Stefano Mazzoni, PhD

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Professional Summary

Professor and **Senior Consultant** in energy **optimization and decarbonization** with extensive experience in the **public and private sectors**. Proven track record of achieving **high-impact results through innovative solutions** and strategic leadership.

Work Experience

Nov 2023 – Present **Expert Committee Member**, *Italian Government, Presidency of the Council of Ministers*, Rome, Italy

Consulting expert for the Ministry for institutional reforms and regulatory simplification.

- Provides expert support to the Ministerial Commission on **environmental and energy security policies** in collaboration with the Minister of the Environment and Energy Security.
- Contributes to evaluating policies and regulatory frameworks to ensure alignment with national energy security goals.

Mar 2023 – Present **Assistant Professor**, *University of Roma Tor Vergata*, Rome, Italy

Tenured Assistant Professor in Energy Conversion Systems and Turbomachinery.

- Conducts research on multi-energy system optimization and clean energy environments, focusing on Carbon Capture and Storage (CCS) and Carbon Capture and Utilization (CCU).
- Develops innovative cogeneration technologies for simultaneous generation **of hydrogen, water, and e-fuels**.
- Teaches Master's course on advanced decarbonized energy systems and Bachelor's course on Energy Systems and Renewable Energy Resources.

2024 – Present **Co-Founder - Head of Technical Committee**, *Evercomm EMEA*, Luxenburg

- Led technical deployment of NxSuite Digitial Platform for advanced Energy System Decarbonization.

Apr 2022 – Mar 2023 **Co-Founder - CTO**, *MEDS Venture Global Pte Ltd*, Singapore

Co-founded MEDS Venture Global, a company focused on Multi-Energy Decarbonized Solutions.

- Member of the Executive & Technology Management committee, responsible for technical deployment of DECAPLAN™ Digital Platform aimed at achieving Net-Zero Multi-Energy Systems.
- Invented two patents related to digital energy optimization (IP Technology Disclosures 2022-332 and 2022-333).

Jan 2019 – Present **Founder**, *Energy Smart Solutions Pte Ltd*, Singapore

Founded a company providing consulting and solutions for Net-Zero Decarbonized projects, achieving substantial savings.

- Completed consulting projects for clients like Worley-Parsons, Jurong Port, and Jurong Town Corporation, generating up to $50 million in savings and reducing CO2 emissions by 25%.
- Developed master planning and design strategies for greenfield projects involving integrated energy systems tailored to diverse end-user demands.
- Focused on optimal dispatch and unit commitment problem-solving, integrating renewable energy, cogeneration, energy storage systems, and AI-based performance monitoring.

July 2016 – Aug 2022 **Senior Research Fellow**, *Nanyang Technological University (NTU)*, Singapore
Research lead in Energy Conversion Systems, focusing on Smart Multi-Energy Systems (SMES).
- Spearheaded the design of an $8 million cogeneration power plant at Jurong Port, realizing $1 million CAPEX savings and achieving 15% primary energy savings and 20% CO2 emissions reduction.
- Utilized the ©E-OPT software platform for validating the design of district cooling systems and optimization of smart districts.
- Coordinated a team of research associates, PhD candidates, and master's students, actively involved in steering committee meetings with national agencies and industry partners.
- Developed the Optimal Planning simulation tool for SMES, modeling various components such as engines, chillers, and thermal energy storage.
- Applied advanced mathematical methods like hybrid evolutionary and simultaneous algorithms, integrated with AI, to optimize system performance.

Nov 2018 – June 2019 **Consultant**, *Shell*, Singapore
Conducted an energy and CO2 footprint reduction study for the Shell Jurong Island Petrochemicals Complex.
- Performed pinch point analysis and optimized plant configuration to reduce energy consumption.
- Developed a roadmap targeting a 95% CO2 reduction by 2035.

June 2014 – June 2016 **Research Fellow**, *University of Roma Tre*, Rome, Italy
Researcher in Energy Conversion Systems with a focus on Concentrated Solar Power (CSP).
- Developed component models for CSP power plants as part of the OMSoP European Project.
- Led technical and economic analyses to optimize CSP power plant performance.
- Managed laboratory testing for solar and turbomachinery applications.

Mar 2016 – June 2016 **Project Evaluator**, *Italian Ministry for University and Research*, Italy
Evaluation of MIUR-DAAD Joint Mobility Program.

