



**POLITECNICO**  
MILANO 1863

**PhD School - Politecnico di Milano**  
**Regulations of the PhD Programme in:**  
**Energy and Nuclear Science and Technology**  
**Cycle XXXIX**

Location: Milano Leonardo/Bovisa

# 1. General Information

PhD School - Politecnico di Milano

PhD Programme: **Energy and Nuclear Science and Technology**

Course start: September 2023

Location of the PhD Programme: Milano Leonardo/Bovisa

Promoter Department: Energy

Scientific Disciplinary Sectors

- FIS/03 Physics of matter
- ING-IND/08 Fluid machines
- ING-IND/09 Energy systems and power generation
- ING-IND/10 Thermal engineering and industrial energy systems
- ING-IND/11 Building physics and building energy systems
- ING-IND/18 Nuclear reactor physics
- ING-IND/19 Nuclear power plants
- ING-IND/20 Nuclear measurements and instrumentation
- ING-IND/27 Chemical technologies

PhD School Website: <http://www.dottorato.polimi.it/>

PhD Programme Website:

- <https://www.phdenergy.polimi.it/>
- <https://www.dottorato.polimi.it/corsi-di-dottorato/ingegneria/scienze-e-tecnologie-energetiche-e-nucleari>

## 2. General Presentation

Energy plays a key role in the global challenge of a sustainable development, requiring immediate actions and appropriate solutions to support the energy transition and the related achievement of UN 2030 Agenda and the Green Deal program launched by the European Commission. In this framework, energy and nuclear science and technology are of fundamental importance to face the ambitious and challenging goals of sustainable development, advancing global health, preserving environment and cultural heritage, and mitigating the effects of climate change.

The PhD Programme in Energy and Nuclear Science and Technology (STEN) provides advanced scientific competences as well as complementary educational activities to develop soft and transferable skills with a multidisciplinary high-level technical knowledge and problem-solving approach in the following areas: production, conversion and transmission of energy, rational use of energy and environmental control, thermal science, nuclear systems and nuclear fuel cycle, radioprotection and application of

ionizing radiations, safety and reliability analysis of energy systems, and development of innovative materials for energy applications.

The STEN PhD Programme is tightly related with the research activities of the Department of Energy, characterized by fundamental and applied interdisciplinary research areas in the energy and nuclear sectors, as follows:

#### Energy systems and components

- Renewable energy technologies.
- Energy from solar, wind, biomass and waste.
- Combustion and fuel utilization processes with low environmental impact.
- Thermodynamic cycles for generation and co-generation of mechanical, electrical and thermal power.
- Reverse cycles for cooling and conditioning.
- Design of critical components such as turbines, compressors, pumps, internal combustion engines and heat exchange devices.
- Fuel cells and electrolyzers.
- Hydrogen production technologies.
- Hydrogen transport, storage and utilization.
- Batteries and energy storage technologies.
- e-fuels production technologies.
- Micro-co-generation.
- CO<sub>2</sub> capture and storage, CO<sub>2</sub> utilization.
- Energy systems and components noise impact and mitigation actions.
- Computational fluid dynamics (CFD), optimization of renewable multi-energy systems.

#### Thermal engineering

- Heat and mass transfer in building envelope and in heating, ventilating, air conditioning & refrigeration equipment and systems.
- Indoor air quality, air filtration and cleanrooms.
- Heat pumps.
- Solar & renewable energy heating and cooling.
- Innovative technologies for building boundaries and bio-climatic projects, automation systems for buildings, energy efficient products and components, environmental and economic impact of energy transformation including noise impact and mitigation actions, technological aspects connected with the use of renewable energy, integration of natural and artificial lighting.
- Advanced thermal-measurement techniques.
- Techniques for heat transfer enhancement.

#### Nuclear engineering

- Development of innovative detectors and of the related electronics for radiation dosimetry and monitoring.
- Development of advanced methods for electronic signal processing.
- Radioprotection and nuclear safeguards.
- Ionizing radiation applications in the technology and energy fields as well as in other areas of interest, as medical, high energy particle physics, etc..
- Design of new generation nuclear power plants for energy conversion from the point of view of thermo-hydraulics, thermo-mechanics, neutronics, dynamics and control, fuel and fuel-cycle.

