

# Md. Zahurul Haq

Ph.D., CEA, FBSME, FIEB

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## Research/Professional Interests

- Energy conversion, conservation and optimisation,
- Thermodynamics and Thermal system design,
- Combustion and Engines,
- Refrigeration and air-conditioning,
- Mechatronics, Robotics and Control Systems.

## Education and Qualifications

1993 B.Sc. Engg. (Mech) Bangladesh University of Engineering & Technology (BUET), Bangladesh.  
1995 M.Sc. Engg. (Mech) Bangladesh University of Engineering & Technology (BUET), Bangladesh.  
1998 Ph.D. The University of Leeds, Leeds, UK.

## Membership of Associations

- Certified Energy Auditor (No. 90208), The Association of Energy Engineers (AEE), Atlanta, USA.
- Life Fellow (F7621), The Institution of Engineers, Bangladesh (IEB).
- Life Fellow (F18002 ME), Bangladesh Society of Mechanical Engineers (BSME).
- Life Member, Bangladesh Solar Energy Society (BSES).

## Current Positions

July 2024 - **Dean**, Faculty of Mechanical Engineering, BUET.  
Nov. 2004 - **Professor**, Department of Mechanical Engineering, BUET.

## Additional Positions

Dec. 2025 - **Chairman, Board of Governors**, Engineering University School and College, BUET campus, Dhaka-1000.  
July 2024 - **Member, Board of Directors**, Bangladesh Institute of Management (BIM), Bangladesh.  
Oct. 2023 - **Member, Board of Governors**, Research and Innovation Centre for Science and Engineering, (RISE), BUET.  
June 2023 - **Convenor, Curriculum Development Committee** for Institute of Energy & Sustainable Development (IESD), BUET.  
Feb. 2023 - **Chairman, Advisory Committee** for Institute of Robotics & Automation (IRAB), BUET.  
Jan. 2021 - **Member, Technical Advisory Committee (TAC)** for *Energy Efficiency and Conservation Promotion Financing Project*, Sustainable and Renewable Energy Development Authority (SREDA), Ministry of Power, Energy and Mineral Resources, Bangladesh.  
Dec. 2019 - **Member, Energy Management Advisory Committee (EMAC)**, SREDA, Ministry of Power, Energy and Mineral Resources, Bangladesh.  
Oct. 2020 - **Convenor, Committee for Upgradation** of Institute of Energy & Sustainable Development (IESD), BUET.

- Jan. 2015 - **Member, Technical Advisory Committee** for *Sustainable Finance Department (Green Banking Wing)*, Bangladesh Bank (Central Bank of Bangladesh).
- Mar. 2010 - **Member, Board of Directors**, Bangladesh Diesel Plant Ltd. (a Commercial Enterprise of Bangladesh Army).

### Additional/Past Affiliations

- Feb. 2014 - Feb. 2016 **Head/Chairperson**, Dept. of Mechanical Engineering, BUET.
- Feb. 2012 - Aug. 2014 **Director**, Centre for Energy Studies, BUET.
- Sep. 2006 - Apr. 2010 **Provost**, Titumir Hall, BUET.
- Nov. 2003 - Nov. 2005 **System Analyst**, Computer Centre, BUET.
- June 2016 - **Member, Guidance Note Preparation Committee** for Green Transformation Fund (GTF), for *Sustainable Finance Department*, Bangladesh Bank.
- Mar. 2016 - **Member, Engineering Sub-Committee** for development of *Standard Syllabus Guideline*, University Grants Commission of Bangladesh.
- Apr. 2014 - May 2016 **Member, Energy Management System Working Group**, Energy Efficient & Conservation Master Plan up to 2030.
- Dec. 2008 - May 2010 **Member, Board of Directors**, Rupantarita Praktik Gas Co. Ltd. (RPGCL).
- Mar. 2007 - Dec. 2015 **Member, Project Management Board**, Haripur Gas Turbine Power Station.
- Jan. 2012 - Dec. 2015 **Chairman, Mechanical Engg. Div. Committee**, Bangladesh Standards & Testing Institution (BSTI).
- Nov. 2008 - Dec. 2016 **Member, Steering Committee**, Bangladesh National Building Code (BNBC), 2020.
- Oct. 2013 - Dec. 2015 **Member, ISO PC-248/WG-3**, International Organization for Standardization (ISO).
- *ISO/CD 13065: Sustainability Criteria for Bio-energy*: **Chairman, National Mirror Committee & Head of Delegation ISO ISO/PC 248 meetings**: 23 Sep. - 4 Oct. 2013, Stockholm, Sweden, 14 - 21 Feb. 2014, Berlin, Germany and 19 - 23 Jan. 2015, Berlin, Germany.
  - *Asia-Pacific Robot Contests (ROBOCON 2005-2009)*: **Team-Instructor** for
    - Robocon-2009, Tokyo, Japan,
    - Robocon-2008, Pune, India,
    - Robocon-2007, Hanoi, Vietnam,
    - Robocon-2006, Kualalampur, Malaysia,
    - Robocon-2005, Beijing, China.
- Dec. 2025 - **Conference Chair**, Energy Conference 2023: National and Global Issues (ENCON23), Organised by BUET.
- Dec. 2023 - **Conference Chair**, 15th International Conference on Mechanical Engineering (ICME 2025), organised by Department of Mechanical Engineering, BUET.

