Stefano Mazzoni, PhD

Curriculum Vitae

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Passionate in energy systems optimisation & decarbonization

Work Experience

Oct 2025 – Present **European Commission Expert**, *European Commission - Contract*, Brussels Metropolitan Area, Remote

Appointed by the European Commission as Expert Evaluator for up to **50M €** Horizon Projects

- Serves as Recognized Expert in **Digital Twins and Industrial Processes Optimization and Transformation**.
- Evaluate Horizon Europe project proposals and provide technical expertise in digital innovation and industrial transformation initiatives

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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 the evaluation of policies and regulatory frameworks to ensure alignment with national energy security goals.

Jan 2026 – Dec 2027 **Visiting Professor**, *University of Bath, Faculty of Engineering & Design*, Bath, UK

Visiting Professor in the Faculty of Engineering & Design (fixed-term appointment confirmed by the Board of Studies).

- Collaborates on research and teaching activities in **energy systems, decarbonisation and sustainable finance**.
- Engages in joint publications, seminars and supervision with academic staff at the University of Bath.

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

Tenured Assistant Professor in Energy Systems, Turbomachinery, and Decarbonization Strategies

- Conducts research on **multi-energy systems**, decarbonization of hard-to-abate sectors, and integration of H_2/NH_3, CCS/CCU, and Power-to-Gas solutions.
- Develops **multi-objective optimization models** for energy planning, including investment, CO_2 taxation, carbon credits, and storage strategies.
- Coordinates industry-funded projects (INNIO, Evercomm) on sustainable mobility, circular economy, and AI/ML-driven energy analytics.
- Selected to support the **University's PNRR Orientation Program (2024–2026)**, delivering modules D and E in addition to regular teaching load as part of third mission initiatives.
- Teaches Master courses on **Decarbonization Techniques**, Bachelor courses on **Renewable Energy Systems**, **Geothermal Applications**, and PhD Courses on **Technology Transfer**.
- Supervises applied labs and PhD activities on **energy system modeling**, optimization, and innovation in clean technologies.
- **Supervises more than 10 bachelor's and master's students**, as well as Phd ones

Nov 2025 – Present **Co-Founder**, *Start-up/Spin-off* ***NexusEnergyHub Srl***, Italy
Founded the Innovative Start-up / Spin-off NexusEnergyHub Srl, **winner of a 50,000 € ESA grant.**
- Develop an innovative SaaS digital platform that integrates high-resolution satellite data;
- Based on advanced artificial intelligence algorithms and blockchain technology, supports the design, optimal management and economic valorisation of distributed energy systems aimed at sustainable decarbonization and CO2 tokenization and blockchain.

Dec 2023 – Present **Consultant**, *INNIO - Jenbacher*, Jenbach, Austria
Consulting expert for Green Hydrogen and Green Ammonia in **Decarbonization Pathways**.
- Optimization and Integration of C**HP H2 ready solution** into **District Cooling** Operations
- Integration of **Green NH3 and Green H2 as long-term storage backup solutions**, thanks to Internal Combustion Engines
- **Electromobility EV Infrastructure** supported by Green H2 INNIO Engine integration. Proven PBP $\leq$ 6 years for Fast EV Charging Stations.

Jan 2024 – Present **Consultant**, *EVERCOMM SG* , Singapore
Consulting expert for Digital Platform development in the **CO2 value chain** in Decarbonization Pathways
- Development of CO2 benchmark computational algorithms and advanced AI-based routines for carbon credit assessment
- Design of HTA sectors and Industrial System Decarbonization solutions for NXMap Platform
- Implementation of HVAC & Chiller Plant Energy Efficiency Measures for reduced CO2 emissions
- Creation of comprehensive energy system component databases (500+ components including Solar PV, Gas Engines, Chillers, Storage systems)
- Development of factorised cost assessment methods for HVAC systems and energy technologies

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 the Start-up / Spin-off of NTU University 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.
- 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.

