

# Dr. Nayyar Hussain Mirjat

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Engineering Research Group (EEERG),  
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<https://scholar.google.com.pk/citations?user=zQAZVLIAAAAJ&hl=en>



<https://www.muett.edu.pk/departments/electrical-engineering/faculty-members>

## CURRENT STATUS

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- Assistant Professor, Department of Electrical Engineering
- Researcher, Energy and Environmental Engineering Research Group

## KEY EXPERTISE

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- Energy Planning and Policy Analysis
- Energy Modelling
- Decision Analysis
- Sound IT Skills, i.e., MS Office, MS Vision, MS Project, etc
- Strong interpersonal skills to lead and the ability to work effectively in a team environment
- Skill in organizing resources and establishing priorities
- Working knowledge of project management principles, practices, techniques, and tools

## KEY ACHIEVEMENTS

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- Development of Energy Modelling and Decision Support Framework for Sustainable Electricity System of Pakistan.
- Research Fellowship at University Technology Malaysia (UTM), awarded as part of ICT Endowment Fund by the MUET, Jamshoro
- Exchange Student at Coventry University, U.K,
- 03 Impact Factor Publications from the Ph.D. thesis.

## RESEARCH INTERESTS

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- Sustainable Energy Planning, Energy Policy, Energy Modelling, Decision Analysis, Power Economics & Management, Distributed Generation, Hybrid Systems, Energy Materials

## MEMBER

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- Pakistan Engineering Council
- Energy Working Group, Energy Wing, Planning Commission, Government of Pakistan

## QUALIFICATION

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- **2018** Ph.D. Energy Systems Engineering, MUET, Jamshoro
  - **2007** M.Engg. Electrical Power, NED, UET, Karachi
  - **2003** B.E. Electrical Engineering, MUET, Jamshoro
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## WORK EXPERIENCE

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- **May 2015 to date**, Assistant Professor, Department of Electrical Engineering, Mehran University of Engineering and Technology, Jamshoro Pakistan.
- **January 2012 to April 2015**, Assistant Professor and HoD, Department of Electrical Engineering, Mehran University of Engineering and Technology, SZAB Campus, Khairpur Mir's
- **August 2010 to December 2011**, Procurement and Contract Specialist, North Sindh Urban Service Corporation Limited under Asian Development Bank (ADB) financed Urban Services Improvement Program
- **July 2009 to July 2010**, Research Assistant, University Technology PETRONAS, 31750 Tronoh, Perak, Malaysia
- **May 2004 to July 2009**, Assistant Manager, BMR&E Projects, Pakistan Steel Mills Corporation, Bin Qasim, Karachi, Pakistan
- **May 2003 to May 2004**, Junior Engineer, Islamabad Electric Supply Company, Pakistan

## MERIT AWARDS/DISTINCTION

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- Ph.D. research funded under Pakistan Strategy Support Program of **PSSP-USAID** in collaboration with International Food and Policy Research Institute (IFRPI), Washington DC, USA, and Planning Commission of Pakistan.
- Awarded **travel grant by HEC** to present research papers at 12<sup>th</sup> International Energy Conference to be held from 19-20 June 2018 at Tehran, Iran
- Awarded **travel grant by HEC** to present research papers at 6<sup>th</sup> Annual International Conference Sustainable Energy and Environmental Sciences (SEES-2017), at Singapore
- Awarded **travel grant by HEC** to present research papers at the 14<sup>th</sup> International Conference on Sustainable Energy Technologies – SET 2015, Nottingham, UK

## SUBJECTS TEACHING

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- **Undergraduate:** Instrumentation & Measurement, Power Generation System, Power Economics and Management, Power System Control and Stability
- **Postgraduate:** Energy Management, Advanced Power Generation, Procurement and Contract Management, Energy Policy and Planning, Energy Resources Economics and Management

