SUSTAINABLE DEVELOPMENT GOAL

7

AFFORDABLE AND CLEAN ENERGY

SDG 7: Affordable and Clean Energy

1. Executive Summary

The University of Dhaka contributes to Sustainable Development Goal 7 (SDG 7: Affordable and Clean Energy) through academic research, technical capacity development, knowledge dissemination, and engagement with national and international stakeholders in the energy sector. During 2025, the University's Energy Institute (Shakti Institute) played a central role in promoting academic understanding of emerging clean energy technologies, particularly microbial fuel cells and solar photovoltaic systems.

The University's activities during the reporting period included technical seminars on microbial fuel cell technology and solar cell simulation, a national knowledge dissemination workshop examining the sixteen-year journey of the Energising Development (EnDev) initiative, and a strategic consultation with the Japan International Cooperation Agency (JICA) concerning a proposed institutional development initiative that included renewable energy among its priority areas.

The University also hosted the VisionX: AI Powered National Innovation Challenge, which brought together 41 teams from 35 universities. The participation of the Advisor to the Ministry of Power, Energy and Mineral Resources created an opportunity to connect academic innovation with national energy-sector priorities.

These activities demonstrate the University's contribution to clean energy research, technical knowledge development, policy engagement, and the promotion of innovation. However, the available records primarily document academic and institutional engagement rather than the implementation of renewable energy infrastructure on campus. No consolidated data on renewable energy generation, campus electricity consumption, energy efficiency improvements, or greenhouse gas emission reductions were available in the source material.

2. Institutional Commitment and Strategic Alignment with SDG 7

The University of Dhaka recognizes the importance of higher education institutions in advancing sustainable energy transitions through research, innovation, technical education, and collaboration with relevant stakeholders. Universities can contribute to the development of affordable and clean energy solutions by strengthening scientific knowledge, preparing skilled human resources, and supporting evidence-informed policy discussions.

Within this context, the Energy Institute (Shakti Institute) served as a key institutional platform for clean energy-related academic activities during 2025. Its seminars and technical knowledge-sharing initiatives focused on emerging technologies and research methodologies relevant to renewable energy development.

The University's engagement with JICA and the Sustainable and Renewable Energy Development Authority (SREDA) further demonstrated its interest in connecting academic expertise with national development priorities. These engagements reflect the University's

potential role in supporting Bangladesh's renewable energy transition through research, technical capacity building, and institutional cooperation.

The reporting period is January–December 2025. Nevertheless, the available activity records are concentrated mainly between July and November 2025. Accordingly, this report presents the documented initiatives without assuming that similar activities occurred during months for which specific evidence was not available.

3. Academic Research and Technical Capacity Development in Clean Energy

3.1 Seminar on Microbial Fuel Cell Technology

On 10 July 2025, the Energy Institute (Shakti Institute) organized a technical research seminar titled *"A Seminar on Microbial Fuel Cell Technology: Introduction, Theory, Design."* The seminar was held at the Institute's seminar room and focused on the fundamental principles, structural design, biochemical processes, and operational mechanisms of microbial fuel cells.

The session was presented by Md. Rakib Hossain, Research Assistant at the Energy Institute, and chaired by Dr. S. M. Nasif Shams, Director of the Institute.

Microbial fuel cells are an emerging bio-electrochemical technology that can convert chemical energy stored in organic compounds into electrical energy through microbial activity. The seminar explored the potential of this technology to combine organic waste treatment with electricity generation.

The session contributed to academic understanding of alternative bio-energy systems and their possible applications in low-cost and off-grid energy solutions. It also provided an opportunity to strengthen institutional research capacity in an emerging area of clean energy technology.

Contribution to SDG 7: The seminar supported knowledge development and research capacity in alternative energy technologies, particularly bio-energy generation. It was relevant to the broader objective of expanding knowledge and technological capabilities for sustainable energy solutions.

3.2 Technical Seminar on Solar Cells and SCAPS-1D Modelling

On 14 August 2025, the Energy Institute organized another technical capacity-building seminar titled *"Introduction to Solar Cell and SCAPS-1D (Part-1): Prerequisites for Publication on the Technological and Knowledge Implications of Solar Cells."*

The session was chaired by the Director of the Energy Institute and presented by a Research Assistant of the Institute. It focused on the application of SCAPS-1D (Solar Cell Capacitance Simulator in 1 Dimension), a numerical simulation tool used in photovoltaic device research.

The seminar covered several technical aspects of solar cell development, including:

- Numerical modelling of photovoltaic devices and semiconductor layers.
- Analysis of carrier transport and recombination mechanisms.

- Examination of spectral response and layer thickness.
- Optimization of photovoltaic device parameters before physical fabrication.
- Research methodologies and analytical requirements for publishing studies on solar cell technology.