### Expert Member of University Selection Boards

- Bangladesh University of Engineering and Technology (BUET): for selection of Professors, Associate Professors, Assistant Professors and Lecturers (July. 2024 - to date).
- Ahsanullah University of Science and Technology (AUST): for selection of Professor, Associate Professor, Assistant Professor and Lecturer for Department of Mechanical and Production Engineering (Apr. 2023 - to date).
- Chittagong University of Engineering and Technology (CUET): for selection of Assistant Professor and Lecturer for Department of Mechanical Engineering (Sep, 2017 - Nov. 2020).
- Chittagong University of Engineering and Technology (CUET): for selection of Assistant Professor and Lecturer for Department of Mechatronics and Industrial Engineering (Nov. 2020 - May 2023).

- Khulna University of Engineering and Technology (KUET): for selection of Assistant Professor and Lecturer for Institute of Environment and Power Technology (May 2022 – to date).
- Bangladesh Textile University (BUTEX): for selection of Assistant Professor and Lecturer for Mechanical Engineering (Dec. 2020 – to date).

### Honours and Awards

- *Financial Incentive (Oct. 2023):* for article *Thermodynamic analysis and optimisation of a novel transcritical CO<sub>2</sub> cycle* (2022), *Energy Conversion and Management*, 273, 116407.
- *Financial Incentive (Jan. 2022):* for article *Optimization of an Organic Rankine Cycle-Based Waste Heat Recovery System Using a Novel Target-Temperature-Line Approach* (2021), *Journal of Energy Resources Technology* 143(9), 092101.
- *Certificate of Outstanding Contribution in Reviewing (October 2018):* awarded by *Energy* (journal impact factor 6.082) published by Elsevier.
- *PANASONIC Award (2005):* Asia-Pacific Robot Contest, Robocon 2005, Beijing, China.
- *Commonwealth Scholarship (1995-1998):* for Ph.D. in the UK.

### Research Grants

- *The Wind Energy Resource Mapping (WERM) Project for Bangladesh, 2000-2004* (Team member), funded by UNDP.
- *Development of Autonomous Mobile Robots using Locally Available Hardware Components, 2007-2008* (Project director), funded by Committee for Advanced Studies and Research (CASR), BUET.
- *Development of Design Process Simulation Lab for Teaching, Learning and Research, 2011-2012* (Team member and Alternative manager), Higher Education Quality Enhancement Project (HEQEP) Sub-project CP071, implemented by The University Grants Commission (UGC), Bangladesh.

