



NOAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY

Noakhali - 3814, Bangladesh.

SDG PROGRESS REPORT 2024

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



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Comprehensive Report: SDG 9 - Industry, Innovation, and Infrastructure

Noakhali Science and Technology University

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Introduction

Noakhali Science and Technology University (NSTU) is fundamentally dedicated to advancing Sustainable Development Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. We believe that scientific research, technological development, and sustainable engineering are the primary engines for economic growth and societal resilience.

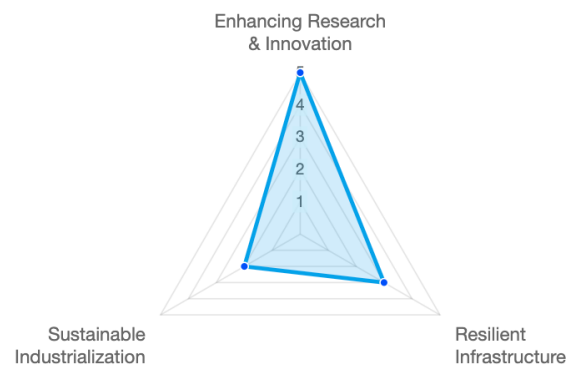
Our extensive 2024 research portfolio, featuring 38 high-impact publications, demonstrates a deep and multifaceted commitment to this goal. Our work is organized around two key pillars:

- Research and Innovation:** A high-impact 2024 research portfolio (38 publications) driving the foundational R&D for next-generation industries and sustainable infrastructure.
- Operations and Industry Linkages:** Translating our research into tangible economic impact through industry funding and fostering a nascent innovation ecosystem.

This report details our 2024 accomplishments across these critical pillars.

Pillar 1: Research for Innovation (2024)

Focus Areas of 2024 Research



Pillar 1: Progress through Research and Innovation

Our 2024 research is strategically focused on three core areas that directly align with the targets of SDG 9.

Section 1.1: Enhancing Scientific Research & Fostering Innovation (Targets 9.5, 9.b)

Our most significant contribution in 2024 has been to Target 9.5 (Enhance scientific research). Our researchers are pioneering the materials and technologies that will define future industries.

- Advanced R&D in Energy Technology:** We have produced a wealth of foundational research in clean energy generation, including innovation in solar (Shakil, J.A. et al.; Sifat,

M.I. et al.; Wasi, N.F. et al.), green hydrogen and fuel cells (Islam, F. et al.; Im, K. et al.), and novel energy harvesting materials (Rana, S.S. et al.; Islam, A.J. et al.).

- **Driving Green Technology & Innovation:** Our research provides blueprints for "green technology" in industrial processes (Ahmed, T. et al.) and analyzes the macroeconomic frameworks for green technology adoption (Voumik, L.C. et al.; Alam, M.B. et al.).

Section 1.2: Building Resilient & Sustainable Infrastructure (Targets 9.1, 9.a)

Our research directly supports the development of Target 9.1 (Quality, reliable, sustainable and resilient infrastructure).

- **Designing Future-Proof Infrastructure:** We are developing the blueprints for next-generation sustainable infrastructure, including using machine learning to identify optimal locations for EV charging stations (Ahmed, M. et al.) and frameworks for "Green Libraries" (Tanzin, M. et al.).
- **Enabling Resilient Infrastructure (Target 9.a):** We are producing the critical data and financial frameworks for infrastructure development. This includes resource prospecting for Concentrating Solar Power (Mia, M.S. et al.), climate data for resilient planning (Dia, R.B. et al.), and financial analysis of Green Bonds (Kumar, B. et al.).

Section 1.3: Promoting Sustainable & Efficient Industrialization (Targets 9.2, 9.4)

Our work promotes Target 9.4 (Upgrade industries to make them sustainable).

- **Greening Industrial Processes:** We are developing strategies to improve resource-use efficiency, including models for energy-efficient textile manufacturing (Tushar, S.R. et al.) and energy balance in agriculture (Deb, N.C. et al.).
- **Macroeconomic Analysis of Industrialization:** Our researchers are analyzing the complex interplay between industrialization, energy, economic growth, and environmental impact (Borsha, F.H. et al.; Raihan, A. et al.).