An important aspect of the session was its emphasis on computational modelling as a means of reducing the cost and resource requirements associated with physical research and development. By enabling researchers to examine and optimize device parameters virtually, such methods can support more efficient investigation of affordable photovoltaic technologies.

The seminar strengthened the University's academic capacity to engage with solar energy research and provided technical exposure to an important area of renewable energy development.

Contribution to SDG 7: The initiative supported research and technical knowledge development in solar photovoltaic technology, contributing to the broader objective of advancing affordable renewable energy solutions.

4. Strategic Partnerships and National Energy-Sector Engagement

4.1 Strategic Development Meeting with JICA

During the week of 17 July 2025, senior leadership of the University of Dhaka, including the Vice-Chancellor and Treasurer, held a strategic development meeting with a high-level delegation from the Japan International Cooperation Agency (JICA).

The discussion focused on potential technical and financial cooperation for an upcoming institutional development project. The proposed areas of collaboration included:

- Renewable energy.
- Artificial intelligence.
- Financial technology.
- Environmental management.
- Science and technology infrastructure.

The proposed framework aimed to strengthen institutional capacity, improve laboratory infrastructure, and develop technical skills among young faculty members and undergraduate and postgraduate students.

Renewable energy was identified as one of the priority areas within this broader institutional development agenda. The proposed cooperation therefore offered a potential avenue for strengthening the University's research and technical capabilities in clean energy.

The meeting represented an important step in exploring international development cooperation. However, the available documentation records a strategic consultation and proposed areas of collaboration; it does not establish that a renewable energy project had been formally approved, financed, or implemented during 2025.

Contribution to SDG 7: The engagement demonstrated institutional interest in international cooperation for renewable energy research, technical capacity development, and science and technology infrastructure.

4.2 Knowledge Dissemination Workshop on EnDev's 16-Year Journey

During the week of 13 November 2025, the Energy Institute (Shakti Institute) organized a national-level knowledge dissemination workshop titled *"EnDev's 16-Year Journey."*

The workshop examined the sixteen-year implementation experience of the Energising Development (EnDev) initiative, which focuses on expanding access to sustainable energy in developing contexts.

The Chairman of the Sustainable and Renewable Energy Development Authority (SREDA) Board attended as the Chief Guest. The workshop featured two analytical sessions in which academic researchers and policy practitioners presented papers reviewing experiences in areas such as:

- Rural electrification.
- Clean cooking technologies.
- Off-grid renewable energy deployment.
- Sustainable energy access and development.

The workshop provided a platform for reviewing programme experiences and discussing their relevance to future energy-sector planning. Its engagement with SREDA leadership also connected academic knowledge dissemination with national institutional priorities.

By facilitating discussion between researchers and energy-sector policymakers, the University contributed to the exchange of knowledge on practical approaches to expanding sustainable energy access.

Contribution to SDG 7: The workshop supported knowledge sharing on renewable energy access, rural electrification, and clean cooking, with relevance to national energy policy and the expansion of sustainable energy services.

5. Innovation, Technology and Engagement with National Energy Priorities

5.1 VisionX: AI Powered National Innovation Challenge

On 20 November 2025, the Department of Computer Science and Engineering organized the *"VisionX: AI Powered National Innovation Challenge"* at the Nawab Ali Chowdhury Senate Bhaban of the University of Dhaka.

The national competition brought together 41 teams from 35 national and international universities to showcase applied artificial intelligence and software-based innovations. The event was chaired by the Vice-Chancellor, while the Pro-Vice-Chancellor (Administration) delivered the opening remarks.

The University of Dhaka achieved the Champion position in the Project Showcasing Track.

An important feature of the event was the participation of the Advisor to the Ministry of Power, Energy and Mineral Resources as the Chief Guest at the prize distribution ceremony. The participation of senior energy-sector leadership created an opportunity to connect university-led technological innovation with national development priorities.

Although the competition was not exclusively focused on energy technology, its engagement with the national energy leadership was relevant to discussions on the potential application of digital technologies in energy-sector modernization. Artificial intelligence and software-based innovation may have applications in areas such as energy management, smart systems, and resource monitoring.

The event therefore demonstrated the University's broader commitment to innovation and technology development, while creating opportunities for interaction between emerging talent and national policymakers.

Contribution to SDG 7: The event offered an indirect contribution to the technology and innovation dimensions of sustainable energy development. Its relevance to SDG 7 should be understood as an institutional innovation and stakeholder-engagement contribution rather than evidence of a completed energy technology deployment.

6. Consolidated SDG 7 Progress and Institutional Contributions

The University's documented initiatives during 2025 demonstrate contributions across research, technical capacity development, stakeholder engagement, and innovation. The following table summarizes the principal activities and their relevance to the SDG 7 framework.