Awards

2025 **International Grant**, Awarded from ***European Space Agency*** **ESA** (**50,000 euro**)
2025 **National Grant**, Integration of AI solutions for Industrial Optimization
2024 **Best Paper Award**, ICEEE 2024 International Conference
2020 **Outstanding Reviewer**, Applied Energy International Journal, ELSEVIER
2020 **Distinguished Scientist**, Sustainable Development of Energy, Water & Environment Systems
2014 **Best Paper Award**, SASE 2014 International Conference

Patent

2023 TD2022-332 - Energy Dispatch and Energy Planner V2 **(1st Inventor)**
2023 TD2022-333 - Optimal MasterPlanning and Real Time Dispatching
2019 TD2019-038 - Energy Dispatch and Energy Planner V1 **(1st Inventor)**

Research Field

1 **Multi-Energy Systems and Sustainable Mobility:** Investigated the integration of electricity, heat, cooling, and desalinated water production systems under circular economy and fuel diversification principles. Collaborated with INNIO Jenbacher on H_2-powered ICEs for sustainable mobility; outcomes included a technical white paper, international publication, and invited webinar moderation (Oct 2024). Extended research to low-impact fuel production (NH_3/H_2) with further publications. Supported energy community (CER) design with Profs. Gambini and Vellini, optimizing load-renewable matching; results presented at SDEWES 2024 and under review at *Journal of Cleaner Energy Systems*. Co-authored a study on advanced CHP for hard-to-abate industrial processes, published in an international journal. Appointed lecturer in Experis–Manpower Master on EVs and global decarbonization (2023–2025).

2 **Optimization Techniques for Energy Master Planning:** Developed proprietary optimization frameworks for solving highly nonlinear energy system configuration problems in industrial districts, addressing multi-objective functions involving CAPEX, OPEX, carbon tax, and incentives. Applied to port systems using green H_2/NH_3, with outcomes published in *Renewable Energy* and presented at ECOS 2024. Explored coupling of Liquid Air Energy Storage with green vectors, resulting in a publication in Elsevier's *Journal of Energy Storage*. Proposed optimized cold dispatch solutions combining vapor compression and absorption chillers, ICEs, and thermal storage; results published in *Energy Conversion and Management* (Elsevier). Advanced district energy systems optimization applied to energy communities (CER), with results published in high-impact journals and presented at ECOS 2023.

3 **Decarbonization Techniques for Energy Systems:** Led research with Evercomm Singapore and Evercomm EMEA to develop methodologies for assessing decarbonization potential of multi-energy systems using limited global data combined with proprietary databases. Integrated international emission scopes (1, 2 & 3) and blockchain protocols for Carbon Credit & Tax quantification. Developed investment and OPEX cost models for generation technologies and applied factor-based component models for decarbonization cost analysis. Ongoing research targets simplified models for sector-wide scenario assessment (glass, metals, cement). Findings have been disseminated in international conferences and contributed to the teaching of the graduate course "Techniques and Methodologies for Energy System Decarbonization" (2023–2025).

4 **Hard-to-Abate Sectors and Alternative Fuels:** Designed functional mapping methodology for evaluating H_2/CH_4 fuel blending potential in glass, refining, pulp & paper, and steel sectors. Assessed sector-specific energy demands and H_2 production costs, supporting decarbonization cost analysis. Awarded Best Paper at ICEEE 2024 by Prof. Bin Chen (Beijing Normal University). Co-authored a Power-to-Gas chapter (Elsevier, ed. Dincer) on e-fuels and circular economy. Additional work with INNIO on NH_3/H_2 ICEs led to publication in *Energies* (MDPI) and a technical white paper.

5 **AI & ML for Smart Energy Communities:** Advanced AI/ML predictive analytics for energy master planning in smart districts. In collaboration with Prof. Yan Ke (Hunan University), developed hybrid models for environmental forecasting and load aggregation, aimed at enhancing reliability, sustainability, and efficiency of local energy networks. Findings submitted to Scopus-indexed journals and presented at international seminars. Additional work on fault detection and diagnostics (FDD) for large-scale HVAC systems also led to a peer-reviewed journal submission.