Pillar 2: Progress through University Operations and Industry Linkages

NSTU's operational strategy is focused on translating our deep research capabilities into tangible economic innovation and industrial partnerships.

Section 2.1: Research Income from Industry (2024)

We are actively building partnerships with industry to fund applied research. In 2024, our university generated **2,536,000 BDT** in research income from industry and commerce.

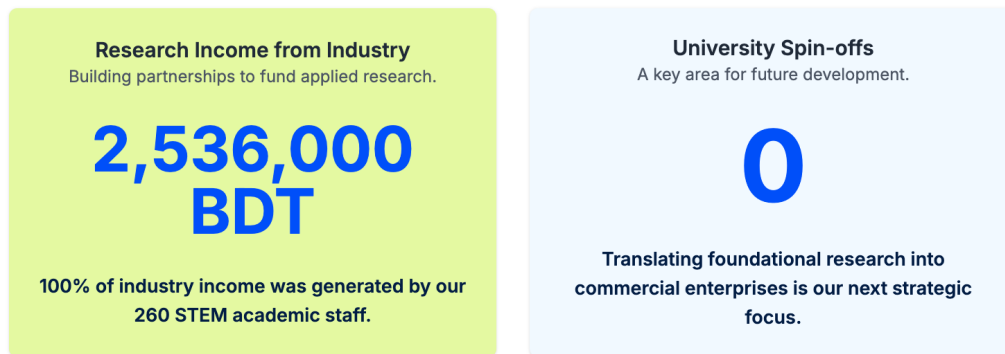
- **100%** of this income (**2,536,000 BDT**) was generated by our **260 STEM academic staff** (out of a total 395 academic staff). This highlights our strength in applied science and engineering and demonstrates a strong, targeted link between our STEM research and industrial needs.

Section 2.2: University Spin-offs (2024)

In 2024, the number of active university spin-offs was **0**. While our research in innovation is strong, we recognize that translating this foundational research into new commercial enterprises is a key area for future development and strategic focus.

Pillar 2: Operations – Industry & Innovation (2024)

We are building strong links to industry while identifying key areas for future growth in innovation.



Conclusion

Noakhali Science and Technology University's 2024 contribution to SDG 9 is powerful. Our 38 publications demonstrate a comprehensive strategy, fostering innovation through foundational R&D in materials and energy, designing sustainable infrastructure, and providing frameworks for efficient industrialization. Operationally, our **2,536,000 BDT** in industry-funded research demonstrates a strong and growing link between our STEM faculty and the private sector. While we have laid the groundwork for innovation, our 2024 data (0 spin-offs) provides a clear benchmark to focus future efforts on commercializing our research and fostering a vibrant start-up ecosystem.

Appendix: SDG 9 Targeting 2024 Publications Referenced

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3. Ridwan, M.K., Akther, A., Al-Absy, M.S.M., Yağış, O., Jaheer Mukthar, K.P. (2024). The Role of Tourism, Technological Innovation, and Globalization in Driving Energy Demand in Major Tourist Regions. *International Journal of Energy Economics and Policy*.
4. Islam, R., Abdur, R., Ashraful Alam, M., Islam, D., Jamal, M.S. (2024). Modulating Mn-doped NiO nanoparticles: structural, optical, and electrical property tailoring for enhanced hole transport layers. *Nanoscale Advances*.
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13. Deb, N.C., Basak, J.K., Paudel, B., Kang, M., Kim, H. (2024). Estimation of Energy Balance throughout the Growing–Finishing Stage of Pigs in an Experimental Pig Barn. *Agriculture Switzerland*.
14. Ahmed, T., Suzauddula, M., Akter, K., Hossen, M., Islam, M.N. (2024). Green Technology for Fungal Protein Extraction—A Review. *Separations*.
15. Raihan, A., Hasan, M.A., Voumik, L.C., Akter, S.M.S., Ridwan, M.K. (2024). Sustainability in Vietnam: Examining economic growth, energy, innovation, agriculture, and forests' impact on CO₂ emissions. *World Development Sustainability*.
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