

# MOSTAFA KERMANI

Senior Project Engineer, Hitachi Energy, Västerås, Sweden (Now).

IEEE Member

Lecturer

Postdoctoral Researcher, Chalmers University of Technology, Sweden.

Technical Manager of the LAMBDA Microgrid Laboratory at Sapienza University of Rome, Italy.

## Professional Expertise

- Sustainable Electrical Power Systems Design.
- Renewable Energy Sources and Energy Storage System Integration.
- Application of Power Electronics in Power Systems.
- SCADA for Smart Energy Management System.
- Sustainable Port and harbor Microgrid System.
- Multi Energy Systems (Electricity, Heat and H2) Modeling.

## Educations

- **Ph.D.** in Electrical Engineering, Sapienza University of Rome, Italy, Feb 2019.  
**Thesis:** “Sustainable Energy System based on Renewable Energy Sources in a Microgrid: Optimization of Energy Consumption by using Hybrid Energy Storage Systems based on PSO algorithm (Case study: Port of Long Beach in the USA)”.
- **Master of Science**, Department of Electrical and Computer Engineering, Birjand University, Birjand, Iran, Sep 2013.  
**Thesis:** “Transient voltage Stability Analysis of an Isolated Microgrid based on SCIG Wind Turbine and Battery Energy Storage System”.
- **Bachelor of Science**, Department of Electrical and Computer Engineering, Ebnehesam University, Birjand, Iran, Aug 2011.  
**Thesis:** “Feasibility study for PV power plants implementation in Birjand city, Iran”.

## Professional Experiences

- Senior Project Engineer in PGGA group, Hitacgi Energy, Västerås, Sweden (**Now**).
- Postdoctoral Researcher, Electrical Engineering Department, Chalmers University of Technology, Gothenburg, Sweden, **June 2020-August 2022**.
- Visiting Researcher at Industrial Process and Energy Systems Engineering Department, EPFL University, Switzerland, **July 2022**.
- Postdoctoral Research Fellow, Department of Electrical Engineering, Sapienza University of Rome, Italy, **May 2019-Apr 2020**.
- Co-founder of LAMBDA MG LAB and Campobasso Energy Community projects, Sapienza University of Rome, Italy, **2019-2020**.
- Technical Manager of the LAMBDA Microgrid Laboratory, Department of Electrical Engineering, Sapienza University of Rome, **Sep 2018-May2020**.
- Guest Editor of Special Issue "[Building Automation and Special Electrical Systems](#)" belongs to the "Energy and Buildings" section, MDPI Energies, **2020**.
- Member of Chairs Committee at IEEE IEEEIC I&CPS Conference, **Since 2018**.
- Secretary of IEEE Student Branch Sapienza, **2018 –2020**.
- Design and Technical Consultant at Abrysham Negar-e-Pars Company for Utility-Scale Solar Photovoltaic Power Plants, **2016-2018**.
- Technical Consultant, Binalood 34MW Wind Farm, Neyshaboor, Iran, **2016**.
- Collaboration with Science and Technology Park, Khorasan, Iran, **2013-2015**.
- Chairman of the board, Tozi-e-Nirooye Kavir Company, **2011-2015**.

## Teaching Experiences

- Tutor of “Advance Power System”, “Power Electronic Converters” & “Electric Machinery”, Chalmers University of Technology, Gothenburg, Sweden, **2020-2022**.
- [Teaching “Power System for Smart Buildings” and “Electrical Design of Smart Buildings Laboratory”](#) courses at Sapienza University of Rome, **2018 – Present**.
- Co-Supervisor of 1 Ph.D., Supervisor of 3 and Co-Supervisor of 8 Master Thesis students at Sapienza University of Rome, Italy, **Since 2019**.
- Presented Seminar “Optimal Operation and Planning of Energy Hub”, Department of Electrical Engineering, Sapienza University of Rome, Italy, **March 8th-9th, 2022**.
- Presented Seminar “Optimization of Energy Consumption in a Port Microgrid by Energy Storage Systems”, Department of Electrical Engineering, Amirkabir University (AUT), Tehran, Iran, **July 29th, 2019**.
- Lecturer, Faculty of Electrical Engineering, Birjand University, Iran, **2014 - 2015**.
- Responsible for Electrical Engineering Lab, Faculty of Electrical Engineering, Ebne-Hesam University, Birjand, Iran, **2014-2015**.