6 **CO_2-Based Energy Systems:** Contributed to the national project on next-gen CO_2-based reverse cycles, led by Prof. Manno. Published a study on optimization of vapor-injection cycles in reciprocating compressors in the *International Journal of Refrigeration*. Developed optimization algorithms integrating neural networks and reinforcement learning, focusing on eco-compatible system design.

7 **CO_2 Compression Systems:** Supported research on turbomachinery design for CO_2 compression/liquefaction in CCGT and steam power plants, under the supervision of Prof. Vellini. Developed a numerical optimization model—solved via Gurobi—using Equality Constraints Recursive Quadratic Programming to identify optimal shaft-speed and compression ratios across compressors.

Research Projects

1 **International Projects: AWARDED** ESA-BIC Grant for Integration of Geo-Satellite data for Energy Optimization and Decarbonization in holistic approach of multi-energy systems (budget: **€50,000.00**)

2 **National Projects: AWARDED** Application of AI for industrial systems (budget: **€6,000.00**)

3 **International Projects:** LEAP - SE proposal *'Production of Renewable Ammonia for Global Markets in Africa: Fuelling Europe's Decarbonization Ambitions'* (budget: **€150,000.00**), under evaluation, **1st selection passed**

4 **National Projects: Under-Evaluation -** Hydrogen Production & Transportation Saefty Measures and Digital Toolkit - I**NAIL - BRIC (€359,000.00)**

5 **National Projects: Under-Evaluation -** ROSENTOK Project - Harvasting Traffic Energy Recovery System and Tokenisation of CO2 credits - **REGIONE LAZIO (€170,000.00)**

6 **International Projects – MAECI Grande Rilevanza (China): Under Evaluation** *PI Prof. Stefano Mazzoni - Fundamental Research on Industrial Off-Gas-Driven Zn–CO_2 Valorization and Optimal System Integration through H_2 Value Chain Assessment* – in partnership with the **Shanghai Institute of Applied Physics, Chinese Academy of Sciences** (PI: Prof. Guntae Kim) – **€180,000.00**

7 **International Projects – MAECI Grande Rilevanza (China): Under Evaluation** – *Design Foundation and Regulation Mechanism of Low-carbon Flexible Multi-Energy Complementary Distributed Energy System Based on Multi-Energy Storage* – in partnership with the **University of Pisa** (PI: Prof. Umberto Desideri) and **North China Electric Power University – NCEPU** (PI: Prof. Liqiang Duan) – **€60,000.00**

Research & Consulting Contracts

1 **Evercomm Singapore Pte. Ltd.– Contract #1** (2023) **€20,000.00**

2 **Evercomm Singapore Pte. Ltd. – Contract #2** (2024) **€7,200.00**

3 **Evercomm Singapore Pte. Ltd. – Contract #3** (2025) **€19,800.00**
4 **Evercomm EMEA – Contract #1** (2024) **€1,500.00**
5 **Evercomm EMEA – Multi Research Agreement** (2024) **€6,000.00**
6 **INNIO (Jenbacher) – Contract #1** (2023) **€1,440.00**
7 **INNIO (Jenbacher) – Contract #2** (2024) **€5,400.00**
8 **INNIO (Jenbacher) – Contract #3** (2025) **€1,440.00**
9 **INNIO (Jenbacher) – Contract #4** (2025) **€5,400.00**

Total value of externally funded research contracts signed: **€68,180.00**. Contracts demonstrate continuity and partner satisfaction over a three-year period.

Institutional Activiy

2023–2025
- Member, State Exam Board for Engineering Professional Qualification (2024, 2025).
- Member, PhD School Council (39th and 40th Doctoral Cycles).
- Contributor to curriculum management committees for the BSc and MSc in Energy Engineering.
- Department Representative, IAD School Council (Jun 2024 – Feb 2025).
- Member of Graduation Committees and Examination Boards (BSc and MSc).