## THESIS/PROJECT SUPERVISION

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- **Ph.D. (02):**
  1. Mr. Ehsanullah, Proposed Thesis Title, "Development of Solar PV Electricity Generation Scenarios and Assessment of GHG Mitigation for Pakistan"- **In Progress**
  2. Mr. Arshad Chughtai, Proposed Thesis Title, "Electricity Demand Side Management for Energy Efficient Future of Pakistan" **In Progress**
- **Masters (04):**
  1. Mr. Suhail Ahmed Shaikh, Proposed Thesis Title, Techno-Economic Analysis of Hybrid Power System in Remote Areas of Sindh Province: A Case Study of Village of Shafiabad (District Sanghar), **In Progress**
  2. Ms. Lala Rukh Memon title "Cost-Benefit Analysis of Different Biomass Resources for Clean Electricity Generation"-for M.E Energy Systems Engineering, **(2018)**
  3. Mr. Zohaib Samtio title "A Delphi Based MCDM Model for Harnessing Renewable Energy Resources of Sindh for Electricity Generation" for M.E Electrical Power Engineering, **(2017)**
  4. Mr. Asif title "Integration of Solar and Wind Power Generation in a Direct Current Microgrid Set-up" for M.E. Electrical Power Engineering, **(2017)**

- **Under-graduate (04 Groups):**
  1. Group title “Techno-Economic Analysis of Matiari-Lahore HVDC Transmission Line under China-Pakistan Economic Corridor (CPEC),” for B.E Electrical Engineering (2018)
  2. Group title “Projection of Long-Term Electricity Demand and Supply-Side Assessment for Pakistan 2015-2050; An Application of Long-Range Energy Alternative Planning (LEAP) model”, for B.E Electrical Engineering (2017)
  3. “Group title Electricity Demand-Supply Scenario for Sindh Province (Pakistan) for 2035: An Application of Long-Range Energy Alternative Planning (LEAP) model”, for B.E Electrical Engineering (2016)
  4. Group title “Pakistan’s Energy Crisis: Integrated Energy Modelling, A Review,” for B.E Electrical Engineering (2014)

## **CONFERENCES/SEMINARS/WORKSHOPS ATTENDED**

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- 17th World Wind Energy Conference and Exhibition WWEC2018 28-3 November 2018
- 5<sup>th</sup> International Conference on Energy, Environment and Sustainable Development (EESD2018), Mehran UET, Jamshoro, November 14-15, 2018
- Project Implementation and Administration Training by Asian Development Bank (04-08 Oct. 2010)
- Technical Writing Course at University Technology PETRONAS, Malaysia (Feb 2010)
- 02 Weeks Training Course on “Project Preparation and Appraisal” at Pakistan Institute of Development Economics (Planning Commission), Islamabad (April 2007).
- ISO 9001, TQM and Effective Communication at Pakistan Steel Training Institute, Karachi.
- Improving Boiler & Steam System Efficiency in Energy Network of Industry by Energy Conservation Authority (ENERCON), Pakistan (June 2006).
- 06 Weeks technical training in Electrical Power Distribution System at WAPDA Engineering Academy, Faisalabad (July/August 2003).
- 06 Weeks training in Power System Management at WAPDA Staff College, Islamabad September/October 2003).
- 4 Weeks internship training at Thermal Power Plant (1655MW), Guudu (June/July 2001).

## **JOURNAL RESEARCH PUBLICATIONS**

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### **2019**

1. Solangi YA, Tan Q, **Mirjat NH**, Ali S. Evaluating the strategies for sustainable energy planning in Pakistan: An integrated SWOT-AHP and Fuzzy-TOPSIS approach. *Journal of Cleaner Production*. 2019 Jul 16:117655 (I.F: 6.2).
2. A. Mengal, **N. H. Mirjat**, G. Das Walasai, S. A. Khatri, K. Harijan, and M. A. Uqaili, "Modeling of Future Electricity Generation and Emissions Assessment for Pakistan," *Processes*, vol. 7, no. 4, p. 212, 2019 (I.F: 1.9).
3. YA Solangi, Q Tan, **NH Mirjat**, GD Valasai, MWA Khan, M Ikram, “An Integrated Delphi-AHP and Fuzzy TOPSIS Approach toward Ranking and Selection of Renewable Energy Resources in Pakistan” *Processes* 7 (2), 118. (I.F: 1.9)
4. Rafique M, Uqaili MA, **Mirjat NH**, Ahmad K, Shuai Y. Theoretical investigations on transition metal trioxide (TMO<sub>3</sub>) cluster incorporated monolayer aluminum nitride (AlN) using DFT technique. *Physica E: Low-dimensional Systems and Nanostructures*. 2019, 1;110:24-31 (I.F: 2.399).