## Patent

- **M. Kermani, M. E. Ghasemzadeh** (Jan 10th, 2015).  
Title: “**Smart Insulators for Electrical Network Monitoring**”

## Computer Skills

- **Simulation Tools**
  - WS500 ABB
  - PSE DE/HMI ABB
  - Matlab (Simulink)
  - GAMS
  - Python
  - HOMER
  - DigSilent
  - ETAP
  - PVsyst
  - Dialux

## Reviewer in Journals and Conferences

- IEEE Transactions on Industry Application Society.
- IET Generation, Transmission & Distribution.
- Applied Energy, Elsevier.
- Renewable Energy, Elsevier.
- Energies and Sustainability in MDPI.
- IEEE IAS conference.
- IEEE EEEIC conference.

## Industry Education Courses

- “Industrial Electricity professional” in Technical and Vocational Training Organization, Iran, Standard Number: 83-8-55/15.
- “Skilled Technician of PLC S7” in Technical and Vocational Training Organization, Iran, Standard Number: 45/35/8/21.
- Successfully Attended and passed the “Patent Arbitration Course” for the national patents.

## Online Webinar

- IEEE Seminar on "Microgrids: Swedish and International Perspectives", May 26, 2021.
- Flexibility as a Commodity in Local Energy Communities, December 2021.
- Fourth Generation of District Heating and Cooling Systems, December 2021.
- SCADA System in Transportation Sector, December 2021.

## Languages

- **Persian:** Native
- **English:** Fluent
- **Italian:** Working proficiency
- **Swedish:** Beginner

## Achievements

- Presented the Final Lecture for Senior Lecturer position in “Energy Technology” Halmstad University, Sweden (Ref.2021/125). ( **Aug. 2022**)
- Shortlisted for the Associate Professor in “Environmental Sustainability Analysis of Urban Systems” NTNU University, Norway (Ref.2021/14097). ( **Feb. 2022**)
- Erik Feuk grants in 2021, 2022, Chalmers University of Technology, Sweden.

## Selected Publications

### Book

- Martirano, L., **Kermani, M.**, “MV LV Electrical Power Systems for Smart Buildings Microgrids and Energy Communities,” Wiley (Editing).

This book presents a roadmap for a Smart Building from the main grid point of connection to the users. My contribution was writing, chapters 8 (microgrids for smart buildings), 9 (PV and BESS sizing and design), 10 (building automation for smart buildings) and appendix (basic of power systems).

### Papers: Journals

1. **Kermani, M.**, Chen, P., Göransson, L., & Bongiorno, M. (2022). A comprehensive optimal energy control in interconnected microgrids through multiport converter under N-1 criterion and demand response program. Renewable Energy, 199, 957-976. [doi.org/10.1016/j.renene.2022.09.006](https://doi.org/10.1016/j.renene.2022.09.006)

This paper introduces a comprehensive solution for optimal energy control for interconnected microgrids based on battery energy storage and multiport converter sizing to host electric vehicles by considering the uncertainties.

2. Jasinski, M., Najafi, A., Homae, O., **Kermani, M.**, Tsousoglou, G., Leonowicz, Z., & Novak, T. (2023). Operation and Planning of Energy Hubs Under Uncertainty-a Review of Mathematical Optimization Approaches. IEEE Access. [DOI: 10.1109/ACCESS.2023.3237649](https://doi.org/10.1109/ACCESS.2023.3237649)

This paper categorize research studies that have applied mathematical optimization approaches towards making operational and planning decisions for energy hubs including robust, information gap decision theory, stochastic programming, and chance-constrained optimization methods.

3. **Kermani, M.**, Shirdare, E., Parise, G., Bongiorno, M., & Martirano, L. (2022). A Comprehensive Techno-economic Solution for Demand Control in Ports: Energy Storage Systems Integration. IEEE Transactions on Industry Applications. [doi:10.1109/TIA.2022.3145769](https://doi.org/10.1109/TIA.2022.3145769)

This paper introduces a holistic solution for energy and demand control with energy storage technologies in a sustainable port.

