Hasan Mahmud, PhD

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AREA OF EXPERTISE/ RESEARCH INTERESTS:

An energy policy expert and researcher with extensive experience in energy–economy modeling, renewable energy systems, long-term energy planning, and energy policy analysis. Professional work spans national and international research institutions, government organizations, and applied policy environments, with a strong focus on sustainable energy transition for developing economies, particularly Bangladesh.

AREA OF EXPERTISE/ RESEARCH INTERESTS:

- Global, national, and sub-national energy–economy modeling
- Renewable energy technologies and integration
- Long-term energy planning and scenario analysis
- Energy policy analysis and regulatory support
- Energy statistics and demand forecasting
- Energy pricing and market analysis
- Carbon markets and low-carbon development pathways

RESEARCH PROJECT INVOLVEMENT:

- Update the Integrated Energy and Power Masterplan of Bangladesh
- SLUDGE to OIL: Pilot scale Production of Petroleum Oil from Waste-Sludge through Hydrothermal Liquefaction
- Demand Response Enabled Future Smart Grid to Maximize Intermittent RE Penetration (Energy Meter for Priority Load management, Remote monitoring, Theft detection)
- Converting Solid Waste to Energy- MSW to Bio coal (pilot scale) for Power Generation
- Photo electro-catalytic Panel Technology for Green Hydrogen Generation from Water
- Develop Energy Harvesting Glass for Green Building Application
- Carbon markets and low-carbon development pathways
- A novel biomass derived Na/K-ion battery for low-cost energy storage system
- Design Standard for Easybikes (3 and 4 wheel EV)
- Development of a flow-acceleration system to maximize the power output of wind turbine
- Develop Power Quality Composite Indicator using Bigdata Analytics
- Prepare High-Performance Supercapacitors for Energy Storage using Locally Available Materials
- Development of An Artificial Intelligence Enabled Digital Twin of a Solar PV Plant to Enhance Renewable Penetration in Power Grid of Bangladesh
- Develop Nanoparticles deposited graphene-based Membrane for Fuel Cells

PROFESSIONAL EXPERIENCE:

Director (Innovation), Bangladesh Energy and Power Research Council (BEPRC), 2022- Onwards

- Leading innovation-oriented research to support national energy and power sector planning
- Developing analytical frameworks and models for long-term energy system analysis
- Advising government stakeholders on energy transition, fuel mix optimization, and sustainability strategies
- Managing research grant programs, evaluating proposals, and supervising the research projects funded by BEPRC.
- Formulating different guidelines for research related activities like technology innovation, study, startup, internship (Industry-academia-Government collaboration model), scholarship program.
- Coordinating interdisciplinary research teams and collaborating with national and international partners.
- Presenting BEPRC's activities at public events, workshops, and symposiums

Chair Researcher, Asian Institute of Technology (AIT), Thailand, 2018-Dec 2021

- Conducted advanced research under the supervision of Prof. Joyashree Roy (IPCC Lead Author and Nobel Peace Prize Laureate, 2007)
- Selected by the national committee of Bangladesh and the AIT technical committee among those 87 applicants working under the Ministry of Power and Energy.
- Conduct Bangladesh-focused energy research, especially for integrated energy–economy modeling

Assistant Manager (Technical), Sylhet Gas Fields Limited (A company of Petrobangla), 2009-2017

- Technical oversighted gas field operations and development planning
- Analyzed the production strategies, reservoir performance, and operational efficiency
- Supervised operation of condensate fractionation plant
- Supervised drilling, logging, well testing, workover activities
- Involved in procurement activities (tender preparation, evaluation, NOA, agreement) of drilling fluid, well completion equipment and well services (drilling, logging, DST, Cementing, Completion) through international tender

EDUCATION:

Jan 2018-Dec 2021 **PhD in Energy policy planning and Economics**
Asian Institute of Technology, Thailand

- Coursework: Energy-Economic Modeling and Policy Analysis, Development and Evaluation of Energy Projects, Energy Statistics and Energy Demand Forecasting, Carbon Market and Carbon Finance, Energy Pricing and Applications, Power Sector Management under Deregulation, Quantitative Research Methodologies.
- CGPA: 3.92 out of 4
- Dissertation Title: Sustainability Challenges and Solution Pathways for the Energy Sector in Bangladesh: Implications for Development.

Aug 2007-July 2009 **M. Sc. in Petroleum Engineering**
Bangladesh University of Engineering & Technology, Dhaka, Bangladesh

- Specialization: Drilling, Reservoir Simulation, Petroleum Production.

Aug 2000-May 2007 **B. Sc. in Chemical Engineering & Polymer Science Shah**
Jalal University of Science and Technology, Sylhet, Bangladesh

TRAINING/WORKSHOPS:

- **Basic Training Course on VEDA2.0-TIMES Energy-Economy modeling Software**: 25 – 27 November 2020, Organized by IEA-ETSAP, Athens, Greece.
  [TIMES (The Integrated MARKAL-EFOM System) model is used to generate global/national/ sub-national energy scenarios to conduct in-depth energy and environmental analyses. Energy Technology Systems Analysis Program (ETSAP) is one of the longest running Technology Collaboration Programme of the International Energy Agency]
- **JRC Week on Composite Indicators and Scoreboards 2019**, European Commission Joint Research Center, Italy: training program and community practice on Composite Indicators and Scoreboards organized by European Commission Joint Research Center in Ispra, Italy from 04-08 November, 2019 to make up to date with the latest developments on composite indicators as well as on data visualization tools.
- **Summer School in energy economics** 2022, The Energy Center, The University of Auckland, New Zealand that include electricity, gas and oil market; renewable energy, transportation and carbon market

PROGRAMING & MODELING SKILLS:

- Software/Computer language: R programing, Python (basic), C+ programing, Microsoft Office, SPSS etc.
- Energy system modeling software like VEDA-TIMES; reservoir simulation & well test software.