5. Rafique M, Uqaili MA, **Mirjat NH**, Tunio MA, Shuai Y. Ab-initio investigations on titanium (Ti) atom-doped divacancy monolayer h-BN system for hydrogen storage systems. *Physica E: Low-dimensional Systems and Nanostructures*. 2019, 1;109:169-78 (**I.F: 2.399**).
6. TA Jumani, MW Mustafa, MM Rasid, **NH Mirjat**, MH Baloch, S Salisu, "Optimal Power Flow Controller for Grid-Connected Microgrids using Grasshopper Optimization Algorithm" *Electronics* 8 (1), 111 (**I.F: 2.110**).
7. S. A. U. Rehman, Y. Cai, **N. H. Mirjat**, G. D. Walasai, and M. Nafees, "Energy-environment-economy nexus in Pakistan: Lessons from a PAK-TIMES model," *Energy Policy*, vol. 126, pp. 200-211, 2019 (**I.F: 2.696**).

## 2018

8. Jumani TA, Mustafa MW, Rasid MM, **Mirjat NH**, Leghari ZH, Saeed MS. Optimal Voltage and Frequency Control of an Islanded Microgrid using Grasshopper Optimization Algorithm. *Energies*. 2018, 17;11(11):3191 (**I.F: 2.9**).
9. **N. H. Mirjat**, M. A. Uqaili, K. Harijan, G. D. Walasai, M. A. H. Mondal, and H. Sahin, "Long-term electricity demand forecast and supply side scenarios for Pakistan (2015–2050): A LEAP model application for policy analysis," *Energy*, vol. 165, pp. 512-526, 2018. (**I.F: 4.968**)
10. Y. Solangi, Q. Tan, M. Khan, **N. H. Mirjat**, and I. Ahmed, The Selection of Wind Power Project Location in the Southeastern Corridor of Pakistan: A Factor Analysis, AHP, and Fuzzy-TOPSIS Application, *Energies* vol. 11, p. 1940, 2018. (**I.F: 2.676**)
11. P. H. Shaikh, Z. H. Leghari, **N. H. Mirjat**, F. Shaikh, A. R. Solangi, T. Jan, et al., Wind–PV-Based Hybrid DC Microgrid (DCMG) Development: An Experimental Investigation and Comparative Economic Analysis, *Energies*, vol. 11, p. 1295, 2018. (**I.F: 2.676**)
12. S. H. Qazi, M. W. Mustafa, U. Sultana, **N. H. Mirjat**, S. A. Soomro, and N. Rasheed, Regulation of Voltage and Frequency in Solid Oxide Fuel Cell-Based Autonomous Microgrids Using the Whales Optimisation Algorithm, *Energies*, vol. 11, p. 1318, 2018. (**I.F: 2.676**)
13. **Hussain Mirjat N**, Uqaili M, Harijan K, Mustafa M, Rahman M, Khan M. Multi-criteria analysis of electricity generation scenarios for sustainable energy planning in Pakistan. *Energies*. 2018, 11(4):757 (**I.F: 2.676**).
14. Rafique M, **Mirjat NH**, Soomro AM, Khokhar S, Shuai Y. Manipulation of inherent characteristics of graphene through N and Mg atom co-doping; a DFT study. *Physics Letters A*. 2018, 26;382(16):1108-19 (**I.F: 1.863**).
15. A. A. Memon, S. A. A. Shah, W. Shah, M. H. Baloch, G. S. Kaloi, and **N. H. Mirjat**, "A Flexible Mathematical Model for Dissimilar Operating Modes of a Switched Reluctance Machine," *IEEE Access*, vol. 6, pp. 9643-9649, 2018 (**I.F: 3.2**).
16. Baloch AA, Shaikh PH, Shaikh F, Leghari ZH, **Mirjat NH**, Uqaili MA. Simulation tools application for artificial lighting in buildings. *Renewable and Sustainable Energy Reviews*. 2018 Feb 1; 82:3007-26 (**IF 9.184**).
17. Rafique M, Shuai Y, **Hussain N**. First-principles study on silicon atom doped monolayer graphene. *Physica E: Low-dimensional Systems and Nanostructures*. 2018, 1;95:94-101 (**I.F: 2.399**).