Member of Commissions and Scientific Affiliation

1 **Government Advisory Roles:** Member of the expert group appointed by the Presidency of the Council of Ministers (Italy), supporting the revision of Legislative Decree 152/2006 on environmental regulations, in coordination with the Ministry of Environment and Energy Security (2023–2025).

2 **Expert Evaluator – NEST Research Program (Politecnico di Torino):** Appointed as an independent expert evaluator for the NEST research calls (11.2024–11.2025) under the cascading funding scheme for universities. Officially nominated by DDG n. 3060/2024 to assess technical and scientific merit as per Article 10.2.c of the call issued by DDG 2203/2024.

3 **UK Research Evaluator:** Appointed as external evaluator for the 2025 SUPERGEN Energy Hub Flexible Funding Call at the University of Bath (UK), contributing expert reviews for UK-funded energy research proposals (06–07.2025).

4 **Expert Evaluator – Sapienza University Research Call:** Invited as an expert committee member for the evaluation of research projects submitted to the 2024 Research Funding Call at Sapienza University of Rome (10.2024).

5 **PhD Thesis Committees and Evaluations:** Served as external reviewer for doctoral theses at **(1)**the University of New South Wales (Australia) on building load profile optimization and emissions reduction; **(2)**University of Trieste on master-planning optimization of integrated energy systems; and **(3)** as committee member at the University of Pisa for a thesis on V-Flow battery systems.

6 **Collaboration with Supergen Energy Networks Hub (UK):** Ongoing cooperation focused on multi-energy systems, environmental techno-economic assessment, and AI-enhanced modeling platforms for net-zero strategies. The collaboration supports integration of energy communities across scales and involves continued engagement with the University of Rome and the EPSRC-funded Supergen Hub.

7 **Scientific Advisory Board – SDEWES Conferences (2024–2026):** Appointed as a distinguished member of the Scientific Advisory Board for multiple international conferences on Sustainable Development of Energy, Water and Environmental Systems (SDEWES), including: the 20th SDEWES Dubrovnik (2025), the 1st AF.SDEWES Oujda-Saidia in Morocco (2025), the 21st SDEWES Gran Canaria (2026), and the 3rd AP.SDEWES Shenzhen (2026). Recognition reflects ongoing scientific contributions to energy transition and integrated environmental systems research.

8 **Session Chair – SDEWES Conferences:** Chaired the **Industrial Sector Decarbonization** session at **SDEWES 2024** (Rome) and served as **Session Chair for Water Desalination** at **SDEWES 2025**, contributing to international dialogue on sustainable energy and water systems.

9 **Member – Energy Turbomachinery Network (ETN):** Invited to join the European Energy Turbomachinery Network consortium in February 2025. Personally sponsored the institutional membership for the Department of Industrial Engineering, enabling faculty members and university affiliates to access ETN activities. Actively contributing to the **Energy Integration Working Group**, and engaged in the preparation of a **Marie Skłodowska-Curie Actions (MSCA) 2026 proposal**.

10 **Contributor – IEA EBC Annex 84:** Active participant in the IEA EBC Annex 84 international consortium on Demand Management of Buildings in Thermal Networks. Since his Senior Fellowship at Nanyang Technological University, contributed to the modeling of heating, cooling, and storage networks. Supported benchmarking of simulation software, analyzing comparative performance. A scientific publication is expected during 2025–2026, as confirmed by the project coordinator.

Editorial Board Memberships

2024–2025 **Guest Editor – Sustainability (MDPI):** Coordinated the Special Issue *'Energy Storage, Conversion and Sustainable Management'*, focusing on integrated energy storage and sustainable system design.

2025–2027 **Proposed Guest Editor – Building and Environment (Elsevier):** Proposal under review for a Special Issue titled *'Emerging Large Language Models for Smart and Net-Zero Building Design'*, co-edited with Prof. Yan Ke (Hunan University).

