Anas Karaki, Ph.D.

Hamad Bin Khalifa University, Doha, Qatar

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Professional Summary

Passionate about sustainable energy and advancing power systems, aiming to make impactful contributions to the field. With research experience spanning power-electronics, smart grids, energy storage and data centers, I apply advanced, evidence-driven approaches to addressing energy-related challenges and driving innovation through sustainable and resilient solutions. Senior IEEE Member (SMIEEE) committed to energy innovation.

Education

Ph.D., Sustainable Energy Aug. 2021 – May 2025
Hamad Bin Khalifa University, Doha, Qatar

M.Sc., Electrical and Computer Engineering Jan. 2017 – Aug. 2020
Texas A&M University, College Station, TX, USA

B.Sc., Electrical and Computer Engineering Sep. 2012 – May 2016
Minor in Mathematics
Texas A&M University at Qatar, Doha, Qatar

Work Experience

Postdoctoral Research Fellow, QEERI, HBKU, Doha, Qatar Aug. 2025 – Present

- Enhance the second life of Lithium-ion batteries
- Develop electric vehicle chargers (AC and DC chargers)
- Model and optimize the efficiency of data centers in arid regions

Research Associate, QEERI, HBKU, Doha, Qatar Sep. 2023 – Aug. 2025

- Model power systems and improve microgrid stability via real-time simulations
- Perform experimental tests for grid-connected and off-grid power inverters
- Enhance the integration of electric vehicles and ancillary services to the grid

Teaching Assistant, College of Science and Engineering, HBKU, Doha, Qatar Jan. 2022 – May 2024

- Prepare and deliver lecture notes related to the applications of game theory
- Deliver seminars for graduate students

Research Assistant, Texas A&M University at Qatar, Doha, Qatar Jul. 2019 – Aug. 2021

- Construct a microgrid testbed for experimental validation
- Investigate challenges related to power electronics-dominated systems

Research Assistant, Texas A&M University, College Station, TX, USA Jan. 2017 – Jun. 2019

- Perform experimental tests for inverters with hardware-in-the-loop
- Conduct research related to microgrid frequency and voltage restoration

Project Engineer, Siemens W.L.L., Doha, Qatar Jul. 2016 – Nov. 2016

- Plan and review substation schematics and single-line diagrams
- Evaluate the technical requirements for power transformers and switchgear

Selected Publications

Journal Articles

1. **A. Karaki**, A. Karaki, S. Bayhan, H. Abu-Rub, "**Battery Prognostics Using Single-Cycle Statistical Inference and Parametric Discharge Curves**," *Journal of Energy Storage*, 2026.

2. **A. Karaki**, A. Sharida, S. Bayhan, H. Abu-Rub, "**Autonomous Seamless Transition between Grid-Connected and Islanded Operations for DC-Coupled EV Charging Infrastructures**," *IEEE Open Journal of the Industrial Electronics Society*, 2026.

3. D. Pillai, S. Jain, J. Garcia, A. Thiruchuthan, **A. Karaki**, O. Gandhi, C. Rodriguez, S. Bayhan, V. Benito, "**Agrivoltaics for Arid Climates: Developments, Technological Trends, and Global Data-Driven Technoeconomic Assessments**," *Renewable and Sustainable Energy Reviews*, 2026.

4. **A. Karaki**, A. Sharida, S. Bayhan, H. Abu-Rub, "**A Parameter-Adaptive Predictive Control Strategy for Grid-Connected Inverters with Different Filter Topologies**," *IEEE Transactions on Industrial Electronics*, 2025.

5. A. Sharida, A. Kouzou, **A. Karaki**, U. Fesli, S. Bayhan, H. Abu-Rub, "**Passivity-Based Inverse Model Predictive Control With Reduced Sensors for Grid-Forming Inverters**," *IEEE Transactions on Power Electronics*, 2025.

6. A. Sharida, A. Carreno, A. B. Bayindir, A. N. Alquennah, **A. Karaki**, S. Bayhan, H. Abu-Rub, M. Malinowski, "**Multiport Smart Transformers: A Review of Architectures, Applications, and Future Trends**," *IEEE Industrial Electronics Magazine*, 2025.

7. F.B. Gurbuz, A. Karaki, **A. Karaki**, S. Demirbas, S. Bayhan, "**Model-free Reinforcement Learning in Microgrid Control: A Review**," *IEEE Access*, 2025.

8. **A. Karaki**, K. Abedrabboh, and L. Al-Fagih, "**Evolutionary Game-Based Battery Scheduling: A Comparative Study for Prosumers in Smart Grids**," *IEEE Access*, 2025.