Education

Jan 2011 – Jun 2014 **PhD in Industrial and Mechanical Engineering**, *University of Roma Tre*, Rome, Italy
Thesis: *IGCC Power Plant Simulator: Gas Turbine and Steam Cycle.*

Oct 2007 – May 2010 **Master's Degree in Industrial and Mechanical Engineering**, *University of Roma Tre*, Rome, Italy
Graduated with Laude; Thesis: *Steam Cycle Simulator for Combined Power Plants.*

Oct 2004 – Dec 2007 **Bachelor's Degree in Industrial and Mechanical Engineering**, *University of Roma Tre*, Rome, Italy
Thesis: *Emulsions in Reciprocating Engines.*

Technical Skills

Energy Systems	Energy Conversion, Modeling of Power Plant Components, Thermodynamic, **Decarbonization** Turbomachinery, Steam Cycles, Solar Power Plants, Heat Transfer Devices
Optimization	**Optimization Techniques**, **AI and ML**,Neural Networks, Unit Commitment & Master Planning
Programming	Fortran 77, Matlab, Python, Neuro Dimension, Aspen Suite, ANSYS, AutoCAD

Languages

Italian	Native
English	Professional Proficiency
German	Basic Proficiency

Awards

2024	Best Paper Award, ICEEE 2024 International Conference
2020	Outstanding Reviewer, Applied Energy International Journal, ELSEVIER
2020	Distinguished Scientist, Sustainable Development of Energy, Water and Environment Systems
2015	Best Paper Award, SASE 2015 International Conference

Patent

2023 TD2022-332 - Energy Dispatch and Energy Planner V2

2023 TD2022-333 - Optimal MasterPlanning and Real Time Dispatching

2019 TD2019-038 - Energy Dispatch and Energy Planner V1

Interests

Photography (Professional Level), Traveling, Chess (Semi-Pro), Cycling, Soccer, Horse Riding, Swimming, Diving, Cinema, Music, and Art

References

2023 **Nastasi, B., Mazzoni, S.** Renewable Hydrogen Energy Communities layouts towards off-grid operation. *Energy Conversion and Management*, 291, art. no. 117293. DOI: 10.1016/j.enconman.2023.117293.

2023 **Mazzoni, S., Magnolia, G., Vellini, M., Gambini, M.** Decarbonisation and Optimization Strategies in Distributed Energy Community characterized by Demand of Electricity, Cooling, and Heating. *ECOS 2023*, 36th International Conference, p. 2019–30, DOI: 10.52202/069564-0183.

2023 **Gambini, M., Mazzoni, S., Vellini, M.** The Role of Cogeneration in the Electrification Pathways towards Decarbonization. *Energies*, 16(15), art. no. 5606. DOI: 10.3390/en16155606.

2023 **Magnolia, G., Gambini, M., Mazzoni, S., Vellini, M.** Renewable energy, carbon capture and sequestration, and hydrogen solutions as enabling technologies for CO2 reduction: An application to the 2030 Italian national energy scenarios. *Cleaner Energy Systems*, 4. DOI: 10.1016/j.cles.2022.100049.

2023 **Atzori, D., Tiozzo, S., Vellini, M., Gambini, M., Mazzoni, S.** Industrial Technologies for CO2 Reduction Applicable to Glass Furnaces. *Thermo*, 3, pp. 682–710. DOI: 10.3390/thermo3040039.

2022 **Nastasi, B., Mazzoni, S., Groppi, D., Romagnoli, A., Astiaso Garcia, D.** Comparing optimal Hydrogen solutions in Renewable Energy Community in Islands. *SDEWES 2022*.

2021 **Mazzoni, S., Ooi, S., Desideri, U., Nastasi, B., Comodi, G., Romagnoli, A.** The Adoption of a Planning Tool Software Platform for Optimized Polygeneration Design and Operation - a District Cooling Application in South-East Asia. *Applied Thermal Engineering*, 199, art. no. 117532.

2021 **Bartolini, A., Mazzoni, S., Comodi, G., Romagnoli, A.** Distributed energy systems to lower carbon emissions in future industrial districts. *Applied Energy*, 301, art. no. 117324.

2021 **Nastasi, B., Mazzoni, S., Groppi, D., Romagnoli, A., Astiaso Garcia, D.** Optimized integration of Hydrogen technologies in Island energy systems. *Renewable Energy*, 174, pp. 850-864.

2021 **Mazzoni, S., Sze, J.Y., Nastasi, B., Ooi, S., Desideri, U., Romagnoli, A.** A techno-economic assessment on the adoption of latent heat thermal energy storage systems for district cooling optimal dispatch and operations. *Applied Energy*, 289, art. no. 116646.

2021 **Nastasi, B., Mazzoni, S., Groppi, D., Romagnoli, A., Astiaso Garcia, D.** Solar power-to-gas application to an island energy system. *Renewable Energy*, 164, pp. 1005-1016.