- Development of nuclear reactors for aerospace applications and nuclear fusion systems.
- Nuclear plant decommissioning, reprocessing, conditioning and radioactive waste transport and disposal.

#### Reliability and Safety Engineering of Energy and Nuclear Systems

- Advanced Reliability, Availability, Maintainability (RAM) analysis.
- Prognostics and Health Management (PHM).
- Predictive Maintenance.
- Condition-Informed Risk Assessment.
- Resilience Assessment.
- Complex Systems and Critical Infrastructures Analysis in the Nuclear, Energy, and other industries.

#### Materials for Energy & Physics of Matter

- Production and characterization of nanostructured materials by Physical Vapor Deposition techniques.
- Laser-matter interaction and plasma studies for material synthesis.
- Design of oxides, nitrides and novel materials for optical and plasmonic applications.
- Synthesis of novel (1D-2D) carbon based structures for advanced applications.
- Production of nanomaterials for next generation batteries.
- Production and characterization of catalysts for energy related chemical processes.
- Characterization of novel materials by advanced techniques.
- Study of advanced metallic alloys and protective coatings for harsh environments.
- Study of plasma-wall interaction in plasma machines via experiments and numerical modelling.
- Design of new materials for Inertial Confinement Fusion: simulations and experiments.
- Laser-plasma physics and laser-driven particle acceleration: theory and experiments.
- Plasma systems for space propulsion.

The STEN PhD Programme sets the candidate within a multidisciplinary environment that facilitates educating young researchers to contribute to the growth of scientific and technological knowledge and to create new technological solutions as the answer to the global and industrial challenges.

Some examples of specific research topics that can be investigated during the PhD thesis are sketched in Figure 1.

Interdisciplinary research projects are advised and encouraged. Participation to conferences, seminars, summer schools, and visiting periods in internationally recognized research institutes and companies are promoted and encouraged as part of the PhD path.

The STEN PhD Programme is run by the Department of Energy and managed by a Faculty Board (see attachment A2) led by a Faculty Board Head (see attachment A1). The Head chairs the Faculty Board, coordinates the preparation of the annual educational programme and organises the general educational activities of the PhD Programme.

The Faculty Board is responsible for the educational programme and for teaching and administrative activities related to the PhD Programme



### 3. Objectives

The STEN PhD Programme aims at providing a high level education and a challenging research experience in all the areas of Energy and Nuclear engineering sectors, facing the ambitious challenges imposed by the global priorities of sustainable development advancing global health, preserving environment and cultural heritage, mitigating the effects of climate change, efficiently exploiting energy resources and achieving decarbonization in all aspects of production, conversion, transport, distribution, storage, management and final use of energy, including urban, industrial and mobility sectors. The PhD graduate will develop the main skills and competences for leading, organizing, planning and managing R&D at the highest international levels in all the fields of Energy and Nuclear Science and Technology.

### 4. Professional opportunities and job market

The STEN PhD graduate is a specialist capable of performing high level research and of managing and designing innovation in the energy and nuclear fields. In this framework, job opportunities are:

- Leading, coordinating and managing research in public and private entities, industrial companies, universities and research institutes.
- Coordinating research programmes proposed by national and European legislation, with the capability of managing the required applications, documentation and reports.
- Coordinating research programmes in companies, industries and research institutes operating in energy production, conversion and transmission, rational use of energy, design, development and operation of innovative nuclear systems, risk and reliability analysis of components and systems, production of innovative materials for applications in the energy field and innovative measurement instrumentation and devices.
- Managing energy activities in companies characterized by large energy utilization, design and development of innovative energy systems.
- Managing and control of nuclear plants and components, design and development of innovative nuclear systems in national and international industries, companies, research institutes and regulatory authorities.

#### EXECUTIVE PhD

The STEN PhD Programme also offers those already employed in a company an opportunity to increase their competencies and gain a higher level of professional expertise in the development, management and coordination of research activities, with respect to that provided by the Master of Science and Master study courses. PhD graduates will be capable of playing managerial roles, providing a strategic contribution to the growth of their companies.

### 5. Enrolment

#### **5.1 Admission requirements**

Italian and International citizens can apply. They are requested to have graduated in accordance with

the pre-existing laws D.M. 3.11.1999 n. 509, or to have a Master of Science degree in accordance with D.M. 3.11.1999 n. 509, or a Master of Science in accordance with D.M. 22.10.2004 n. 270, or similar academic title obtained abroad, equivalent for duration and content to the Italian title, with an overall duration of university studies of at least five years.