Invited Speaker

2025 **Invited Speaker – Green Energy Academic Workshop:** Invited by the North China Electric Power University (NCEPU) to participate in the *"Collaborating on Green Energy Journeys – Co-Creating a New Energy Future"* workshop, jointly organized with Italian partner universities (October 21–24, 2025, Beijing, China).

2025 **Invited Speaker – Supergen Energy Hub:** Invited by Prof. Phil Taylor at the Annual Supergen Energy Hub Conference, sitting at the round table related to Energy Transition (09/09/2025, Bath, UK).

2025 **Invited Speaker – ETN Webinar on Power Plant Economics:** Delivered a webinar session on CAPEX, OPEX, fuel costs, and economic fundamentals of power plants, with insights on cost-reduction programs (09/2025, Brussels, Belgium).

2025 **Research Collaborator – Nanyang Technological University (NTU):** Invited by Prof. Erik Cambria to initiate a research collaboration on blockchain protocols for decarbonization, integrating AI and ML into smart energy systems (19/08/2025, Singapore).

2025 **Invited Guest – Hunan University Collaboration Meeting:** Presented research on AI/ML prediction models for RES availability in decentralized energy systems, as part of a collaboration with Prof. Yan Ke (11/08/2025, Changsha, China).

2025 **Invited Speaker – ETN Webinar on Power Plant Economics:** Delivered a webinar session on CAPEX, OPEX, fuel costs, and economic fundamentals of power plants, with insights on cost-reduction programs (09/2025, Brussels, Belgium).

2025 **Guest Lecturer – MASTER SAFE, SAFE Energy Resources Management Master:** Delivered a lecture on decarbonization, hydrogen, and hard-to-abate sectors within the "Strategic and Regulatory Framework" module (16/05/2025, Rome, Italy).

2024 **Invited Speaker – Shanghai Jiao Tong University Seminar:** Delivered a workshop on hydrogen integration in hard-to-abate sectors and solar-H2 hybrid systems for resilient multi-energy configurations (08/2024, Shanghai, China).

2024 **Workshop Leader – INNIO Academic-Industrial Dialogue:** Led a seminar on fuel diversification (H2 and NH3) and circular economy strategies for sustainable energy systems (07/05/2024, Jenbach, Austria).

2024 **Invited Speaker – INNIO Webinar on Green Hydrogen:** Presented the white paper *"Hydrogen-Powered Gensets for Electric Vehicle Charging"* during a webinar hosted by INNIO (16/10/2024, Jenbach, Austria), focusing on cost-effective e-mobility infrastructure solutions using green hydrogen.

2024 **Workshop Leader – Engineering Risk Seminar (Marsh):** Led a session on "Digital Manufacturing and Associated Risks" and showcased research on decarbonization and energy efficiency at Università di Roma Tor Vergata (07/02/2024, Abu Dhabi, UAE).

2023 **Guest Lecturer – Shanghai Jiao Tong University:** Delivered a doctoral-level lecture on optimization techniques and decarbonization strategies for complex multi-energy systems (20/12/2023, Shanghai, China).

2023 **Invited Speaker – Supergen Energy Networks Conference:** Presented digital platform-based strategies for energy system decarbonization at the Royal Academy of Engineering's Supergen Conference (06/09/2023, London, UK).

2023 **VIP Speaker – Future Energy Asia Conference:** Presented advanced optimization techniques for sustainable energy systems in subtropical and equatorial contexts to an international audience (18/05/2023, Bangkok, Thailand).

Scientific Cooperation

Academic

1 **University of Bristol (UK):** Collaboration with Prof. Philip Taylor on energy network optimization and multi-energy systems.

2 **University of Bath (UK):** Joint academic exchange and research cooperation with Prof. Philip Taylor on smart energy infrastructure.

3 **Nanyang Technological University (Singapore):** Research collaboration with Prof. Alessandro Romagnoli on energy hubs, ORC systems, and decarbonization strategies.