### Specialized Training/Workshop/Seminar Participation (Certified)

- Korea (19-27 Nov. 2018): *Energy Audit Training of Trainer in Korea*, KEA-ADB partnership.
- Japan (22-29 July 2015): *Energy Efficiency and Conservation (EE&C) in Japan*, JICA.
- Indonesia (3-4 June 2013): *Increasing Consensus & Stakeholder Engagement*, ISO Workshop, Lombok.
- Malaysia (9-13 July 2012): *Advanced Micro-Power System*, SERI-UKM, KL.
- India (2-22 July 2006): *Unigraphics NX-4 and Team-center*, UGS.
- Egypt (22-26 June 2002): *Laser Diagnostics of Combustion Processes*, National Institute of Laser Enhanced Sciences, Cairo University, Cairo.
- Singapore (26 Nov. - 14 Dec. 2001): *Mechatronics System Technology*, Japan-Singapore 3rd Country Program for the 21st Century.
- UK (29 Jun. - 3 July 1998): *Engine Emissions Measurements*, The University of Leeds, Leeds.

### ISO Meetings/Workshops Participation

- Berlin, Germany (16 - 23 Jan. 2015): *ISO 'Sustainability Criterial for Bioenergy' standard pre-seminar and ISO/PC 248 WG3 meetings within SIS and partners programme 'Trade promotion through standardisation.*
- Berlin, Germany (14 - 21 Feb. 2014): *ISO 'Sustainability Criterial for Bioenergy' standard pre-seminar and ISO/PC 248 WG3 meetings within SIS and partners programme 'Trade promotion through standardisation.*

- Stockholm, Sweden (23 Sep. - 4 Oct. 2013): ISO 'Sustainability Criterial for Bioenergy' standard pre-seminar and ISO/PC 248 WG3 meetings within SIS and partners programme 'Trade promotion through standardisation.
- Colombo, Srilanka (1 -2 July 2013): Regional workshop on support to the development of ISO 13065 Standard on Sustainability Criteria for Bioenergy.
- Colombo, Srilanka (23-24 Apr. 2013): Sub-regional training session on Stakeholder engagement within the SESA programme "Trade promotion through standardisation in the South and South East Asia (SESA) regions".
- Kathmandu, Nepal (21-23 Nov. 2012): SESA workshop, SIS-SAWTEE Programme: "Trade promotion through standardisation in the South and South East Asia (SESA) regions".

### Major Invited Talks

- *Grid Connected Solar: Technical and Policy Issues in Renewable Energy Policy, Regulations and Grid Connectivity Issues* [Resource Person] (2012): SAARC Workshop, 21-22 Nov. 2012, Thimpu, Bhutan.
- *Sustainability of Bioenergy* [Keynote Presentation] (2013): International Conference on Green Energy and Technology (ICGET), Aug. 24-26, 2013, Kitakyushu, Fukuoka, JAPAN.
- *Energy Efficiency and Conservation* [Resource Person] (28 Jan. - 06 Feb. 2024): Training programme organised by Bangladesh Power Management Institute (BPMI).
- *Energy Auditing and Energy Management* [Resource Person] 14 May - 21 May, 2024): Training programme organised by Sustainable and Renewable Energy Development Authority (SREDA),
- *Energy Efficiency in Buildings* [Resource Person] (21 Oct. 2022): Energy Fundamentals Course for graduates and professionals Jointly facilitated by BUET, USAID and NREL.
- *Effective Efficiency of Thermal Energy Conversion and Conservation Devices* [Keynote Presentation] (28 Jan. 2023): 17<sup>th</sup> Annual Paper Meet of Mechanical Engineering (APMME)-2023: organized by Mechanical Engineering Division, IEB, (27-28 Jan. 2023), Dhaka.
- *Promoting Energy, Efficiency, and Conservation Awareness* [Keynote presentation] (1 Feb. 2022): organised by Power Division, Ministry of Power, Energy and Mineral Resources (Bangladesh).
- *Energy Efficient Power Technology Elements; Energy Efficient Heat Transfer Equipment; Energy Efficient Refrigeration, Air-conditioning Systems and Heat Pumps; Energy Efficient Transfer & Control Equipment* [Resource Person] [2021]: Training on Energy Efficiency & Conservation in Textile & Industry, Mar. 2021, organized by Sustainable & Renewable Energy Development Authority (SREDA), Ministry of Power, Energy and Mineral Resources, Bangladesh.
- *Thermodynamics of Power Generation: Rationale for Exergy* [Keynote Presentation] (2017): International Conference on Mechanical Engineering and Applied Sciences (ICMEAS 2017) Military Institute of Science and Technology (MIST), 21-22 Feb. 2017, Dhaka.
- *Power Generation: Efficiency Improvement* [Resource Person] (2018): Short Training Course on Application of Energy Saving Technologies of Residential, Commercial and Industrial Sectors in Bangladesh organized by Centre for Energy Studies, BUET, Sept. 2018, Dhaka.
- *Energy Efficiency: Thermal* [Resource Person] [2018]: Basic Course on Renewable Energy & Energy Efficiency: Capacity Building to Bangladesh Power Sector, Coordinated by Ricardo Energy & Environment.