The certified knowledge of the English language is a requirement for admission. Please refer to the PhD School website for details.

The admission to the Programme will be established according to the evaluation of the candidate curricula, motivation letters and the illustrative reports of possible PhD researches, that will be submitted by the candidates when applying for the admission.

## **5.2 Admission deadlines and number of vacancies**

The number of positions is indicated in the Call for admission to the 39<sup>th</sup> PhD cycle Programme: <http://www.dottorato.polimi.it/en/>

Scholarships both on general and on specific themes are available, in accordance with what specified in the call for admission.

# **6. Contents**

## **6.1 Requirements for the PhD title achievement**

The achievement of the PhD title in Energy and Nuclear Science and Technology requires a study and research activity of at least three years equivalent full-time study and research and the development of the PhD thesis.

PhD candidates must earn a minimum of **20 course credits** (as better detailed in Section 6.3), and to continuously conduct studies and research.

Candidates will be asked to demonstrate knowledge of the Italian language, equal to at least A1 level of the Common European Framework of Reference for the knowledge of languages. This requirement will be needed in order to register for the final exam. Italian native speakers and all those who can demonstrate knowledge of the Italian language to the required level will be exempt.

At the beginning of the course, the Faculty Board assigns a tutor, that shall be a member of the Faculty Board, to each PhD candidate to assist him/her during the overall training programme. The PhD candidate chooses the educational path, activities and the study plan in agreement with the tutor and the supervisor (see Section 6.2). Eventually, the study plan has to be submitted for approval to the Head of the PhD Programme (see Section 6.4).

The Faculty Board may assign extra course credits to candidates, in case they need to complete their preparation in specific topics, relevant for their research projects.

## **6.2 Research development**

The main aim of all Politecnico di Milano PhD programmes is the development in the candidates of a research-oriented mind-set, with expertise and skills in a specific research topic. To this end, candidates develop a problem-solving capability in complex contexts, including the capacity of performing deep problem analysis, identifying original solutions, and evaluating their applicability in practical contexts. These skills provide the PhD candidates with major opportunities of development in their research both

in public and private organizations and in the academic field.

The duration of the Programme is normally three years and the PhD research is developed under the guidance of a supervisor, who supports the candidate in carrying out the everyday activities related to the thesis development. The supervisor is not necessarily a member of the Faculty Board, and may also belong to an institution different from Politecnico di Milano. The supervisor can be supported by one or more co-supervisors.

Candidates must acquire the capability to present and discuss their work in their research community. Thus, both the participation to international conferences and the publication of the research results in peer-reviewed journals are encouraged. Further activities intended to develop the candidate personal skills and research expertise are encouraged during the PhD path.

The PhD Programme favors the candidate interactions with other research groups. Research visits are strongly encouraged, preferably abroad.

### 6.3 Objectives and general framework of the teaching activities

The PhD Programmes and the PhD School activate teaching forms of different kind and credit value, including courses, seminars, project workshops, laboratories. Teaching activities both cover the basic research issues (problems, theories, methods), which represent the founding element of the PhD Programme and identify clearly its cultural position, and deepening in a specialist way some research issues connected with the problems developed in the theses.

Lessons are held in English.

Structured teaching activities allow students to earn ECTS credits. Other activities, typically specialized and for which it is difficult to evaluate the learning and its quantification, fall within the scientific activities taken into account by the Faculty Board in the overall evaluation, but they do not allow to earn ECTS.

The PhD School of Politecnico di Milano proposes a set of courses aiming to train the PhD candidates in soft and transferable skills. The skills and abilities provided by these courses are expected to help candidates across different areas of their careers in order to respond to the rapidly evolving needs of the global economy and society at large.

#### COURSES

The STEN candidates must **attend and pass exams of courses for at least 20 ECTS** selected from those offered by the STEN PhD Programme, by other PhD Programmes at the Politecnico di Milano and/or by the PhD School and, in special cases, from PhD Programmes at other universities, according to the following rules:

- **10 ECTS** must be obtained from soft and transferable skills **courses organized by the PhD School** (i.e., 2 courses of 5 ECTS each). The PhD School courses activated for the 2023-2024 Academic Year are summarized in Table 1.