PUBLICATIONS:

a. Book Chapter

1. Roy, J., Das, N., Some, S. & **Mahmud, H.** (2021). Fast growing developing countries: dilemma and way forward in a carbon constrained world. In Dasgupta, P. et al. (Eds). Sustainable Development Insights from India: Selected Essays in Honour of Ramprasad Sengupta (pp 23-41). Springer Nature Pte Ltd, Singapore. doi: 10.1007/978-981-33- 4830-1.
2. **Mahmud H.**, Huque M. M. & Manadal P. C. (2017). Developing Optimum Production Strategy of Kailashtilla Gas Field and Economic Analysis. In: Awang M., Negash B., Md Akhir N., Lubis L., Md. Rafek A. *(eds) ICIPEG 2016*. Springer Nature Pte Ltd, Singapore.

b. Peer Review Articles

3. A Islam, A Malek, MT Islam, FY Nipa, O Raihan, **H Mahmud**, ME Uddin. (2025). Next frontier in photocatalytic hydrogen production through CdS heterojunctions *International Journal of Hydrogen Energy 101*, 173-211. https://doi.org/10.1016/j.ijhydene.2024.12.300
4. **Mahmud, H.**, Roy, J, (2024). Energy sector sustainability for a fast-growing economy like Bangladesh: an empirical assessment. *Sustain Sci* **19**, 51–73 (2024). https://doi.org/10.1007/s11625-023-01385-2

5. J. Roy, **H Mahmud**, F. A. Nahid, (2025). Past Trends, Alternative Futures, and Energy Demand Scenarios for Bangladesh. *Sustainability Science.* 2025 [Under review: submitted revised manuscript]
6. **Mahmud, H.** & Roy, J., (2021). Barriers to Overcome in Accelerating Renewable Energy Penetration in Bangladesh. Sustainability 2021, 13, 7694. https://doi.org/10.3390/su13147694
7. A. Islam, T Islam, **H Mahmud**, O Raihan, MS Islam, HM Marwani (2024). Accelerating the green hydrogen revolution: A comprehensive analysis of technological advancements and policy interventions. *International Journal of Hydrogen Energy 67*, 458-486. https://doi.org/10.1016/j.ijhydene.2024.04.142
8. A. Islam, T Islam, **H Mahmud**, O Raihan, MS Islam, HM Marwani (2024). Accelerating the green hydrogen revolution: A comprehensive analysis of technological advancements and policy interventions. *International Journal of Hydrogen Energy 67*, 458-486. https://doi.org/10.1016/j.ijhydene.2024.04.142
9. A Islam, MT Islam, SH Teo, **H Mahmud**, AM Swaraz, AI Rehan, AI Rasee, (2025). Progress in silicon-based materials for emerging solar-powered green hydrogen (H2) production. *Advances in Colloid and Interface Science 343*. https://doi.org/10.1016/j.cis.2025.103558
10. A. Islam, SH Teo, MT Islam, AH Mondal, **H Mahmud**, S Ahmed, M Ibrahim, (2025). Harnessing visible light for sustainable biodiesel production with Ni/Si/MgO photocatalyst. *Renewable and Sustainable Energy Reviews 208*. https://doi.org/10.1016/j.rser.2024.115033
11. Roy, J., Islam, S. T., Pal, I. & **Mahmud, H.** (2021), White Paper: Top Ten Priorities in Implementation of Low Carbon Sustainable Energy Development and Adaptation Framework to Reduce Disaster Impact in the Context of Bangladesh. International Energy Journal 21, Special Issue 1A, PP 143-145.
12. **Mahmud, H.** & Roy, J., (2020). Sustainable Energy Sector for Fast Growing Economy like Bangladesh: How Relevant are the Past Asian Precedents? International Energy Journal 20 (3A), 381-394.
13. Roy, J., **Mahmud, H.**, Assadi, M., Iman, N., & Nikpey, H., (2020). Moving beyond Gas: Can Bangladesh Leapfrog and Make the Energy Transition Just by Exploring the Role of Geothermal Energy and Gas Infrastructure? International Energy Journal 20 (3A), 395-410.
14. **Mahmud H.**, Tinni E., & Mahmud S. (2018). Drilling Challenges: A Case Study of Rashidpur Field. *Journal of nature science and sustainable technology, 12*(3), 189-197.
15. **Mahmud, H.,** Huque, M. M., Rahman, M. M. & Islam, H.O., (2018). Recompletion of KTL-5 Well: An Investigation of Excessive Water Production. Journal of Nature Science and Sustainable Technology 12 (4), 221-227.
16. Hussain, I., Muzemder A. T. M. S. H. & **Mahmud, H**, (2016). Dynamic Material Balance Study of Gas Reservoir Using Production Data: A Case Study of New Gas Sand of Kailashtila Gas Field. International Journal of Oil, Gas and Coal Engineering. Vol. 4, No. 4, 2016, pp. 38-44. doi: 10.11648/j.ogce.20160404.11

c. Conference Papers

17. Roy J., **Mahmud, H.** & Assadi, M., (2019). Drilling technology system: a win-win solution for just transition, leapfrog and international partnership Case study of Bangladesh. *International Conference on Applied Energy 2019 (ICAE2019).*Vasteras, Sweden.
18. **Mahmud, H.** (2020). Barriers to Renewable Energy Penetration in Bangladesh: An Analysis Based on Interpretive Structural Modeling Methodology. 2020 International Conference and Utility Exhibition on Energy, Environment and Climate Change (ICUE), Pathumthani, Thailand.

REFERENCES:

1. Dr. Md. Rafiqul Islam
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