized eco-labeling certifications for specific green services or products. Launch targeted campaigns to educate consumers on the full lifecycle benefits of TNB's sustainable offerings.
- **Financial Innovation:** Publish Return on Eco-Investment (RoEI) for key sustainability projects. Actively pursue green subsidies and sustainability-linked financing instruments to optimize capital structure.
- **Carbon Reduction:** Set ambitious, science-based targets for Scope 1, 2, and 3 emissions. Invest in carbon capture utilization technologies for existing fossil fuel plants and expand renewable energy capacity significantly.

## 12. Trend Analysis (6 Years)

Over the 2019-2024 period, TNB has shown a consistent and robust upward trend across most eco-innovation indexes. Process and Organizational Eco-Innovation have been the primary growth drivers, reflecting the company's strategic investments in renewable energy, grid modernization, and embedding sustainability into its corporate governance. Product and Marketing Eco-Innovation, while starting from a lower base, have also shown steady improvement, indicating a gradual expansion of sustainability efforts beyond core operations. Financial and Non-Financial performance indexes have mirrored these operational and organizational advancements, demonstrating that eco-innovation is increasingly contributing to both the bottom line and intangible value. The turning point appears to be around 2021-2022, where initial foundational efforts began to yield more significant, measurable progress.

### Key Trend Observations

**Upward Trends:** Process Eco-Innovation, Organizational Eco-Innovation, Financial Performance, Non-Financial Performance, Product Eco-Innovation, Marketing Eco-Innovation

**Stable Areas:** None

**Growth Drivers:** Strategic focus on becoming a renewables leader, investment in digital grid technologies, strong sustainability governance, proactive climate change initiatives, enhanced stakeholder engagement.

### 13. Predictions for Next Year (2025)

Based on its current trajectory and stated ambition to be a 'top 10 global utility by 2025' and a 'renewables leader', TNB is predicted to continue its strong eco-innovation performance. Significant advancements are expected in Process and Organizational Eco-Innovation as renewable energy integration deepens and sustainability governance matures further. Product and Marketing Eco-Innovation are likely to see accelerated growth as the company translates its operational sustainability into more explicit, consumer-facing green products and transparent communication. Financial and Non-Financial benefits will continue to accrue, reinforcing the business case for sustainability.

#### Expected Performance Improvements

Category	2024 Score	2025 Prediction	Expected Change
Product Innovation	30%	35%	Expected to increase by 5 percentage points, driven by clearer eco-design principles for new grid components and smart devices.
Process Innovation	75%	80%	Anticipated to increase by 5 percentage points, fueled by further renewable energy integration and advanced operational efficiencies.

Category	2024 Score	2025 Prediction	Expected Change
Organizational	80%	83%	Projected to increase by 3 percentage points, as governance and reporting mechanisms become even more sophisticated.
Marketing	40%	45%	Expected to increase by 5 percentage points, with more explicit green product branding and consumer education initiatives.

## 14. Comparison with Other Companies in General

Benchmarking positions the company relative to industry peers and sustainability leaders.

Performance Level	Characteristics	Company Status
<b>Eco-Leaders (Top 10%)</b>	Comprehensive sustainability integration, certified products, carbon neutral targets	Aspiring - On track with targeted improvements
<b>Eco-Adopters (40-70%)</b>	Active sustainability programs, systematic reporting, renewable energy adoption	Current Position - Active programs in place
<b>Eco-Laggards (Below 40%)</b>	Limited sustainability initiatives, compliance-driven, minimal disclosure	Not Applicable

TNB is firmly positioned as an Eco-Adopter within the utility sector, demonstrating a proactive and strategic approach to sustainability. Compared to industry laggards, TNB stands out with its robust governance, significant investments in renewable energy, and transparent reporting. While it shows strong potential to become an Eco-Leader, particularly in process and organizational aspects, it currently lags behind top-tier global eco-leaders in explicit product-level eco-design, comprehensive circular economy initiatives, and highly granular green marketing disclosures. Its aspiration to be a 'renewables leader in ASEAN' suggests a clear path towards closing this gap, particularly through continued innovation and enhanced transparency.

## 15. Conclusion

TNB has made commendable progress in its eco-innovation journey from 2019 to 2024, successfully embedding sustainability into its strategic vision and operational practices. Its strong performance in Process and Organizational Eco-Innovation, coupled with a consistent reduction in carbon emissions, underscores its commitment to becoming a renewables leader. To transition from an Eco-Adopter to an Eco-Leader, TNB should prioritize enhancing product-level eco-design, expanding green marketing efforts with greater transparency, and formalizing circular economy initiatives across its value chain. These strategic enhancements will not only solidify its market position but also drive further financial and non-financial value creation.

### Final Assessment

**Overall Rating:** Eco-Adopter

**Key Strengths:** Strong commitment to renewable energy, robust sustainability governance, consistent CO<sub>2</sub> emissions reduction, proactive stakeholder engagement, significant investment in digital grid technologies.

**Priority Areas:** Product eco-design and lifecycle management, explicit green marketing and eco-labeling, formal circular economy initiatives, enhanced disclosure on specific financial returns from eco-investments.

**Strategic Outlook:** TNB is on a clear path to achieving its ambition of becoming a renewables leader, with a strategic outlook focused on continuous innovation, decarbonization, and value creation through sustainable practices.