# Lorenzo GIANNUZZO

08/28/1998 TRICASE (LE) ITALY
Nationality: Italian

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## EDUCATION

10/02/2023 - up to present

### Ph.D. in Energetics

Politecnico di Torino

*The value of flexibility and ancillary services in aggregates of consumer/prosumers.*

03/23/2021 - 03/22/2023

Research Activity:

*The objective of this research is to study how aggregates of users and/or prosumers at the distribution scale might coordinate among themselves to provide ancillary services (e.g., balancing service provider, voltage regulation, fast ramp-up/ramp-down) to the distribution grid operator. The focus is on the amount of flexibility they can provide while minimizing the single and overall discomfort of each user. By means of conventional and newer optimization techniques (e.g., based on artificial intelligence algorithms), the methodological approach is aimed to identify the optimal management strategy that users should adopt to respond to flexibility services. Different user demand scenarios will be analyzed looking into the progressive decarbonization/ electrification of the final users by adoption of electrified heating, and electric mobility.*

### Master's Degree in Energy And Nuclear Engineering

Politecnico di Torino

Thesis: Profiling of residential users through machine learning techniques in the context of Renewable Energy Communities

*The establishment of Renewable Energy Communities is a complex process that requires multidisciplinary expertise ranging from the economic and energy sectors to the legal and administrative sectors. At present, electric load measurement infrastructure, especially in residential areas, does not allow for hourly data collection, which does not allow for an accurate assessment of their contribution in terms of energy sharing. This work aims to profile residential users who wish to participate in this context on an hourly basis through non-intrusive techniques for load profiles reconstruction. The goal is to identify the typical load profile of the individual user, through machine learning techniques, based on monthly data, easily obtainable from electricity bills, and to extract an hourly profile using a data-driven methodology, with the objective of estimating the main energy parameters that determine the valorization and incentivization of energy sharing within Renewable Energy Communities.*

Supervisors: *Prof. Lanzini A., Dr. Minuto F.*

09/05/2017 - 03/15/2021

### Bachelor's Degree in Energy Engineering

Politecnico di Torino


I declare that I read the privacy statement on the processing of my personal data and my rights within the meaning of the General Data Protection Regulation (EU Regulation 2016/679) and Legislative decree no.196 of 30th June 2003 (Code regarding the protection of personal data): https://didattica.polito.it/privacy/index_en.html. I hereby give my consent to the processing of my personal data included in my CV.

## PROFESSIONAL & RESEARCH EXPERIENCE

### Research Grant - Advanced machine learning and AI algorithms supporting Renewable Energy Communities projects

03/26/2023 - 09/26/2024

Politecnico di Torino - Torino (TO) - ITALY

The aim of the project is to implement machine learning and AI algorithms to estimate the most important KPIs related to Renewable Energy Communities in order to support and provide accurate feasibility studies. The main goal is to allow stakeholdes and aggregators to better estimate economic and energetic outputs of Renewable Energy Community projects in contexts of data scarcity.

External collaboration contract

### Research Grant - Machine learning algorithms supporting Renewable Energy Communitiy projects

09/23/2022 - 03/22/2023

Politecnico di Torino - Torino (TO) - ITALY

Development of machine learning algorithms to support the spread of Renewable Energy Community projects for the italian regulatory framework. The projects involves advanced clustering algorithms to recognise electrical load pattern of end-users and the simulation of different Renewable Energy Communities based on the different typologies of its members.

External collaboration contract

### Research Grant - Development of Renewable Energy Communities business models

02/22/2022 - 09/22/2022

Politecnico di Torino - Torino (TO) - ITALY

Developing business models for the Italian regulatory framework for renewable energy communities using machine learning algorithms.