### Offered Courses (partial list)

- ME 203: Engineering Thermodynamics
- ME 307: Heat Transfer Equipment Design

- ME 361: Instrumentation and Measurement
- ME 407: Advanced Thermodynamics
- ME 415: Refrigeration & Building Mechanical Systems
- ME 417: Internal Combustion Engines
- ME 475: Mechatronics
- ME 6101: Classical Thermodynamics
- ME 6163: Combustion Engineering
- RME 3102: Advanced Mechatronics Engineering
- RME 3204: Control Systems Design

### **Theses/Academic Project Supervision: M.Sc. Engg. Theses**

- *Optimisation Of Nanostructure Surface For Explosive Boiling Of Argon Using Genetic Algorithm* (M.W.B. Nouman, 2024)
- *Exergy And Thermo-Economic Study Of A 412 MW Natural Gas-Fired Combined Cycle Power Plant* (M.S. Islam, 2023)
- *Multi-Objective Optimization Of Organic Rankine Cycle Based Waste Heat Recovery Systems Using Artificial Intelligence* (R.D.A. Zayed, 2022)
- *Energy Efficient HVAC Design of Buildings Using Locally Available Materials* (M.E.J. Khan, 2019)
- *Energy and Exergy Analysis of Waste Heat Recovery Systems using Organic Rankine Cycle* (A. Saha, 2016)
- *Exergetic and Power Augmentation Analyses of Gas Turbine with Air-bottoming Combined Cycle* (M.J. Hoque, 2016)
- *Optimum PID Control of a Servo-motor Subjected to Frictional Loads, Inertia and Disturbances* (K.A. Rahman, 2014)
- *Energy and Exergy Based Analysis of a Multi-Fuelled SI Engine* (A. Morshed, 2013)
- *Dynamic Response of a Mobile Robot Drive Using PID Control* (Z. Aziz, 2011)
- *Development and Tuning of a PID Control System for Mobile Robot Drive* (S.M. Ali, 2011)
- *Exergy Analysis of a Four Stroke Spark-Ignition Engine using Different Fuels* (M.R. Mohiuddin, 2010)
- *Dynamic Characteristics of Servo-Controlled Mobile Robot using Optimum Pulse Width Modulation (PWM)* (M.E. Kabir, 2009)
- *Sesame Oil as an Alternative Fuel for Diesel Engines in Bangladesh* (A.K.M.M. Morshed, 2008)
- *Energy-Exergy Analysis of a Diesel Engine Running of Preheated SVO (Straight Vegetable Oil)* (M.M. Islam, 2006)
- *Performance of a Diesel Engine with Preheated Vegetable Oil as an Alternative Fuel* (M.S. Uddin, 2005)
- *Comprehensive Modelling of Diesel Engine with Biogas/Diesel Dual Fuelling for Optimized Performance* (Z.A. Bhutto, 2003)
- *Experimental Investigation of Dual-Fuel Diesel Engine* (M.H. Rahman, 2003)
- *Modelling of Flame Propagation in Biogas-Air Premixture* (M. Mizanuzzaman, 2001)

