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

Location: Milano Leonardo/Bovisa

1. General Information

PhD School - Politecnico di Milano

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

Course start: November 2021

Location of the PhD Programme: Milano Leonardo/Bovisa

Promoter Department: Energy

Scientific Disciplinary Sectors

- FIS/03 Physics of matter
- ING-IND/08 Fluid machinery
- 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: <http://www.dottorato.polimi.it/it/corsi-di-dottorato/corsi-di-dottorato-attivi/scienze-e-tecnologie-energetiche-e-nucleari/>

2. General presentation

With the PhD Programme in Energy and Nuclear Science and Technology, the Department of Energy offers to graduate students a research opportunity 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, methods for safety and reliability analysis and development of innovative materials for energy applications.

The PhD Programme has the objective of providing high quality training in scientific research and, as a consequence, preparing professional profiles capable of tackling the numerous activities involved in high level research, both in academia and in industry, which often requires a higher level of education than that offered by the Master of Science and Master study courses. The PhD graduate is specifically

trained for leading, organizing, planning, managing and controlling research activities at high levels of international competitiveness in the field of Energy and Nuclear Science and Technology.

The growing interconnections between research and production activities require that the educational horizon opens up to include international and industrial research. Thus, PhD training includes exchanges and internships in internationally prominent public and private companies. Study (conferences, seminars, summer schools, etc.) and research (in qualified laboratories) periods in international research institutes and/or companies (internships) are foreseen for a duration of at least three months. In some cases it might be possible to complete the PhD thesis in an international research institute.

The proposed multidisciplinary approach aims at i) allowing the candidate to reach the “state of art” in the specific research field; ii) developing models, instrumentation and experience contributing to the growth of scientific and technological knowledge; iii) creating and verifying new technological solutions as a consequence of specific requirements and constraints offered by industrial applications.

The PhD course is run by a Coordinator and a Faculty Board.

The Coordinator chairs the Faculty Board, coordinates the preparation of the annual Educational Programme and organises the general educational activities of the PhD course (see Attachment A1).

The Faculty Board is responsible for the Educational programme and for teaching and administrative activities related to the PhD course (see Attachment A2).

3. Objectives

The PhD Programme is strictly related to the research activities of the Department of Energy. These activities are characterized by the existence of fundamental research topics common to Energy and Nuclear Science and Technology and by other aspects more specific to the energy and nuclear fields. This is reflected by the structure of the PhD Programme, which includes a background *common* to all PhD candidates and two subsequent tracks, *energy* and *nuclear*, dealing with more specific and characterizing aspects and chosen by the PhD candidate for finalizing his/her education.

Examples of fundamental, interdisciplinary research activities *common* to all PhD candidates are:

- thermodynamics, heat and mass transfer, single and multiphase thermo-hydraulic, advanced measurement methods;
- advanced aspects of physical-mathematical modelling of systems, processes, machines and devices;
- safety and reliability analysis of complex systems characterized by high levels of risk, both on a design and a diagnostic level, by means of innovative methods and techniques also applied to industrial and environmental problems;
- development of innovative materials, with focus on renewable and nuclear energy production areas and, as a support to these subjects, research in the field of surface and plasma physics;
- thermodynamic, economical and environmental optimization of energy conversion systems.

According to general requirements of the PhD School of the Politecnico di Milano, the PhD Programme is based on a total of 180 credits (60 credits per year) and training is divided into two areas (education and research):

- Education (20÷60 credits)

- PhD thesis (120÷160 credits)

The PhD candidate chooses the educational path and activities for each single stage, in agreement with the tutor and the supervisor, submitting the choice to the Board of Professors for approval.

Study and development of the above mentioned issues is then completed by the choice of one of the two characterizing tracks.

Energy track

The “Energy” track of the PhD programme allows the PhD candidate to develop competencies in pioneering research: 1) in the set of thermo-fluid-dynamic and chemical processes involved in the production, conversion and rational and sustainable use of energy in fixed or mobile plants; 2) in the fundamental practical aspects related to energy saving for civil applications, comfort and environment quality control (internal and external).

Some examples of research activities related to these topics are:

1. study of combustion and fuel utilization processes with low environmental impact; optimization of thermo-dynamic cycles for generation and co-generation of mechanical, electrical and thermal power; study of inverse cycles for cooling and conditioning; design of critical components such as gas, steam or hydraulic turbines, compressors, pumps, internal combustion engines and heat exchange devices; heat transfer enhancement; study of renewable technologies; energy from wind, biomass and waste; fuel cells; hydrogen production; micro-co-generation, CO₂ capture and storage techniques; advanced thermal-measurement techniques; CFD; fire engineering.
2. 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, technological aspects connected with the use of renewable energy, integration of natural and artificial illumination.

Nuclear track

The “Nuclear” track of the PhD Programme allows the PhD candidate to develop competences in pioneering research necessary to build and operate a nuclear system, ranging from reactor physics to nuclear plant design, from radiochemistry to radioactive waste management, from radioprotection to decommissioning, from the development of detectors and of the related electronics to radiation measurements at low and high doses, from applications of ionizing radiations to energy-related issues in other fields.