External collaboration contract

## LANGUAGE SKILLS

Mother tongue: Italian

Other languages

| | UNDERSTANDING | | SPEAKING | | WRITING |
|---|---|---|---|---|---|
| | Listening | Reading | Spoken interaction | Spoken production | |
| English | B1 | B1 | B1 | B1 | B1 |

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user

Common European Framework of Reference for Languages

## COMPUTER SKILLS

| | |
|---|---|
| PROGRAMMING LANGUAGE/CODE | advanced level |
| PROGRAMS/SOFTWARE | advanced level |
| DATABASES | advanced level |
| CAD | advanced level |

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## OTHER INFORMATION

Driving license

Available to travel on business abroad

Available to relocate abroad

## PUBLICATIONS

2023 Lorenzo Giannuzzo, Francesco Demetrio Minuto, Daniele Salvatore Schiera, Andrea Lanzini (2023). "Reconstructing hourly residential electrical load profiles for Renewable Energy Communities using non-intrusive machine learning techniques". In Energy and AI. DOI: https://doi.org/10.1016/j.egyai.2023.100329

2022 Francesco Demetrio Minuto, Andrea Lanzini, Lorenzo Giannuzzo and Romano Borchiellini (2022). "Digital platforms for Renewable Energy Communities projects: an overview". In IOP Conference Series: Earth and Environmental Science. DOI: https://doi.org/10.1088/1755-1315/1106/1/012007

## CONFERENCES

06/14/2023 - 06/15/2023 PhD Student "8th AIGE/IIETA International Conference and 18th AIGE Conference - Reconstructing hourly residential electrical load profiles for Renewable Energy Communities using non-intrusive machine learning techniques" Torino (TO), ITALY
Link: https://www.symposium.it/files/eventi/207/prog-def-1306-507.pdf

## EXAMS *

### Master's Degree in Energy And Nuclear Engineering

| conference date | Exam | Credits |
|---|---|---|
| 02/08/2021 | Thermal design and optimization | 12 |
| 02/23/2021 | Electric plant design | 6 |
| 06/25/2021 | Energy and environmental design of buildings | 8 |
| 07/01/2021 | Energy applications of materials | 6 |
| 09/17/2021 | Energy systems lab | 6 |
| 02/04/2022 | Energy management and automation in buildings | 6 |
| 02/10/2022 | Industrial use of energy | 10 |
| 02/21/2022 | Design of thermal plants | 8 |
| 06/23/2022 | Safety and Risk Analysis | 6 |
| 07/01/2022 | Energy economics | 6 |
| 07/01/2022 | Physical principles of thermal therapies | 6 |
| 07/12/2022 | Lighting and noise control systems | 6 |
| 07/21/2022 | Stage | 6 |
| 01/26/2023 | Thermal machines II and structural mechanics | 12 |
| 03/22/2023 | Thesis | 16 |

### Bachelor's Degree in Energy Engineering

| conference date | Exam | Credits |
|---|---|---|
| 09/20/2017 | English Language 1st level | 3 |
| 01/30/2018 | Mathematical analysis I | 10 |
| 06/22/2018 | Computer science | 8 |
| 06/25/2018 | Linear Algebra and Geometry | 10 |

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| | | |
|---|---|---|
| 06/29/2018 | Introduction to Sustainable Engineering | 6 |
| 07/06/2018 | Physics I | 10 |
| 01/28/2019 | Applied thermodynamics and heat transmission | 8 |
| 02/08/2019 | Physics II | 6 |
| 02/14/2019 | Engineering Drawing | 6 |
| 02/18/2019 | Mathematical analysis II | 6 |
| 06/28/2019 | Introduction to electrical engineering/Electrical machines | 10 |
| 07/22/2019 | Machine mechanics | 8 |
| 09/13/2019 | Thermo-fluiddynamics | 10 |
| 09/20/2019 | Fundamentals of structural mechanics | 8 |
| 02/03/2020 | Science and technology of materials | 6 |
| 02/05/2020 | Chemistry | 8 |
| 02/06/2020 | Power plants and sustainability | 12 |
| 06/22/2020 | Building physics and HVAC systems | 8 |
| 06/26/2020 | Combined Heat and Power (CHP) Plants | 6 |
| 07/17/2020 | Elements of nuclear engineering | 8 |
| 07/20/2020 | Applied energy and renewable sources | 8 |
| 01/29/2021 | Computational laboratory for heat transfer and Fundamentals of machines | 12 |
| 03/15/2021 | Final essay | 3 |

* *Fields marked with an * are certified by Politecnico di Torino, while the potential thesis description is added by the candidate.*

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