9. **A. Karaki** and L. Al-Fagih, "**Evolutionary Game Theory as a Catalyst in Smart Grids: From Theoretical Insights to Practical Strategies**," *IEEE Access*, 2024.

10. K. Abedrabboh, **A. Karaki**, and L. Al-Fagih, "**A Combinatorial Double Auction for Community Shared Distributed Energy Resources**," *IEEE Access*, 2023.

11. B. Nun, M. F. Umar, **A. Karaki**, M. B. Shadmand, S. Bayhan, and H. Abu-Rub, "**Rank-Based Predictive Control for Community Microgrids with Dynamic Topology and Multiple Points of Common Coupling**," *IEEE Journal of Emerging and Selected Topics in Industrial Electronics*, 2022.

Conference Proceedings

1. A. Bayindir, A. Sharida, **A. Karaki**, S. Bayhan, H. Abu-Rub, "**Isolated Multi-Input Multi-Output Power Supply for Data Centers**," *18th Asia-Pacific Power and Energy Engineering Conference (APPEEC)*, Singapore, Aug. 2026.

2. M. Gad, A. Sharida, M. Al-Qahtani, **A. Karaki**, S. Bayhan, "**Coordinated V2G Support and Network-Aware Smart Charging of Electric Vehicles in Distribution Networks**," *35th International Symposium on Industrial Electronics (ISIE)* , Nagoya, Japan, June 2026.

3. **A. Karaki**, A. Alswaiti, A. Sharida, S. Bayhan, H. Abu-Rub, "**Four-Port SST-Based Multi-Objective Control for Hybrid PV-Battery Powered Data Centers**," *51st Annual Conference of the IEEE Industrial Electronics Society (IECON)*, Madrid, Spain, Oct. 2025.

4. A. Sharida, **A. Karaki**, S. Bayhan, H. Abu-Rub, "**DC Plasma Power Supply with Multi-Port Solid-State Transformer and Inverse Model Predictive Control**," *51st Annual Conference of the IEEE Industrial Electronics Society (IECON)*, Madrid, Spain, Oct. 2025.

5. A. Kutay Aydogan, **A. Karaki**, A. Sharida, S. Bayhan, H. Abu-Rub, M. Ehsani, "**End-of-Life Prediction Models for Lithium-ion Batteries in Electric Vehicles: Approaches, Challenges and Future Directions**," *51st Annual Conference of the IEEE Industrial Electronics Society (IECON)*, Madrid, Spain, Oct. 2025.

6. A.A. Jabbar, M. Wanik, **A. Karaki**, S. Bayhan, "**Evaluating the Impact of Electric Vehicle Charging on MV/LV Distribution Network Using Distribution-Level Phasor Measurement Unit Data**," *34th International Symposium on Industrial Electronics (ISIE)*, Toronto, ON, Canada, June 2025.

7. M. Gad, M. Al-Qahrani. **A. Karaki**, A. Sharida, M. Wanik, "**Assessing the Impact of Electric Vehicle Charging on Distribution Network**," *19th International Conference on Compatibility, Power Electronics and Power Engineering (CPEPowerEng)*, Antalya, Türkiye, May 2025.

8. F.B. Gurbuz, **A. Karaki**, S. Bayhan, "**Q-learning-based frequency and voltage restoration for parallel grid-forming inverters**," *19th International Conference on Compatibility, Power Electronics and Power Engineering (CPEPowerEng)*, Antalya, Türkiye, May 2025.

9. T. Teague, S. Refaat, M. Farrag, **A. Karaki**, "**A Comparative Study of UPS Batteries For Data Center Applications**," *19th International Conference on Compatibility, Power Electronics and Power Engineering (CPEPowerEng)*, Antalya, Türkiye, May 2025.

10. **A. Karaki**, A. Krama, S. Bayhan, "**Predictive Control for Parallel Grid-Connected Inverters with Low-Voltage Ride-Through Capability**," *50th Annual Conference of the IEEE Industrial Electronics Society (IECON)*, Chicago, IL, USA, Nov. 2024.

11. **A. Karaki**, S. Bayhan, M. B. Shadmand, "**An Enhanced Predictive Control Scheme for Vehicle-to-Grid Integration During Voltage Sag**," *18th International Conference on Compatibility, Power Electronics and Power Engineering (CPEPowerEng)*, Gdynia, Poland, June 2024.