18. S. A. U. Rehman, Y. Cai, R. Fazal, G. Das Walasai, and **N. H. Mirjat**, "An integrated modeling approach for forecasting long-term energy demand in Pakistan," *Energies*, vol. 10, p. 1868, 2017. **(I.F: 2.676)**,
19. S. A. U. Rehman, Y. Cai, **N. H. Mirjat**, G. D. Walasai, I. A. Shah, and S. Ali, "The Future of Sustainable Energy Production in Pakistan: A System Dynamics-Based Approach for Estimating Hubbert Peaks," *Energies*, vol. 10, p. 1858, 2017. **(I.F: 2.676)**,
20. M. H. Baloch, S. A. Abro, G. Sarwar Kaloi, **N. H. Mirjat**, S. Tahir, M. H. Nadeem, et al., "A research on electricity generation from wind corridors of Pakistan (two provinces): a technical proposal for remote zones," *Sustainability*, vol. 9, p. 1611, 2017. **(I.F: 2.075)**
21. F. Shaikh, Q. Ji, P. H. Shaikh, **N. H. Mirjat**, and M. A. Uqaili, "Forecasting China's natural gas demand based on optimized nonlinear grey models," *Energy*, vol. 140, pp. 941-951, 2017. **(I.F: 4.968)**
22. **Mirjat NH**, Uqaili MA, Harijan K, Valasai GD, Shaikh F, Waris M. A review of energy and power planning and policies of Pakistan. *Renewable and Sustainable Energy Reviews*. 2017, 1;79:110-27 **(IF 9.184)**.
23. G. D. Valasai, M. A. Uqaili, H. R. Memon, S. R. Samoo, **N. H. Mirjat**, and K. Harijan, Overcoming electricity crisis in Pakistan: A review of sustainable electricity options, *Renewable and Sustainable Energy Reviews*, vol. 72, pp. 734-745, 2017. **(I.F: 9.184)**
24. G. D. Valasai, **N. H. Mirjat**, M. A. Uqaili, H. U. R. Memon, S. R. Samoo, and K. Harijan, "Decarbonization of Electricity Sector of Pakistan—An," *Journal of Clean Energy Technologies*, vol. 5, 2017.
25. Rehman SA, Cai Y, Nafees M, Das Walasai G, **Mirjat NH**, Rashid W. Overcoming Electricity Crisis in Pakistan: An Overview of the Renewable Energy Status and Development in Pakistan. *Journal of Environmental Accounting and Management*. 2017,1;5(4):357-83.
26. S. H. Qazi, M. Mustafa, U. Sultana, and **N. H. Mirjat**, Enhanced Power Quality Controller in an Autonomous Microgrid by PSO Tuned PI Controller, *Indian Journal of Science and Technology*, vol. 10, 2017.
27. Qazi SH, Mustafa MW, Sultana U, **Mirjat NH**, Current Harmonics Mitigation from Grid-Connected Variable Speed Wind Turbine due to Nonlinear Loads using Shunt Active Power Filter." *Jurnal Teknologi*. 2017, 27;79(4).
28. A. Mengal, K. Harijan, M. Uqaili, **N. H Mirjat**, and G. Valasai, Mitigation of GHG emissions with a 50 MW wind power plant: a case study of Pakistan," *Sindh University Research Journal-SURJ (science series)*, vol. 49, no. 1, 2017.
29. A. Mengal, K. Harijan, M. A. Uqaili, **N. H. Mirjat**, and S. M. A. Shah, Cost estimation and comparison of carbon capture and storage technology with wind energy, *Mehran University Research Journal of Engineering & Technology*, vol. 36, p. 373, 2017.
30. Shaikh SA, **Mirjat NH**, Korejo WS, Walasai GD, Larik AS, Hussain A, Electricity Demand Forecasting: A Pakistan's Perspective. *Asian Journal of Engineering, Sciences & Technology*. 2017, 1;7(2).

## 2016

31. G. Valasai, M. Uqaili, H. Memon, S. Samoo, **N. H. Mirjat**, and K. Harijan, Assessment of renewable energy for electricity generation: using Pakistan TIMES energy model, *Sindh University Research Journal-SURJ (Science Series)*, Vol. 48, 2016.