Reference Professor	Course Title
Aliverti Andrea	Ethics in Research
Armondi Simonetta	Strengthening Critical Spatial Thinking
Arnaboldi Michela	Advanced Interaction Skills for Academic Professionals



<b>Biscari Paolo</b>	English for Academic Communication
<b>Biscari Paolo</b>	Industrial Skills
<b>Biscari Paolo</b>	Scientific Communication in English
<b>Brunetto Domenico Savio</b>	Innovative Teaching Skills
<b>Canina Maria Rita</b>	Creative Design Thinking
<b>Cardilli Lorenzo</b>	European Culture
<b>Di Blas Nicoletta</b>	Professional Communication
<b>Fuggetta Alfonso</b>	Project Management Basics
<b>Iarossi Maria Pompeiana</b>	Power of Images and Visual Communication for Research Dissemination
<b>Conci Claudio</b>	Communication Strategies that Score In Worldwide Academia
<b>Lavagna Monica</b>	Sustainability Metrics, Life Cycle Assessment and Environmental Footprint
<b>Mancini Mauro</b>	Project Management (In Action)
<b>Masarati Pierangelo</b>	Ethical Aspects of Research on Dual-Use Technologies
<b>Mauri Michele</b>	Research Communication. Issue Mapping: Exploring Public Debates Surrounding Academic Topics
<b>Oppio Alessandra</b>	How To Support Complex Decisions: Approaches and Tools
<b>Cuca Branka</b>	The Copernicus Green Revolution for Sustainable Development
<b>Paganoni Anna Maria</b>	La Comunicazione nella Scienza
<b>Pizzocaro Silvia Luisa</b>	Practicing Research Collaboration
<b>Parmeggiani Fabio</b>	Science, Technology, Society and Wikipedia
<b>Sancassani Susanna</b>	Teaching Methodologies, Strategies and Styles
<b>Biscari Paolo</b>	Research Skills
<b>Tanelli Mara</b>	Cognitive Biases and Discriminations: Implications, Risks and Opportunities
<b>Volonte' Paolo Gaetano</b>	Introduction to Academic Research
<b>Rawad El Skaf</b>	Scientific Models: Conceptual Foundations and Philosophical Issues
<b>Hesselbein Chris</b>	Technology and Society
<b>Canali Stefano</b>	Philosophy of Science and Technology
<b>Boeri Elisa</b>	Recording Work 4 Building Memory: Methods, Practices, Tools, Skills to Manage the Knowledge
<b>Colombo Emanuela</b>	Science Diplomacy for Researchers. Filling the Gap between Science and Policy within the Global Challenges

Table 1 ( [link to the list of PhD School Courses](#)).

Note: other courses may be activated during the year: students will be promptly informed and will be allowed to insert new courses in their study plan.

- **5 ECTS** must be obtained from the course **“Smart Energy for the Future”**, yearly organized by the STEN programme.
- **5 ECTS must be obtained from characterizing courses, i.e.:**
  - Courses organized by the STEN PhD Programme, as listed in Table2.
  - Doctoral courses organized by other PhD Programmes at Politecnico di Milano.

- Specialistic courses at doctoral level, workshops, schools and seminars organized by universities or research institutions. For this specific cases credits recognition must be preventively approved by the Faculty Board.

In all cases credits must be certified by a final exam; a final mark is not strictly required.

Depending on the candidate background and research area, tutor and supervisor can suggest the student to attend appropriate extra courses to complete the training path. These must be approved by the Faculty Board and the ECTS obtained will be considered as additional with respect to the mandatory 20 ECTS.

The mandatory 20 ECTS must be obtained within the first two years, to allow the candidate finalizing the research activity and the PhD thesis within the third year. Any exception must be approved in advance by the Faculty Board.

The attendance of specialist courses, workshops, schools, seminars is strongly encouraged and can be inserted in the study plan (as here above reported). When a final exam is not foreseen, they are not qualified as credits but may be registered as optional "additional teaching".