12. **A. Karaki**, S. Bayhan, A. Sanfilippo, B. Zoghdar, and M. Elsied, "**Virtual Inertia Enhancement for Grid Forming Inverters in AC Power Electronics Dominated Grids**," *4th International Conference on Smart Grid & Renewable Energy (SGRE)*, Doha, Qatar, Jan. 2024.

13. **A. Karaki**, M. B. Shadmand, H. Abu-Rub, and S. Bayhan, "**Virtual Inertia Emulation Inspired Predictive Control to Improve Frequency Stability in Power Electronics Dominated Grid**," *IEEE 12th International Symposium on Power Electronics for Distributed Generation Systems (PEDG)*, Chicago, IL, USA, July 2021.

14. **A. Karaki**, M. Begovic, S. Bayhan, and H. Abu-Rub, "**Frequency and Voltage Restoration for Droop Controlled AC Microgrids**," *2nd International Conference on Smart Grid and Renewable Energy (SGRE)*, Doha, Qatar, Oct. 2019.

15. **A. Karaki**, M. Begovic, H. Abu-Rub, S. Bayhan, and I. Poonahela, "**On Frequency Control Techniques for Microgrids**," *International Conference on Smart Energy Systems and Technologies (SEST)*, Sevilla, Spain, Sep. 2018.

Book Chapters

1. **A. Karaki**, K. Abedrabboh, and L. Al-Fagih, "**Game Theory and AI for Strategic Energy Management**," Chapter 7 in *AI and Digitalization in Energy Management*, IET, 2026.

2. A. Krama, **A. Karaki**, U. Fesli, S. Bayhan, H. Abu-Rub, M. Wanik, "**Synthetic data generation through power hardware-in-the-loop (PHIL) simulations**," Chapter 3 in *AI and Digitalization in*

Energy Management, IET, 2026.

3. A. Sharida, **A. Karaki**, S. Bayhan, U. Fesli, and H. Abu-Rub, "**Empowering Resilience: AI and the Future of Microgrids**," Chapter 15 in *AI and Digitalization in Energy Management*, IET, 2026.

4. A. Sharida, **A. Karaki**, S. Bayhan, and H. Abu-Rub, "**Electric Mobility Integration: A Deep Dive into AI Solutions**," Chapter 17 in *AI and Digitalization in Energy Management*, IET, 2026.

Patents

- US Provisional Patent Application No. 63/869,751
  "Modular Energy Hub Apparatus for Integrating Renewable Energy, Storage Systems, and the Utility Grid into EV Charging Infrastructure."
- Patent Application No. 2026-059
  "Apparatus for Multi-Port Bidirectional Power Conversion with Common High Frequency Magnetic Coupling."

Technical Expertise

- **Software** — — MATLAB/Simulink, OPAL-RT/RT-LAB, HOMER, and Adobe Illustrator
- **Soft Skills** — Team Leadership, Strategic Planning, Project Budgeting, Effective Communication
- **Languages** — Arabic (Native), English (Bilingual)

Awards & Honors

- Keynote Speaker, Qatar Foundation Marhaba Class of 2026, Doha, Qatar, August 2026
- Student and Young Professionals Award, IEEE IES 51st IECON, Madrid, Spain, October 2025
- Three Minute Thesis (3MT), 1st Place Winner, HBKU 3MT, Doha, Qatar, April 2025
- Best Paper Award, IEEE 4th SGRE, Doha, Qatar, January 2024
- Aggie Core Values, Respect Award, Texas A&M University at Qatar, April 2020
- Eta Kappa Nu (HKN), Electrical Engineering Honor Society, August 2015
- Best Story Award, Red Bull 60 Seconds Inspirational Video, April 2014
- Valedictorian of Class 2012, Academic Bridge Program (ABP), May 2012

Peer Review

- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Power Electronics
- IEEE Journal of Emerging and Selected Topics in Industrial Electronics
- Annual Conference of the IEEE Industrial Electronics Society (IECON)
- International Conference on Smart Grid and Renewable Energy (SGRE)
- International Conference on Compatibility, Power Electronics and Power Engineering (CPEPowerEng)

Professional Service

- Exhibition Chair, IECON 2026, Doha, Qatar, October 2026
- Publicity Chair, CPEPowerEng 2026, Ningbo, China, July 2026
- Technical Committee, IECON 2025, Madrid, Spain, October 2025
- Publicity Chair, CPEPowerEng 2025, Antalya, Türkiye, May 2025

Community & Volunteering Services

- Vice Chair, IEEE Qatar Section, January 2026 – present
- Vice Chair, IEEE IES Qatar Section Chapter, June 2025 – present