2020 **Rigo-Mariani, R., Chea Wae, S.O., Mazzoni, S.** Impact of the Economic Environment Modelling for the Optimal Design of a Multi-Energy Microgrid. *IECON Proceedings*, 2020, pp. 1837-1842.

2020 **Baldasso, E., Mondejar, M.E., Mazzoni, S., Romagnoli, A., Haglind, F.** Potential of liquefied natural gas cold energy recovery on board ships. *Journal of Cleaner Production*, 271, art. no. 122519. DOI: 10.1016/j.jclepro.2020.122519.

2020 **Rigo-Mariani, R., Ooi, S., Mazzoni, S., Romagnoli, A.** Comparison of Optimization Frameworks for the Design of a Multi-Energy Microgrid. *Applied Energy*, Volume 257.

2019 **Mazzoni, S., Ooi, S., Nastasi, B., Romagnoli, A.** Energy Storage Technologies as techno-economic parameters for Masterplanning and Optimal Dispatch in Smart Multi Energy Systems. *Applied Energy*, Volume 254.

2019 **Mazzoni, S., Ooi, S., Desideri, U., Comodi, G., Romagnoli, A.** The Role of Multi-Energy Polygeneration Plants in the Optimization Process of District Cooling and Heating Design and Operation. *SDEWES 2019*.

2019 **Li, Z., Xu, Y., Fang, S., Mazzoni, S.** Optimal Placement of Heterogeneous Distributed Generators in a Multi-Energy Microgrid under Uncertainties. *IET Renewable Power Generation*, August 2019.

2019 **Mazzoni, S., Ooi, S., Romagnoli, A.** Cogeneration Power Plants for Smart-District Optimal Operations: CO2 and Primary Energy Savings in a real industrial application. *AIP Conference Proceedings*, 2123, art. no. 020099.

2019 **Bartolini, A., Romagnoli, A., Mazzoni, S., Comodi, G.** Influence of users type on costs and primary energy savings potential for decentralized energy systems. *ECOS 2019*.

2018 **Ji, D., Wei, Z., Mazzoni, S., et al.** Thermoelectric generation for waste heat recovery: Application of a system level design optimization approach via Taguchi method. *Energy Conversion and Management*, 172, pp. 507-516.

2018 **Mazzoni, S., Cerri, G., Chennaoui, L.** A Simulation Tool for Concentrated Solar Power based on Micro Gas Turbine Engine. *Energy Conversion and Management*, Volume 174, pp. 844-854.

2018 **Mazzoni, S., Ooi, S., Romagnoli, A.** Application of Electrochemical Energy Storage Technologies as key Parameters for Optimal Dispatch in Microgrid. *SDEWES 2018*, Palermo, Italy.

2017 **Mazzoni, S., Arreola, M.J., Romagnoli, A.** Innovative Organic Rankine arrangements for Water Savings in Waste Heat Recovery Applications. *Energy Procedia*, 143, pp. 361–366.

2016 **Cerri, G., Chennaoui, L., Giovannelli, A., Mazzoni, S.** Turbomachinery based Engine: Concurrent Production of Power and Cool used for Sea Water Desalination. *8th International Gas Turbine Conference*, Brussels, Belgium.

2015 **Cerri, G., Chennaoui, L., Mazzoni, S., Pustina, L.** Power, Cool and Pure Water by an Integrated Turbomachinery Based Innovative GICE Engine with CryoDesalination. *Energy and Water in the Gulf Cooperation Council Countries*, 12-14 April, Ras Al Khaimah, UAE.

2015 **Alavi, B., Cerri, G., Chennaoui, L., Mazzoni, S.** Energy Saving by Refrigeration Vapour Compression Plant Power Regeneration. *Energy and Water in the Gulf Cooperation Council Countries*, Ras Al Khaimah, UAE.

2014 **Cerri, G., Chennaoui, L., Giovannelli, A., Mazzoni, S.** Expander Models for a Generic 300 MW F Class Gas Turbine for IGCC. *ASME TurboExpo 2014*, Dusseldorf, Germany.

2013 **Cerri, G., Mazzoni, S., Salvini, C.** Steam Cycle Simulator for CHP Plants. *ASME TurboExpo 2013*, San Antonio, Texas, USA.

2012 **Mansouri Majoumerd, M., Brehaus, P., Smrekar, J., Assadi, M., Basilicata, C., Mazzoni, S., Chennaoui, L., Cerri, G.** Impact of fuel flexibility needs on a selected GT performance in IGCC application. *ASME TurboExpo 2012*, Copenhagen, Denmark.