4. **Kermani, M.**, Adelmanesh, B., Shirdare, E., Sima, C. A., Carnì, D. L., & Martirano, L. (2021). Intelligent energy management based on SCADA system in a real Microgrid for smart building applications. Renewable Energy, 171, 1115-1127. [doi.org/10.1016/j.renene.2021.03.008](https://doi.org/10.1016/j.renene.2021.03.008)

A real smart energy management in a microgrid based on SCADA system is investigated in this paper. Conceptualization, writing-original draft, programming, editing & review were my contribution. Also, connections, and components adjustments such as Energy Server, Energy Meters are done by the LAMBDA group. (<https://web.uniroma1.it/diaee/lambda-laboratorio-di-impianti-elettrici-microgrid-e-domotica/lambda-laboratorio-di-impianti>)

5. **Kermani, M.**, Shirdare, E., Najafi, A., Adelmanesh, B., Carni, D. L., & Martirano, L. (2021). Optimal Self-scheduling of a real Energy Hub considering local DG units and Demand Response under Uncertainties. IEEE Transactions on Industry Applications., vol. 57, no. 4, pp. 3396-3405, July-Aug. 2021, [doi: 10.1109/TIA.2021.3072022](https://doi.org/10.1109/TIA.2021.3072022).

In relation to the paper 2, a cost based optimal operation of LAMBDA MG Lab in analyzed in this research in different techno-economic scenarios.

6. Martirano, L., Rotondo, S., **Kermani, M.**, Massarella, F., & Gravina, R. (2020). Power Sharing Model for Energy Communities of Buildings. IEEE Transactions on Industry Applications., vol. 57, no. 1, pp. 170-178, Jan.-Feb. 2021, [doi: 10.1109/TIA.2020.3036015](https://doi.org/10.1109/TIA.2020.3036015).

This paper proposes a power sharing model that is useful for energy communities based on renewables sharing for both building level and larger communities

**Papers: Journals**

- **M. Kermani**, G. Ferrari, E. Shirdare, M. Manganelli and L. Martirano, (2022) "Compact and Smart Outdoor Medium/Low Voltage Substation for Energy Communities," in IEEE Transactions on Industry Applications, [doi: 10.1109/TIA.2022.3148357](https://doi.org/10.1109/TIA.2022.3148357).
- Jasiński, M., Martirano, L., Najafi, A., Homae, O., Leonowicz, Z., & **Kermani, M.** (2022). Microgrid Working Conditions Identification Based on Cluster Analysis - A Case Study from LAMBDA Microgrid. IEEE Access, 10, 70971-70979. [doi:10.1109/ACCESS.2022.3186092](https://doi.org/10.1109/ACCESS.2022.3186092).
- Maryam Mohiti, Mohammadreza Mazidi, **Mostafa Kermani**, Davoud Abootorabi Zarchi, Frequency-constrained energy and reserve scheduling in wind incorporated low-inertia power systems considering vanadium flow redox batteries, IET Generation, Transmission & Distribution, <https://doi.org/10.1049/gtd2.12592>
- **Kermani, M.**, Shirdare, E., Abbasi, S., Parise, G., & Martirano, L. (2021). Elevator Regenerative Energy Applications with Ultracapacitor and Battery Energy Storage Systems in Complex Buildings. Energies, 14(11), 3259. [doi.org/10.3390/en14113259](https://doi.org/10.3390/en14113259).
- Martirano, L., Lentola, L., Vescio, G., & **Kermani, M.** (2021). Modularized Electrical Power Systems: The Three-Bus Architecture. IEEE Industry Applications Magazine, 28(1), 18-25. [doi: 10.1109/MIAS.2021.3114667](https://doi.org/10.1109/MIAS.2021.3114667).
- **Kermani, M.**, Parise, G., Chavdarian, B., & Martirano, L. (2020). Ultracapacitors for port crane applications: Sizing and techno-economic analysis. Energies, 13(8), 2091. [doi.org/10.3390/en13082091](https://doi.org/10.3390/en13082091).
- **Kermani, M.**, Carnì, D. L., Rotondo, S., Paolillo, A., Manzo, F., & Martirano, L. (2020). A nearly zero-energy microgrid testbed laboratory: Centralized control strategy based on SCADA system. Energies, 13(8), 2106. [doi.org/10.3390/en13082106](https://doi.org/10.3390/en13082106).
- Edrisian, A., Hajian, M., **Kermani, M.**, & Ebadian, M. (2015). Impact of Reactive Power on Stable Production of Wind Farms. Majlesi Journal of Energy Management 4, no 2. <http://journals.iaumajlesi.ac.ir/em/index/index.php/em/article/view/156>.