4 **Shanghai Jiao Tong University (China):** Cooperation with Prof. Tao Ma on optimization and decarbonization of complex multi-energy systems.

5 **Centre National de la Recherche Scientifique – CNRS (France):** Scientific cooperation with Dr. Remy Rigo Mariani on smart district energy solutions.

6 **Politecnico di Torino (Italy):** Member of the evaluation committee for NEST Research Programs.

7 **University of Pisa (Italy):** Academic collaboration with Prof. Umberto Desideri on doctoral supervision and energy system innovation.

8 **University of Trieste (Italy):** Research cooperation with Prof. Rodolfo Taccani and Dr. Davide Pivetta on hydrogen and energy hub modeling.

9 **University of New South Wales – UNSW (Australia):** External thesis evaluator and collaboration with Prof. Gloria Pignatta on sustainable building energy profiles.

10 **Technical University of Munich – TUM Asia (Singapore):** Joint research with Dr. Alessio Tafone on LAES systems and decarbonization in industrial districts.

11 **University of Hunan (China):** Collaboration with Prof. Yan Ke on AI & ML for RES forecasting and smart energy community optimization.

12 **Technical University of Munich (Germany):** Scientific exchange with Prof. Lorenzo Masia on hybrid systems and advanced energy technologies.

13 **Energy Research Institute – ERI@N (Singapore):** Ongoing collaboration with Mr. Mark Prakasan on integrated decarbonization strategies and energy resilience.

14 **North China Electric Power University - NCEPU (Beijing, China):** Ongoing co-operation on "Green Energy Academic Workshop" on collaborative pathways for the energy transition.

15 **Jeju National University (Jeju, South Korea):** Ongoing academic cooperation on advanced methods for **energy optimisation** in multi-energy systems, including joint workshops, research exchanges, and collaborative project development.

16 **Shanghai Institute of Applied Physics, Chinese Academy of Sciences (Shanghai, China):** Industrial Off-Gas-Driven Zinc–CO_2 Valorization and Optimal System Integration through H_2 Value Chain Assessment", collaboration with Prof. Guntae Kim.

Industrial

11 **Marsh (Dubai – UAE):** Cooperation with Ing. David Causi on risk analysis, energy efficiency, and digital manufacturing in upstream/downstream sectors.

12 **INNIO Jenbacher (Austria):** Joint research on green H_2 engines and distributed generation with Ing. Andrea Pivatello and Dr. Markus Strömich-Jenewein.

13 **Experis – Manpower Group (Italy):** Collaboration with Dr. Pascal Sottostanti on workforce innovation in energy engineering sectors.

14 **Energy Turbomachinery Network – ETN (Belgium):** Member of the European industrial consortium, coordinated by Mr. Christer Bjorkqvist.

15 **Shell (Singapore):** Research interaction with Mr. Berry Koh on digital twins and process decarbonization.

16 **AWS (Singapore):** Collaboration with Mrs. Berenice Toh on cloud-based energy analytics and smart grid platforms.

17 **EVERCOMM Singapore (Singapore):** Partnership with Mr. Ted Chen on emissions modeling, digital platforms, and industrial decarbonization pathways.

18 **MASTER SAFE (ITALY):** Cooperation with Ing. Mattia Luchetta on Optimization and Decarbonization Policies.

19 **DBA S.p.a. (ITALY):** Expert Consultant for Geothermal ORC Preliminary Design & H2 Safety Engineering Experience.

20 **Banca d'Italia (ITALY):** Expert Consultant on PPA optimisation strategies to support the energy transition of public-sector energy systems.

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

Selected Publications

[1] 2025 Mazzoni, S., **Mazzoni, S.**, Nastasi, B. District Cooling Optimal Operation to decarbonize Urban Cold energy supply. *Energy Conversion and Management*, Elsevier, 341, 120019. DOI: 10.1016/j.enconman.2025.120019.