Some examples of research activities related to these topics are:

1. 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, nuclear reactors for aerospace applications and nuclear fusion systems; nuclear plant decommissioning, reprocessing, conditioning and radioactive waste disposal, including the issue of radionuclide transport.

2. nuclear measurements, environmental monitoring, development of innovative nuclear detectors and of the related electronics; radioprotection and nuclear safeguard, development of advanced methods for electronic signal processing; ionizing radiation applications in the technological and energy field as well as in other areas of interest (medical, high energy particle physics, etc.).

If desired and/or required, the structure of the PhD Programme allows the PhD candidate to adequately take advantage of competencies from both tracks.

4. Professional opportunities and job market

The professional profile of the PhD graduate in Energy and Nuclear Science and Technology is that of 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 private research institutes;
- coordinating research programmes proposed by national and European legislation, with the capability of managing the required documentation and reports;
- coordinating research programmes in companies, industries and research institutes operating in energy production, conversion and transmission, rational use of energy, 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 and control institutes.

The PhD Programme in Energy and Nuclear Science and Technology 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 programmes will be established according to the evaluation of the candidates' curricula, motivation letters, and an illustrative report about the development of a possible PhD research, which candidates will send contextually with their application to the admission announcement.

5.2 Admission deadlines and number of vacancies

The number of positions is indicated in the Call for admission to the 37th PhD cycle Programmes: <http://www.dottorato.polimi.it/en/>

Scholarships both on general and on specific themes are available, in accordance with what is 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 of full time study, research and development of PhD thesis.

PhD candidates in Energy and Nuclear Science and Technology must earn a minimum of 20 course credits (see paragraph 6.3 below), and to continuously conduct studies and research.

At the beginning of the course, the Faculty Board assigns a tutor to each PhD candidate to supervise and assist him/her in the overall training programme. The tutor shall be a professor belonging to the Faculty Board. The tutors assist the candidates in the choice of courses to be included in the study plan, which is eventually submitted for approval to the Coordinator of the PhD Programme (see also section 6.4 below).

The Faculty Board may assign extra course credits to one or more 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 the academic field, and in public and private organisations.

PhD candidates are requested to develop an original research contribution. The PhD thesis must thus contribute to increase the knowledge in the candidate's research field. Besides, it has to be coherent with the research topics developed in the Department where the PhD Programme is carried out.

The original research results are collected in the PhD thesis, where the candidate's contribution is put in perspective with respect to the research state of the art in the specific research field.

The PhD research is developed under the guidance of a supervisor, who supports the candidate in the setting-out and in 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.

To develop the capability of carrying out research activities, candidates must earn a minimum of 20 credits from courses coherent with their PhD programme. To each candidate admitted to the programme, a tutor, belonging to the Board of Professors, is appointed. The supervisor and the tutor may coincide.

The tutors supervise and support the candidates over all their training path. They assist the candidates in the choice of courses to be included in a study plan, which must finally be approved by the Coordinator of the PhD Programme.

Further activities intended to develop the candidate's personal skills and research expertise are encouraged during the PhD path.

Candidates must acquire the capability to present and discuss their work in their research community. Consequently, both the participation to international conferences and the publication of the research results in peer-reviewed journals are encouraged.

The PhD programme favors the candidates' research interactions with other groups in their research field, preferably abroad. Research visits of at least three months are strongly encouraged, as through them the candidates may acquire further skills to develop their research work and thesis.

The duration of the programme is normally three years.

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 usually held in English, except when indicated otherwise. The PhD programme includes at least one complete path delivered in English language.

Structured teaching activities allow to earn ECTS credits. Other activities, typically specialised and for which it is difficult to evaluate the learning and its quantification, fall within the scientific activities of which the Faculty Board takes into account 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. The PhD School courses activated for the 2021-2022 Academic Year are summarized in the following table.

<i>Professor</i>	<i>Course title</i>
Aliverti Andrea	Ethics in Research
Armondi Simonetta	Strengthening Critical Spatial Thinking
Arnaboldi Michela	Advanced Interaction Skills for Academic Professionals
Balducci Alessandro	Approaches to Resilience: Social, Economic, Environmental and Technological Challenges of Contemporary Human Settlements
Biscari Paolo	English for Academic Communication
Cardilli Lorenzo	European Culture
Chiodo Simona	Epistemology of Scientific and Technological Research (Technologies Reshaping Humans)
Di Blas Nicoletta	Professional Communication
Gianinetto Marco	The Copernicus Green Revolution for Sustainable Development
Iarossi Maria Pompeiana	Power of Images and Visual Communication for Research Dissemination
Jacchetti Emanuela	Communication Strategies that Score in Worldwide Academia
Lavagna Monica	Sustainability Metrics, Life Cycle Assessment and Environmental Footprint
Mancini Mauro	Project Management (in Action)
Masarati Pierangelo	Ethical Aspects of Research on Dual-Use Technologies
Ossi Paolo Maria	Sulla responsabilità della Tecnica
Paganoni Anna Maria	La comunicazione nella Scienza
Pizzocaro Silvia Luisa	Practicing Research Collaboration / La pratica della collaborazione nella ricerca
Raos Guido	Science, Technology, Society and Wikipedia
Sancassani Susanna	Teaching Methodologies, Strategies and Styles
Valente Giovanni	Scientific Reasoning: Philosophy, Logic and Applications
Volonte' Paolo Gaetano	Introduction to Academic Research
Zani Maurizio	Laboratorio di insegnamento a classi numerose

At least 10 of the 20 course credits that each candidate is required to earn shall be obtained through soft and transferable skills courses organized by the PhD School.