**Conferences**

- **M. Kermani**, P. Chen, L. Göransson and M. Bongiorno, "Optimal Energy Control, Hosting BESS and EVs through Multiport Converter in Interconnected MGs," 2022 IEEE International Conference on Environment and Electrical Engineering and 2022 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2022, pp. 1-7.
- C. Moscatiello et al., "LVDC Microgrids for Power Sharing in Energy Community," 2022 IEEE Industry Applications Society Annual Meeting (IAS), 2022, pp. 1-7.
- G. Caprara, L. Martirano, **M. Kermani**, D. de Mesquita e Sousa, R. Barilli and V. Armas, "Cold Ironing and Battery Energy Storage System in the Port of Civitavecchia," 2022 IEEE International Conference on Environment and Electrical Engineering and 2022 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2022, pp. 1-6.
- N. Vafamand, M. M. Arefi, E. Shirdare and **M. Kermani**, "Decentralized State Estimation of Interconnected DC MGs with Constant Power Loads," 2022 IEEE International Conference on Environment and Electrical Engineering and 2022 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2022, pp. 1-6.
- S. Soltani, M. R. Mazidi, M. Mohiti and **M. Kermani**, "Hardware Implementation New Zero-Setting Power Swing Detection and Fast Detection Symmetrical Fault during Power Swing Algorithms," 2022 IEEE International Conference on Environment and Electrical Engineering and 2022 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2022, pp. 1-6.
- D. L. Carnì, **M. Kermani** and F. Lamonaca, "A power signal alteration analyzer based on empirical mode decomposition," 2022 IEEE International Workshop on Metrology for Living Environment (MetroLivEn), 2022, pp. 298-302.
- R. Loggia, C. Moscatiello, **M. Kermani**, A. Flamini, A. Massaccesi and L. Martirano, "Electric Vehicles Charging Stations Sharing Model Control," 2022 IEEE/IAS 58th Industrial and Commercial Power Systems Technical Conference (I&CPS), 2022, pp. 1-6.
- **M. Kermani**, E. Shirdare, G. Parise and L. Martirano, "Integrated System of Energy Storage Technologies for Demand Control and Energy Saving in Ports," 2021 IEEE Industry Applications Society Annual Meeting (IAS), 2021, pp. 1-5.
- G. Ferrari, **M. Kermani**, M. Manganelli and L. Martirano, "Proposal of a Compact Outdoor Medium/Low Voltage Substation for Energy Communities," 2021 IEEE Industry Applications Society Annual Meeting (IAS), 2021, pp. 1-6.
- L. Martirano, L. Lentola, G. Vescio and M. Kermani, "Three-Bus Architecture for Modularized Electrical Power Systems," 2021 IEEE/IAS 57th Industrial and Commercial Power Systems Technical Conference (I&CPS), 2021, pp. 1-7.
- R. Loggia, **M. Kermani**, R. Araneo, D. Borello, M. Panella and L. Martirano, "A Hybrid Energy Hub Investigation with Renewables and Electric Vehicle in a Smart Microgrid Lab," 2021 IEEE International Conference on Environment and Electrical Engineering and 2021 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2021, pp. 1-7.
- Najafi, A., **Kermani, M.**, Jasiński, M., Martirano, L., & Leonowicz, Z. (2021, October). A hybrid IGDT-robust optimization model for optimal self-scheduling of a smart home. In 2021 IEEE Industry Applications Society Annual Meeting (IAS) (pp. 1-5). IEEE.
- Caprara, G., Armas, V., de Mesquita Sousa, D., Kermani, M., & Martirano, L. (2021, September). An Energy Storage System to support Cruise Ships Cold Ironing in the Port of Civitavecchia. In 2021 IEEE International Conference on Environment and Electrical Engineering and 2021 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-5). IEEE.
- **Kermani, M.**, Shirdare, E., Najafi, A., Adelmanesh, B., Carnì, D. L., & Martirano, L. (2020, October). Optimal Operation of a real Power Hub based on PV/FC/GenSet/BESS and Demand Response under Uncertainty. In 2020 IEEE Industry Applications Society Annual Meeting (pp. 1-7). IEEE.
- B. Mohamadi, J. B. Noshahr, B. Adelmanesh, E. Shidare and **M. Kermani**, "Optimal Battery Energy Storage Sizing in Microgrids by using Artificial Flora Algorithm," 2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2020, pp. 1-6.
- L. Martirano, S. Rotondo, **M. Kermani**, F. Massarella and R. Gravina, "A "Power Sharing Model" (PSM) for Buildings of the Public Administration," 2020 IEEE/IAS 56th Industrial and Commercial Power Systems Technical Conference (I&CPS), 2020, pp. 1-7.