## Major Consultancy Works

- Consultation/Advisory Services for *Supporting Building Energy Efficiency and Environment Rating (BEEER) System through Large-Scale Implementation of Appliances MEPS and EE Labelling Program in Bangladesh* (2022) for The World Bank RFP document no. #1274182 as part of consortia comprising of Centre of Energy Studies (BUET), PwC Bangladesh and PwC India for Centre for Energy Studies, BUET.
- Consultation/Advisory Services for *Air-conditioning, plumbing and fire-safety systems of Padma Oil Company Ltd.'s proposed 12+2 storied Headquarters at Paribagh, Dhaka* 2019-20.
- Consultation/Advisory Services for *Design & Drawing for Sludge Power Generation System (SPGS) Including Re-Designed Dumping Yard (DY) of the Central Effluent Treatment Plant at Savar tannery estate*, 2016-2018.
- Advisory Services for *Implementation of a Cold-storage for Ice-cram using Waste Heat from 50 MW APSC (Ashuganj Power Station Company Ltd., 2018.*
- Design checking/vetting of HVAC system for *Franco-German Embassy in Dhaka*, 2015-16.
- Consultation/Advisory Services for *Feasibility Study for Wind Power Plant at Moheshkhali, Cox's Bazar, Bangladesh* (2014) for Centre for Energy Studies, BUET.
- Consultation on *Assessment of Selected Japanese Low Carbon Technologies to Highlight their Comparative Advantages to Similar non-Japanese Technologies* (2014), for Centre for Energy Studies, BUET.
- Consultation on *Assessment & Design Phase for the Renewable Energy Technology (RET) Implementation in the Official Refugee Camps in Cox's Bazar* (2014-15), for Centre for Energy Studies, BUET.
- Consultation on *Building inspection of RMG Factories in Bangladesh under ILO* (2013-14).
- Consultation on *Construction & Implementation of Common Tannery Effluent Treatment Plant Including Collection & Conveyance System, Common Chrome* (2013-14).
- Consultation/Advisory Services for *Bangladesh Industrial Energy Efficiency Opportunities Assessment*, 2012-13, ICF International Contract: AID-OAA-L-11-00003 for Centre for Energy Studies, BUET.
- Consultation on *Reducing Black Carbon from Heavy Duty Vehicles & Engines*, (2012-13).
- *Co-creation (Design and Testing) of Biogas Socket in Bangladesh*, 2012-13, for SNV Netherlands Development Organisation for Centre for Energy Studies, BUET.
- Consultation/Advisory Services for *Gas-pipeline and booster-compressor system for Mymensingh 210 MW Combined Cycle Power Plant*, 2005-07.
- Consultation/Advisory Services for *HVAC and Building Mechanical System (BMS) for Bangabandhu Sheikh Mujibur Rahman Novo Theatre, Dhaka*, 2002-04.

## Publications

### PhD thesis

1. Haq, MZ (1998). "Fundamental Studies of Premixed Combustion". PhD thesis. School of Mechanical Engineering, The University of Leeds, Leeds, UK.

### Refereed research papers

1. Gu, X, M Haq, M Lawes, and R Woolley (2000). Laminar burning velocity and Markstein lengths of methane-air mixtures. *Combustion and Flame* **121**(1), 41–58.
2. Haq, MZ and M Mizanuzzaman (2002). Burning, Heat Release and Exhaust Products of Bio-Gas-Air Combustion. *Journal of the Institute of Engineers Bangladesh, Multidisciplinary (IEBM)* **27**(1), 74–79.

3. Haq, M, C Sheppard, R Woolley, D Greenhalgh, and R Lockett (2002). Wrinkling and curvature of laminar and turbulent premixed flames. *Combustion and Flame* **131**(1), 1–15.
4. Bradley, D, M Haq, R Hicks, T Kitagawa, M Lawes, C Sheppard, and R Woolley (2003). Turbulent burning velocity, burned gas distribution, and associated flame surface definition. *Combustion and Flame* **133**(4), 415–430.
5. Haq, MZ and MH Habib (2003). Performance of a Diesel Engine Partially Fuelled by Natural Gas and Biogas. *Journal of Mechanical Engineering (JME), The Institute of Engineers Bangladesh (IEB)* **32**, 1–10.
6. Haq, MZ (2005). Correlations for the Onset of Instabilities of Spherical Laminar Premixed Flames. *Journal of Heat Transfer* **127**(12), 1410–1415.
7. Haq, MZ (2005). Effect of Developing Turbulence and Markstein Number on the Propagation of Flames in Methane-Air Premixture. *Journal of Engineering for Gas Turbines and Power* **128**(2), 455–462.
8. Haq, MZ (2021). Optimization of an Organic Rankine Cycle-Based Waste Heat Recovery System Using a Novel Target-Temperature-Line Approach. *Journal of Energy Resources Technology* **143**(9). 092101.
9. Haq, MZ, MSR Ayon, MWB Nouman, and R Bihani (Dec. 2022). Thermodynamic analysis and optimisation of a novel transcritical CO<sub>2</sub> cycle. *Energy Conversion and Management* **273**, 116407.
10. Ayon, MSR, N Deb, MM Rahman, and MZ Haq (2026). A novel three-stage direct expansion cycle with optimal internal heat recovery and splitting-mixing processes for utilising LNG's cold energy. *Energy Conversion and Management: X* **30**, 101738.
11. Haq, MZ (2026). Multi-Objective Optimization of a Novel Supercritical CO<sub>2</sub> Cycle for Waste Heat Recovery From a Gas Engine's Flue Gas. *Journal of Energy Resources Technology, Part A: Sustainable and Renewable Energy* **2**(4), 042104.