## 2013

32. **N. H. Mirjat**, P. Nallagownden, and T. Ibrahim, Long-Term Sustainable Energy Planning for Malaysia: A Modelling and Decision Aid Framework," *Journal of Energy and Environment*, vol. 3, 2013.

## CONFERENCE PUBLICATIONS

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1. A Multi-criteria Analysis of Options for Power Generation from Biomass in Pakistan, 5<sup>th</sup> International Conference on Energy, Environment and Sustainable Development 2018 (EESD 2018)
  2. Electricity demand and supply sides scenarios for Pakistan (2016-2037): Impact of energy efficiency and CO<sub>2</sub> mitigation in residential and industrial sectors, 5<sup>th</sup> International Conference on Energy, Environment and Sustainable Development 2018 (EESD 2018)
  3. Techno-Economic Analysis of HVDC Transmission Line Project of China-Pakistan Economic Corridor (CPEC), Proceedings of the 4<sup>th</sup> International Conference on Power Generation Systems and Renewable Energy Technologies (PGSRET) 10-12 September 2018, Islamabad, Pakistan
  4. Energy Efficiency and Conservation Prospects: Analysis of Sectoral Energy Consumption and Saving Potential for Pakistan, The 12<sup>th</sup> international Energy Conference (IEC 2018)
  5. S. H. Qazi, M. Mustafa, N. H. Mirjat, and U. Sultana, "Performance evaluation of PI and PI-PSO in improving power quality of an autonomous microgrid," 2017.
  6. N. H. Mirjat, G. D. Valasai, M. A. Uqaili, K. Harijan, S. F. Shah, and A. Mengal, "Ranking of Scenario Alternatives for Sustainable Power Generation in Pakistan," in International Conference on Sustainable Energy & Environmental Sciences (SEES). Proceedings, p. 77. 2017
  7. R. M. Larik, S. H. Qazi, N. H. Mirjat, S. Shaikh, and A. R. Bhatti, "179. Under Voltage Load Shedding Scheme to Provide Voltage Stability," 2016.
  8. S. Razaa, N. H. Mirjat, A. Hussain, A. Alia, A. Azhara, A. Kumara, et al., "192. The long-term Electricity Planning for Sindh Province (Pakistan): An Application of Long-range Energy Alternatives Planning." 2016
  9. Pakistan's energy system: integrated energy modeling and formulation of national energy policies, 14<sup>th</sup> International Conference on Sustainable Energy Technologies, SET 2015, Nottingham
  10. A. Mengal and N. H. Mirjat, "Electricity demand and emissions under different policy scenarios for Pakistan," in Proceedings of the international conference on energy, environment, and sustainable development: Mehran University of Engineering and Technology. Jamshoro, Pakistan, 2014.
  11. N. H. Mirjat, P. Nallagownden, and T. Ibrahim, "The Malaysia's Energy Sector: A Modeling and Decision Aid Framework for Long-Term Sustainable Energy Planning," 2010.
  12. K. A. Amur, N. H. Mirjat, And K. M. Brohi, "Remedial Measures for Slow Pace of Land Acquisition in Foreign-Funded Infrastructure Projects in Pakistan. 2010
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## RESEARCH PROJECT TEAM MEMBER/REPORTS CO-AUTHORED

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- PSSP-USAID Project Report, titled “Sustainable Energy System: An Integrated Model and Decision Aid Framework for Electricity Generation to Support Policy Making Decisions,” and other projects reports (Completed)
- Higher Education Commission/British Council funded UK-Pakistan Knowledge Economy Partnership: “Biomass Resource Utilization for Clean Energy Production and Socio-economic Development in Rural Areas.”(Completed)
- Higher Education Commission Funded, NRPU Project “Modeling of Renewable Energy Penetration in the Energy Mix of Pakistan” (On-Going)

## REFERENCES

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1. **Dr. Mohammad Aslam Uqaili**  
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2. **Dr. Jonathan Nixon**  
Senior Lecturer, Faculty Research Centre in Flow Measurement and Fluid Mechanics, Coventry University, Coventry, U.K.  
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