Isabella Pizzuti

Curriculum Vitae

CONTACTS

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PERSONAL INFORMATION

Language proficiency: Italian (native), English (B2)

1. EDUCATION

Type	Year	Institution	Grade
Doctorate of Philosophy in Energy and Environment	Ongoing: Third year	Sapienza University of Rome	-
Master's degree in Mechanical Engineering	2018	Sapienza University of Rome	111/110
Bachelor's degree in Mechanical Engineering	2015	Sapienza University of Rome	106/110

2. APPOINTMENTS

Start	End	Duration	Institution	Position
January 2023	July 2023	6 months	Delft University of technology	Phd Visiting student

3. WORK EXPIERENCE

Start	End	Duration	Company	Position
November 2018	October 2020	2 years	Italtractor ITM SpA (Bologna)	Product engineer and FEM Analyst

4. RESEARCH ACTIVITIES

4.1 Relevant research skills

- Advanced knowledge of commercial software for modelling of energy systems and renewable energy communities (RECs): TRNSYS, HOMER PRO
- Advanced knowledge of open-source modelling tools: CALLIOPE
- Expert programmer of Python
- Expert programmer of open-source tools for modelling of renewable energy communities (RECs)
- Advanced knowledge of optimization methods and libraries to this extent (pymoo)
- Advanced knowledge of GIS modules and libraries to this extent (folium, GeoPy)
- Advanced knowledge of APIs for programming language interface

The following lists refer to the most recent relevant academic and industrial research activities, grouped by topic.

4.2 Academic research activities

Year (s)	Keywords	Brief description
2023	CALLIOPE, electric grid, renewable energy sources	This ongoing project aims to analyse the impact of multiple energy communities on power grid, with focus on the regional scale. The project is carried out in collaboration with professor S. Pfenninger of the Energy and Industry Group (TUDELFT). The analysis of the interaction between the grid and the renewable energy communities involves the creation of a model in CALLIOPE, an open-source software for modelling of renewable energy systems.
2021-2023	pyRES, python, open-source modelling tool, energy systems, renewable energy communities.	The activity deals with the development of open-source python tool for the dynamic simulation of complex energy systems with a high penetration of renewable sources, featuring a time resolution of up to 15 minutes. The tool is specifically developed to support the design of renewable energy communities through the development of a digital model. The main functions can be categorized into energy, economic, and environmental performance calculations, energy demand estimation and optimization. Generation technologies include photovoltaic solar panels, wind turbines, internal combustion engines, cogeneration systems, wave motion energy converters. Fuels include petrol, diesel, natural gas, hydrogen, biogas, biomass, syngas with the possibility of customization. Energy storage options include conventional batteries. pyRES supports system sizing by analysing layouts, conducting comparative assessments, setting optimization problems, testing management strategies and legal frameworks, and evaluating organizational and business models.
2022	Forecast of electricity and heat consumption of Italian energy communities	This ongoing project aims to the analysis and forecast of electricity and heat consumption of Italian energy communities, based on data-driven and machine learning methods. In particular, the research is focused on the compression in latent spaces of large dataset of power demand curves. This program is founded by the Italian Regional Founds.
2021	Test of Renewable energy	This work focus is on the technical aspects involving the optimal selection of users and prosumers and their integration into a local

	community in a minor island scenario	community and the challenges of the implementation of renewable energy source on a minor island scenario.
2021	Using NSGA-II Genetic Algorithm for Optimal Design of Renewable energy community	This work deals with the use of genetic algorithm to solve multi-objective optimization problems aimed at optimizing renewable energy communities (RECs). The desired impacts of the REC are translated into the objective functions of an optimization problem. Economic objectives are represented by a cost function that includes investments, operating costs, and maintenance over the system's lifetime. Energy objectives are represented by the maximization of self-consumption and shared energy.
2020	Modelling of distributed power systems	This work aims to develop digital twins for simulating the energy and economic performance of various generation technologies, such as photovoltaic panels, wind turbines, internal combustion engines, cogeneration systems, wave motion energy converters.
2020	Modelling of electrochemical battery	This work aims to develop a digital twin for simulating the energy and economic performance of an electrochemical battery.

5. INDUSTRIAL ACTIVITIES

5.1 Relevant hard skills

- Expertise in commercial CAD: SolidWorks, Solid Edge, CREO
- Expert FEM analyst
- Expertise in commercial software for Finite Element Method (FEM): Ansys APDL, Ansys Workbench

5.2 Job activities

The following lists refer to the relevant activities, during my work experience as product engineer and FEM analyst.