### Conferences

- Martirano, L., Rotondo, S., Manganelli, M., & **Kermani, M.** (2020, October). A smart microgrid for buildings of the public administration. In 2020 IEEE Industry Applications Society Annual Meeting (pp. 1-4). IEEE.
- J. B. Noshahr, B. Mohamadi, M. Kermani and **M. Kermani**, "Operational Planning of Inverter Control in a grid connected Microgrid with hybrid PV and BESS," 2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2020, pp. 1-5.
- **M. Kermani**, G. Parise, E. Shirdare and L. Martirano, "Transactive Energy Solution in a Port's Microgrid based on Blockchain Technology," 2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe), 2020, pp. 1-6.
- Rotondo, S., **Kermani, M.**, Alfieri, S., Piccini, S., & Martirano, L. (2020, June). Microgrid and building retrofit for NZEB target recognition: from convent to historical residence. In 2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-6).
- **Kermani, M.**, Parise, G., Martirano, L., Parise, L., Chavdarian, B., & Su, C. L. (2019, September). Optimization of energy consumption in STS group cranes by using hybrid energy storage systems based on PSO algorithm. In 2019 IEEE Industry Applications Society Annual Meeting (pp. 1-5). IEEE.
- Martirano, L., **Kermani, M.**, Manzo, F., Bayatmakoo, A., & Graselli, U. (2019, June). Implementation of SCADA systems for a real microgrid lab testbed. In 2019 IEEE Milan PowerTech (pp. 1-6). IEEE.
- Alfieri, S., Piccini, S., & **Kermani, M.** (2019, June). Feasibility study of Nearly Zero Energy Building in a real Microgrid case study. In 2019 IEEE International Conference on Environment and Electrical Engineering and 2019 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-6). IEEE.
- Paolillo, A., Carnì, D. L., **Kermani, M.**, Martirano, L., & Aiello, A. (2019, June). An innovative home and building automation design tool for nanogrids applications. In 2019 IEEE International Conference on Environment and Electrical Engineering and 2019 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-5). IEEE.
- **Kermani, M.**, Parise, G., Martirano, L., Parise, L., & Chavdarian, B. (2019, June). Utilization of regenerative energy by ultracapacitor sizing for peak shaving in STS crane. In 2019 IEEE International Conference on Environment and Electrical Engineering and 2019 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-5). IEEE.
- **Kermani, M.**, Parise, G., Martirano, L., Parise, L., & Chavdarian, B. (2018, November). Power balancing in STS group cranes with flywheel energy storage based on DSM strategy. In 2018 IEEE 59th International Scientific Conference on Power and Electrical Engineering of Riga Technical University (RTU CON) (pp. 1-5). IEEE.
- **Kermani, M.**, Parise, G., Martirano, L., Parise, L., & Chavdarian, B. (2018, June). Optimization of peak load shaving in STS group cranes based on PSO algorithm. In 2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-5). IEEE.
- Kalesar, B. M., Noshahr, J. B., **Kermani, M.**, Bavandsavadkoohi, H., & Ahbab, F. (2018, June). Effect of angles of harmonic components of back to back converter of distributed generation resources on current behavior of distribution networks. In 2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-4). IEEE.
- Kalesar, B. M., Rouhollahi, B., Noshahr, J. B., Tadayon, M., & **Kermani, M.** (2018, June). Multi-Objective Fuzzy Model for Optimal Siting and Sizing of DG Units to Reduce Losses Using Genetic Algorithm. In 2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems (EEEIC/I&CPS Europe) (pp. 1-6). IEEE.
- Parise, G., Martirano, L., **Kermani, M.**, & Kermani, M. (2017, June). Designing a power control strategy in a microgrid using PID/fuzzy controller based on battery energy storage. In 2017 IEEE International Conference on Environment and Electrical Engineering and 2017 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe) (pp. 1-5). IEEE.
- **Kermani, M.** (2016, June). Transient voltage and frequency stability of an isolated microgrid based on energy storage systems. In 2016 IEEE 16th International Conference on Environment and Electrical Engineering (EEEIC) (pp. 1-5). IEEE.