Date	Activity	Organizing unit / stakeholders	Main contribution
10 July 2025	Seminar on Microbial Fuel Cell Technology	Energy Institute (Shakti Institute)	Academic capacity in bio-energy and emerging clean energy technology
17 July 2025	Strategic development meeting with JICA	University administration and JICA delegation	Exploration of renewable energy cooperation and technical capacity development
14 August 2025	Solar Cell and SCAPS-1D Modelling Seminar	Energy Institute (Shakti Institute)	Technical knowledge in photovoltaic research and simulation

13 November 2025	EnDev's 16-Year Journey Workshop	Energy Institute and SREDA	Knowledge dissemination on rural electrification, clean cooking, and renewable energy access
20 November 2025	VisionX: AI-Powered National Innovation Challenge	Department of Computer Science and Engineering; Ministry of Power, Energy and Mineral Resources leadership	Technology innovation and engagement with national energy-sector priorities

7. Alignment with Specific SDG 7 Targets

The University's documented activities can be mapped to several SDG 7 targets. The strength of alignment varies depending on whether an initiative directly addressed a particular target or contributed indirectly through research, capacity development, and institutional engagement.

SDG target	Focus area	University's documented contribution	Nature of alignment
7.1	Universal access to affordable, reliable and modern energy services	EnDev workshop discussions on rural electrification, clean cooking, and sustainable energy access	Knowledge and policy engagement
7.2	Increase the share of renewable energy in the global energy mix	Research seminars on microbial fuel cells and solar photovoltaic technologies	Research and technical capacity development
7.3	Improve energy efficiency	SCAPS-1D modelling seminar and discussion of computational optimization of photovoltaic devices	Indirect technical contribution
7.a	Enhance international cooperation and access to clean energy research and technology	JICA consultation on proposed renewable energy cooperation; engagement with SREDA through the EnDev workshop	Institutional cooperation and knowledge exchange
7.b	Expand infrastructure and upgrade technology for sustainable energy services	Technical research capacity, proposed institutional development cooperation, and engagement with energy-sector leadership through VisionX	Research and innovation-related contribution

The strongest documented contributions relate to research and technical capacity development under Target 7.2 and international cooperation and knowledge exchange under Target 7.a. The

other target linkages are more indirect and should not be interpreted as evidence of completed infrastructure expansion or measurable improvements in energy access and efficiency.

8. Institutional Impact and Significance

The initiatives during 2025 demonstrate the University's contribution to sustainable energy development through its academic and institutional functions.

Strengthening research capacity: The seminars on microbial fuel cells and solar photovoltaic modelling expanded opportunities for academic engagement with emerging renewable energy technologies. These activities helped establish a foundation for further research and technical exploration.

Promoting technological understanding: The use of computational simulation in photovoltaic research highlighted the importance of digital tools in exploring more affordable and efficient renewable energy technologies.

Connecting academic knowledge with policy: The EnDev workshop brought together academic researchers and national energy-sector stakeholders, including SREDA leadership. This provided a platform for discussing practical experiences and policy considerations relating to sustainable energy access.

Encouraging international cooperation: The JICA meeting reflected the University's interest in exploring international technical and financial cooperation, including in renewable energy and science and technology infrastructure.

Promoting innovation and interdisciplinary engagement: VisionX demonstrated the University's capacity to convene national and international university teams around applied technological innovation. The participation of the Ministry of Power, Energy and Mineral Resources leadership further strengthened the connection between academic innovation and national priorities.

Taken together, these activities illustrate the University's role as a contributor to the knowledge, research, and institutional collaboration needed to support Bangladesh's transition towards affordable and clean energy.

9. Conclusion

During 2025, the University of Dhaka demonstrated its commitment to Affordable and Clean Energy through academic research, technical capacity development, stakeholder engagement, and technological innovation. The Energy Institute's seminars on microbial fuel cells and solar photovoltaic modelling strengthened academic engagement with emerging clean energy technologies. The EnDev knowledge dissemination workshop connected research and policy discussions on sustainable energy access, while the JICA consultation explored potential international cooperation in renewable energy and institutional capacity development.

The VisionX national innovation challenge further demonstrated the University's broader role in promoting technological innovation and connecting academic talent with national development priorities.

While these initiatives represent meaningful institutional contributions to the knowledge and collaboration dimensions of SDG 7, further progress will require stronger documentation of campus-level renewable energy deployment, energy efficiency, and measurable energy performance. By combining its existing academic strengths with practical infrastructure development, research partnerships, and systematic monitoring, the University of Dhaka can further strengthen its contribution to Bangladesh's transition towards affordable, reliable, and sustainable energy.