SDS	Name of Course	Professor (coordinator)	Semester	ECTS	Note
ING-IND/19	Smart Energy for the Future	Di Maio F.	1 <sup>st</sup> year – 1 <sup>st</sup> sem.	5	<b>MANDATORY</b>
ING-IND/10&11	Applied Thermal Sciences	Colombo L.	1 <sup>st</sup> year – 2 <sup>nd</sup> sem.	5	
ING-IND/20	Radiation Protection and Instrumentation in Nuclear Systems	Agosteo S.	1 <sup>st</sup> year – 2 <sup>nd</sup> sem.	5	
ING-IND/07	Advanced Measurement Methods	Cozzi F.	1 <sup>st</sup> year – 2 <sup>nd</sup> sem.	5	

Table 2

Note: other courses may be activated during the year: students will be promptly informed and will be allowed to insert new courses in their study plan.

## 6.4 PhD Agreement

During the first 6 months of the doctoral program, the PhD candidates must sign a PhD Agreement with their own Supervisor and tutor (co-supervisor), according to the "Doctoral Agreement Manual" attached to the University PhD Regulations.

## 6.6 Presentation of the study plan

PhD candidates must submit a study plan, which may be modified periodically, if needed. The candidate must inform about the modification the Programme Head, who will revise the new study plan.

## 6.7 Yearly evaluations

Candidates present their work to the Faculty Board at least once a year. In particular, the candidates must pass an annual evaluation in order to be admitted to the following PhD year. The third year evaluation establishes the candidate admission to the final PhD defense.

As a result of each annual evaluation, the candidates who pass the exam receive an evaluation (A/B/C/D) and may proceed with the enrolment to the following year. Candidates who do not pass the

exam are qualified either as “Repeating candidate” (Er) or “not able to carry on with the PhD” (Ei). In the former case (Er), the candidates are allowed to repeat the PhD year at most once. The PhD scholarships – if any – are suspended during the repetition year. In the latter case (Ei), the candidates are excluded from the PhD Programme and lose their scholarships – if any.

In case the Faculty Board holds appropriate to assign directly an exclusion evaluation (Ei) without a previous repetition year, the request must be properly motivated, and validated by the PhD School.

After the final year, candidates who have achieved sufficient results but need more time to conclude their research work and write their theses, may obtain the admission to a further year.

Yearly presentations will take place approximately 1-2 months before the end of the 12 months of activity. Even though several starting dates may be activated for the relevant STEN cycle, only three slots will be considered for the yearly presentations: October-November, January, April-May.

The official schedule will be communicated by STEN secretary in due time.

## **6.8 PhD thesis preparation**

The main objective of the PhD career is the development of an original research contribution. The PhD thesis is expected to contribute to the advance of the knowledge in the candidate research field.

The PhD study and research work is carried out full time, during the three years of the PhD course. Stages or study periods in (Italian or International) companies or external Institutions may complete the candidate preparation.

The resulting theses need to be coherent with the research topics developed within the Department where the PhD Programme is developed.

The candidate must present an original thesis, discussing its contribution to the state of the art in the research field in the research community. At the conclusion of the PhD studies, the Faculty Board evaluates the candidates. Candidates who receive a positive evaluation submit their theses to two external reviewers for refereeing. If the evaluation provided by the reviewers is positive (or after the revisions required by the external reviewers), the candidates defend their thesis in a final exam, in front of a Committee composed of three members (at least two of which must be external experts).

In accordance to PoliMi rules, the Thesis Defense (Final Exam) should be carried out within 6 months after the conclusion of the last year. In order to comply with this requirement, the thesis draft should be submitted to the reviewers not later than 4 months after the conclusion of the last year. The standard form of the PhD Thesis is the traditional monograph.

In specific cases, the doctoral thesis can be presented in the form of “article-based”. The article-based thesis should be a coherent piece of writing consisting in the presentation of at least 3 published original papers written by the PhD candidate as principal author. The papers should deal with a single main overarching goal that must be clearly addressed throughout the thesis. The intent of preparing an “article based” thesis form must be declared during the last presentation to the Faculty Board, when the Board evaluates the admission to the final defense.

## **7. Laboratories,**

For development of the PhD thesis the Department of Energy offers many research laboratories and infrastructures. For more information, see <http://www.energia.polimi.it>

## **8. Internationalisation and inter-sectoriality**

Carrying out study and research activities at external laboratories is strongly recommended in the frame

of the PhD path.

Moreover, Politecnico di Milano supports joint PhD paths with International Institutions, as well as Joint and Double PhD programmes. Further information is available on the PhD School website and on the STEN PhD Programme website.