Year (s)	Keywords	Brief description
2021-2023	Industrial Plant Visit Experience	I observed various processes, including thermal treatments, mechanical machining, metallurgical laboratory work, and component assembly.
2019-2020	Design 3D Modelling, prototyping and testing	I contributed to the product development process CAD software to create detailed 3D models of undercarriage components, and accurate documentation of design specifications.
2019-2020	FEM analysis	I contributed to develop model to test structural performance of track rollers, track shoes, sprockets and Idlers.

6. ADVANCED COURSES

Year	Name
2022	Introduction to Machine Learning (ML) organized by Sapienza University of Rome
2022	Introduction to Python programming organized by CINECA (The largest Italian computing centre)
2021	Efficienza Energetica e Sostenibilità per Energy Manager e Energy Professional nelle PMI nell'ambito del programma E&T organized by Energiada in collaboration with Tor Vergata University of Rome, ENEA, CNI, Casa Clima.

7. TEACHING EXPERIENCE

7.1 Regular Academic Appointments

The following list refers to lectures for Master of Science course in Mechanical Engineering of Sapienza University of Rome.

year	Institution	Course Name	CFU
2023	Sapienza	Laboratorio di modellazione dei sistemi energetici	3
2022	Sapienza	Laboratorio di modellazione dei sistemi energetici	3

7.2 Invited speaker

The following list refers to lectures for Master of Science course in Mechanical Engineering of Sapienza University of Rome.

year	Institution	Course Name	CFU
2023	Sapienza	Sistemi energetici	9
2022	Sapienza	Sistemi energetici	9
2022	Sapienza	Lezione sulle comunità energetiche per i liceali (all'interno del progetto: percorsi per le Competenze Trasversali e l'Orientamento dell'Università di Roma "La Sapienza")	-

8. AWARDS AND HONORS

Year	Award
2018	"Excellent graduate for the academic year 2017/2018." (Sapienza University of Rome)

9. CONFERENCE AND WORKSHOPS

Legend

C=Session chair
O=Track organizer
P=Presenter
A= Attendee

Year	Role	Conference/Workshop	Location
2023	P	18th Conference on sustainable development of energy, water and environment systems (SDEWES)	Dubrovnik,Croatia
2023	O	Turbulence, Heat and Mass Transfer	Rome, Italy
2022	A	OWEMES 2023	Rome, Italy
2022	A	Seconda Conferenza Nazionale sulle Comunità energetiche	Naples, Italy
2022	P/C	17th Conference on sustainable development of energy, water and environment systems (SDEWES)	Paphos, Cyprus

10. PEER-REVIEWED ACADEMIC PROJECTS

Year	Name	Destination	Activity	Grant value
2022-ongoing	“100 Comunità in 100 Comuni”, Regione Lazione e Dipartimento di meccanica e aerospaziale (DIMA)	National	Activities for the analysis, training, and promotion of Renewable Energy Communities in Lazio	300 000 €
2021-2022	“Smart Military District”, Ministero della difesa e Dipartimento di meccanica e aerospaziale (DIMA)	National	Energy redevelopment of military complexes in the 'Castro Pretorio' area in Rome	214 000 €

11. LIST OF PUBBLICATIONS

11.1 References

[1] Corsini, Alessandro, Pizzuti Isabella et al. "Challenges of renewable energy communities on small Mediterranean islands: A case study on Ponza island." Renewable Energy 215 (2023): 118986.

11.2 Products under review

[1] Pizzuti Isabella, et al. “Optimal integration of PVs and Biomasses in an Italian Renewable Energy Community”. Presented at the 18th CONFERENCE ON SUSTAINABLE DEVELOPMENT OF ENERGY, WATER AND ENVIRONMENT SYSTEMS (SDEWES), Dubrovnik 2023.

[2] Tajalli-Ardekani, Pizzuti Isabella et al. “Rome district transition towards sustainable heat and power generation”. Presented at the 18th CONFERENCE ON SUSTAINABLE DEVELOPMENT OF ENERGY, WATER AND ENVIRONMENT SYSTEMS (SDEWES), Dubrovnik 2023.

[3] Pizzuti Isabella, et al. “Optimal integration of PVs and Biomasses in an Italian Renewable Energy Community”. Currently under review for Energy Journal by Elsevier

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