[2] 2025 **Mazzoni, S.**, Nastasi, B. Power-to-Gas Production. In: Dincer, I. (Ed.), *Comprehensive Energy Systems*, 2nd ed. Elsevier. ISBN: 9780443132193 (Hardback), 9780443341083 (eBook).

[3] 2025 Tafone, A., Pivetta, D., Taccani, R., Dal Mondo, F., **Mazzoni, S.**, Romagnoli, A. Multi-objective operational optimization of a multi-energy liquid air energy storage (LAES) in a hydrogen-based green energy hub in Singapore. *Journal of Energy Storage*, 122, 116551. DOI: 10.1016/j.est.2025.116551.

[4] 2025 Strömich-Jenewein, M., Saidi, A., Pivatello, A., **Mazzoni, S.** Net-zero backup solutions for green ammonia hubs based on hydrogen power generation. *Energies*, 18(13), 3364. DOI: 10.3390/en18133364.

[5] 2025 Fusco, L., Manno, M., **Mazzoni, S.**, Vellini, M. Thermodynamic analysis of CO_2 transcritical cycles with vapor injection in reciprocating compressors (Voorhees cycles) for heat pumps operating at different design conditions. *International Journal of Refrigeration*, **180**, 503–517 (2025), Elsevier. DOI: 10.1016/j.ijrefrig.2024.10.007.

[6] 2025 Gambini, M., **Mazzoni, S.**, Vellini, M. A Comprehensive Approach to Design and Operate Solar Distributed Energy Communities in the Roadmap Towards Decarbonization. *Journal of Cleaner Energy System*, Elsevier. [Under Review].

[7] 2025 Dai, Y., Ke, Y., Xu, D., Miao, C., **Mazzoni, S.** Resilient cooperative control strategy for virtually-coupled train sets against DoS attacks. *IEEE Trans. Autom. Sci. Eng.*, Manuscript ID: T-ASE-2025-1545. [Under Review].

[8] 2025 Ke, Y., Wang, H., Bi, J., Gao, Y., **Mazzoni, S.**, Du, Y. Semi-supervised joint training Wasserstein generative adversarial network for HVAC diagnosis with limited fault samples. *Applied Energy*, Manuscript ID: APEN-D-25-11039. [Under Review].

[9] 2025 Huang, J., Shao, B., Ke, Y., Gao, Y., **Mazzoni, S.** PV-MM-Diffusion: An end-to-end multi-modal diffusion model for ultra-short-term probabilistic photovoltaic forecasting. *Applied Energy*, Manuscript ID: APEN-D-25-11589. [Under Review].

[10] 2025 Tartufoli, D., **Mazzoni, S.** Pathways for optimal H_2 integration in HTA sectors: an application in the glass industry. *20th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES 2025)*, Dubrovnik, Croatia, October 5–10.

[11] 2025 Bartolucci, L., **Mazzoni, S.** Optimal integration of smart prosumers in port-centric renewable energy communities: A master-slave planning and dynamic validation framework. *16th International Conference on Sustainable Energy & Environmental Protection (SEEP2025)*, Brunel University, London, UK, July 28–31.

[12] 2025 **Mazzoni, S.**, Pivetta, D., Tartufoli, D., Del Mondo, F., Tafone, A., Taccani, R. Economic impact and decarbonization potential of H_2 integration in glass manufacturing HTA. *38th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2025)*, Paris, France, July.

[13] 2025 Pivatello, A., **Mazzoni, S.** Hydrogen-powered gensets for EV infrastructure optimal integration. *38th International Electric Vehicle Symposium & Exhibition (EVS 38)*, Gothenburg, Sweden, June 15–18.

[14] 2025 Marsza-Pomianowska, A., Graf, C., Johra, H., Leusbrock, I., **Mazzoni, S.**, et al. Demand management of buildings in thermal networks: Project Summary Report (Annex 84). *International Energy Agency (IEA), Energy in Buildings and Communities Technology Collaboration Programme*, May.

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