More specifically, the STEN PhD programme collaborates with several international universities.

An uncomplete list of the most recently activated double or joint PhD agreements includes the following institutions:

- Aalto University
- Delft University of Technology
- Central Supélec Paris
- City University London
- Denmark Technical University (DTU)
- Ecole nationale supérieure Mines-Télécom Atlantique Bretagne
- Eidgenössisch Technische Hochschule (ETH) Zurich
- Eindhoven University of Technology
- Harbin Institute of Technology
- Imperial College London
- Peter the Great St.Petersburg Polytechnic University
- Queensland University of Technology
- Sharif University of Technology, Teheran
- Université Sorbonne Paris Nord
- University of Sevilla

STEN also participates to the following Marie Skłodowska-Curie Actions (MSCA) European Union's reference programmes for doctoral education and postdoctoral training: .

- **EASYGO**, Efficiency and Safety in Geothermal Operations (launched in 2020)
- **GREYDIENT**, Grey-Box Models for Safe and Reliable Intelligent Mobility Systems (launched in 2021)
- **TOPCSP**: Towards Competitive, Reliable, Safe and Sustainable Concentrated Solar Power (CSP) Plants (launched in 2022)
- **ISOP**: Innovation on Supercritical CO<sub>2</sub> Power system (launched in 2023)
- **Training42Phase**: Next Generation Turbomachinery with two phase flow (launched in 2023)

Interaction with and exposure to non-academic sectors provides significant benefits to doctoral candidates as well as to research and innovation intensive employment sectors. Direct exposure to the challenges and opportunities in non-academic sectors of the economy and society at large is fostered by networking, connectivity, inter-sectoral mobility and wide access to knowledge. In particular, the STEN PhD programme collaborates with several Research Agencies and Industrial partners, among others:

- Ansaldo Nucleare SpA
- Aramis Srl
- Ariston SpA
- Atlante Srl
- Baker& Hughes SpA

- CNR, Consiglio Nazionale delle Ricerche
- ElseNuclear Srl
- ENEA, Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile
- ENEL SpA
- Enersem Srl
- ENI, Ente Nazionale Idrocarburi
- EURAC
- Fondazione ENI Enrico Mattei
- INFN, Istituto Nazionale di Fisica Nucleare
- IIT, Istituto Italiano di Tecnologia
- NHOA SpA
- Nuovo Pignone Tecnologie Srl
- SNAM SpA
- Raylab Srl
- RSE, Ricerca sul Sistema Energetico
- Siram SpA
- Thales Alenia Space Italia SpA

## Contacts

### Phd Programme Head

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### PhD Secretary

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## Attachment A1 – PhD Programme Head

### Prof. Vincenzo Dossena

Full Professor of Fluid Machines, holding the Courses of " Fluid Machines" and "Design of Fluid Machines for Green Power Generation" at Politecnico di Milano.

Member of the Board of Professors of the PhD Programme in Energy and afterwards in Energy and Nuclear Science and Technology (STEN) from 2006; Deputy Head of the Energy Department from 2016 to 2019 and member of the Scientific Committee of the GVPM (Wind Tunnel of Politecnico di Milano) from 2017 to 2022. Head of the Laboratory of Fluid Machines (LFM). Co-founder of the CREA LAB (Compressible fluid dynamics for Renewable Energy Applications laboratory), an interdisciplinary experience gathering together researchers from three Departments of Politecnico di Milano (2016)

The scientific research activity is mainly aimed at the study of turbomachinery fluid dynamics and at the performance analysis and optimal design of fluid machines and their components. Particular attention has been devoted to turbomachines operating with organic fluids (ORC).

Further areas of scientific interest concern wind turbines, particularly vertical axis wind turbines (VAWT), also operating in floating off-shore arrangements, and safety valves when operating in peculiar technical situations.

Prof. Dossena has been twice Invited Lecturer at the Von Karman Institute for Fluid Dynamics (Brussels) for two cycles of lectures.

Prof. Dossena has been the Scientific Coordinator of several Research Contracts with major national and international industries operating in the turbomachinery field and responsible for research contracts granted by public institutions.

Prof. Dossena is author of about 85 scientific publications, counting for more than 1300 citations and a Hirsch Index of 22 (source Scopus 2022).