### Papers in refereed conference proceedings

1. Haq, MZ (2002). Effects of Turbulence on Premixed Flame Front Curvature. In: *Proceedings of BSSME-ASME International Conference on Thermal Engineering, 31 Dec, 2001-2 Jan, 2002, Dhaka, Bangladesh*. Bangladesh Society of Mechanical Engineers (BSME), pp.418–424.
2. Haq, M (2003). Developing Turbulence on the Propagation of Flames in Methane-Air Premixture. In: *Proceeding of the International Joint Power Generation Conference (IJPGC2003), June 15-19, 2003, Georgia, USA, Paper No. IJPGC2003-40143*. ASME.
3. Haq, M (2003). Prediction of Instabilities of Spherically Propagating Flames in Laminar Premixture. In: *Proceedings of the ASME 2003 Heat Transfer Summer Conference (HT2003), July 21-23, 2003, Nevada, USA, Paper No. HT2003-47484*. ASME.
4. Haq, M, M Rahman, and Z Bhutto (2003). Performance Studies of a Biogas Fuelled Diesel Engine Operating in a Dual Fuel Mode. In: *Proceedings of the International Conference on Power Engineering: ICOPE-2003(3)*. JSME, pp.57–62.
5. Hossain, S, MY Ali, H Jamil, and MZ Haq (2010). Automated guided vehicles for industrial logistics- Development of intelligent prototypes using appropriate technology. In: *Computer and Automation Engineering (ICCAE), 2010 The 2nd International Conference on*. Vol. 5. IEEE, pp.237–241.
6. Haq, M and M Mohiuddin (2011). Thermodynamic Analysis of a Multi-Fueled Single Cylinder SI Engine. In: *Proceedings of the ASME 2011 International Mechanical Engineering Congress and Exposition (IMECE2011), November 11-17, 2011, Denver, Colorado, USA, Paper No. IMECE2011-62423*. ASME.
7. Haq, MZ (2013). Sustainability of Bioenergy. In: *Proceedings of the International Conference on Green Energy and Technology (ICGET), Aug. 24-26, 2013, Kitakyushu, Fukuoka, JAPAN*. Center for Natural Science & Engineering Research. Kitakyushu, Fukuoka, JAPAN, pp.168–171.
8. Haq, M and A Morshed (2013). Energy and Exergy Based Analyses of a Multi-fueled SI Engine. In: *Proceedings of the ASME 2013 Power Conference, July 29-August 1, 2013, Boston, Massachusetts, USA, Paper No. Power2013-98279*. ASME.

### Book chapters

1. Haq, MZ (2012). "Measurement: System, Uncertainty and Response". In: *Applied Measurement Systems*. Ed. by MZ Haq. InTech, 51000 Rijeka, Croatia, pp.1–22.

2. Morshed, AKMM and MZ Haq (2020). “Energy Audit: The First Step towards Saving Money”. In: *Towards a Sustainable Energy Future*. Sustainable, Renewable Energy Authority (SREDA), Ministry of Power, Energy, and Mineral Resources, Bangladesh, pp.20–28.

### **Editorials**

1. Haq, MZ, ed. (2012). *Advanced Topics in Measurements*. InTech, 51000 Rijeka, Croatia.
2. Haq, MZ, ed. (2012). *Applied Measurement Systems*. InTech, 51000 Rijeka, Croatia.