## Attachment A2 – PhD Faculty Board

Description of the composition of the Faculty Board

<b>Name</b>	<b>Affiliation</b>	<b>SDS/ Title of SDS</b>
<b>DOSSENA Vincenzo (Head)</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/08 Fluid Machines</b>
<b>ANGELOTTI Adriana</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/11 Building physics and building energy systems</b>
<b>BORTOT Davide</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/20 Nuclear measurements and instrumentation</b>
<b>CAMPANARI Stefano</b>	<b>Politecnico di Milano, ENERGY</b>	<b>Adjunct Professor</b>
<b>CASALEGNO Andrea</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/10 Thermal engineering and industrial energy systems</b>
<b>CASARI Carlo Spartaco</b>	<b>Politecnico di Milano, ENERGY</b>	<b>FIS/03 Physics of matter</b>
<b>CHIESA Paolo</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/09 Energy systems and power generation</b>
<b>COLOMBO Luigi</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/10 Thermal engineering and industrial energy systems</b>
<b>DELLASEGA David</b>	<b>Politecnico di Milano, ENERGY</b>	<b>FIS/03 Physics of matter</b>
<b>DE ANTONELLIS Stefano</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/11 Building physics and building energy systems</b>
<b>D'ERRICO Gianluca</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/08 Fluid machines</b>
<b>DI MAIO Francesco</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/19 Nuclear power plants</b>
<b>GIACOBBO Francesca Celsa</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/18 Nuclear reactor physics</b>
<b>GIULINI CASTIGLIONI AGOSTEO Stefano Luigi Maria</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/20 Nuclear measurements and instrumentation</b>
<b>GROPPI Gianpiero</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/27 Chemical technologies</b>

<b>GUILIZZONI</b> <b>Manfredo</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/10 Thermal engineering and industrial energy systems</b>
<b>LUZZI</b> <b>Lelio</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/19 Nuclear power plants</b>
<b>MARIANI</b> <b>Mario</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/20 Nuclear measurements and instrumentation</b>
<b>MAZZARELLA</b> <b>Livio</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/11 Building physics and building energy systems</b>
<b>MEREU</b> <b>Riccardo</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/10 Thermal engineering and industrial energy systems</b>
<b>ONORATI</b> <b>Angelo</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/08 Fluid machines</b>
<b>PASSONI</b> <b>Matteo</b>	<b>Politecnico di Milano, ENERGY</b>	<b>FIS/03 Physics of matter</b>
<b>PERSICO</b> <b>Giacomo Bruno Azzurro</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/08 Fluid machines</b>
<b>POLA</b> <b>Andrea</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/20 Nuclear measurements and instrumentation</b>
<b>RICOTTI</b> <b>Marco</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/19 Nuclear power plants</b>
<b>ROMANO</b> <b>Matteo Carmelo</b>	<b>Politecnico di Milano, ENERGY</b>	<b>ING-IND/09 Energy systems and power generation</b>
<b>RUSSO</b> <b>Valeria</b>	<b>Politecnico di Milano, ENERGY</b>	<b>FIS/03 Physics of matter</b>
<b>ZAVELANI ROSSI</b> <b>Margherita</b>	<b>Politecnico di Milano, ENERGY</b>	<b>FIS/03 Physics of matter</b>



## Attachment A3 – PhD Advisory Board

Members of the advisory board will be periodically invited:

- To meet and discuss with STEN students and Faculty Board, advising about expected future trends of the energy applications and research sectors.
- To participate to students presentations.
- To give speeches and to participate to round-table discussion.

Decarli	Luca	ENI - Risk & Safety Engineering Group Manager (Knowledge Owner)
Monticelli	Enrica	Director of R&D Home, De Longhi
Rossi	Sandro	Direttore Generale del Centro di Adroterapia Oncologica di Pavia
Ruggiero	Marco	External Funding & Technology Development at Baker & Hughes /Nuovo Pignone Tecnologie
Yezerets	Aleksey	Executive Director of Advanced Decarbonization Technologies at Cummins Inc
Zani	Alessandro	Data scientist, Joint Research Centre - European Commission JRC.T.5 – Digital Transformation and Data - Text and Data Mining Ispra (VA)
Zennaro	Roberto	Senior Knowledge Owner Downstream Technologies - Development & Technical Services - Eni Energy Evolution - Eni S.p.A.