Depending on the candidate's background and research area, the tutor and the supervisor can suggest attending appropriate courses from Master of Science programmes in Energy Engineering, Nuclear Engineering and possibly from other Programmes. Such courses are intended to adequately expand the candidate's knowledge.

Education in Energy and Nuclear Science and Technology PhD Programme is based on a minimum of 20 credits.

The candidate must attend and pass exams of courses from the PhD Programme in Energy and Nuclear Science and Technology, from other PhD Programmes at the Politecnico di Milano and/or from those offered by the PhD School and, in special cases, from PhD Programmes at other universities, according to the following rules:

- 10 credits must be obtained through soft and transferable skills courses organized by the PhD School (i.e. 2 courses 5 credits each)
- 5 credits must be obtained by passing the exam of at least one course among the following organized within the frame of the PhD Programme in Energy and Nuclear Science and Technology (see table A)
- 5 credits must be obtained by passing the exam of courses from the PhD Programme in Energy and Nuclear Science and Technology, or from other PhD Programmes at the Politecnico di Milano or from PhD Programmes at other universities. In the last case the course must be proposed and approved by the Faculty.

The tables below summarize the candidate's path (as regards coursework activities). At the same time, the programme foresees that the candidates are devoted to research activity in a continuous way, following the lead of their supervisors, and of the Faculty Board.

First/Second Year

In the first two years the candidate must acquire a minimum of 20 educational credits. Any exception must be approved in advance by the Board of Professors.

Third year

In the third year the candidate should be devoted entirely to the research and to the development of the PhD thesis.

PhD Course List

A) The PhD Programme in Energy and Nuclear Science and Technology organizes the **Characterising Courses** listed in table A.

B) The PhD School organizes every year general and Interdoctoral courses. The acquisition of **at least 10 credits** is **mandatory** among the courses of B type. The list of PhD courses organized by the PhD School is also available at the website:

<http://www.dottorato.polimi.it/en/during-your-phd/phd-school-courses>

C) Other PhD courses

Credits can be obtained from type A or B PhD courses or from other courses provided by other PhD programmes of the Politecnico and/or external entities (in this case, prior approval of the supervisor, the tutor and the Board of Professors is mandatory)

PREPARATORY COURSES (only if foreseen)

If the supervisor and the tutor find it useful or necessary that the candidate attends preparatory courses (chosen among the activated courses at the Politecnico di Milano) the Faculty Board of the PhD programme may assign some extra-credits to be acquired to complete the training path. The credits acquired in this way will be considered as additional, in relation to the mandatory credits to be acquired with the PhD courses.

SPECIALISTIC COURSES, LONG-TRAINING SEMINARS

The attendance of Specialist Courses, Workshops, Schools, Seminars cycles is strongly encouraged and (if these seminars, workshops are certified and evaluated) may permit to acquire credits according the modalities established by the Faculty Board and previous approval of the study plan submitted by the candidate. These courses and workshops can be inserted in the study plan, even if they are not evaluated (and therefore not qualified as credits), as optional “additional teaching”.

The scheduled course planning for the academic year 2021/2022 follows. Other courses may be activated during the year. In this case the candidates will be promptly informed, and it will be allowed to insert these new courses in their study plan.

Table A: PHD COURSES CHARACTERISING THE PHD PROGRAMME

SDS	Name of Course	Professor (coordinator)	A.Y./Semester	Credits	Note
ING-IND/10	Thermodynamics. Equilibrium and nonequilibrium	Beretta G.	1 year, 1 sem	5	
ING-IND/20	Radiation Protection and Instrumentation in Nuclear Systems	Agosteo S.	1 - 2 sem	5	
ING-IND/07	Advanced Measurement Methods	Cozzi F.	1 - 2 sem	5	

6.4 Presentation of the study plan

PhD candidates must submit a study plan, which may be revised periodically (approximately every three months), in order to adequate them to possible changes in the course list, or to needs motivated by the development of their PhD career. The study plans must be approved by the PhD programme Coordinator, according to the modalities established by the Faculty Board of the PhD Programme itself.

6.5 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's 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 at 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.

Deadlines for submission of documentation and evaluation of eligibility of the candidate for the following year are indicatively scheduled as follows:

- first week of September 2022: deadline for submission of documents related to the 1st year, with evaluation by the Board of Professors within September 2022;
- last week of September 2023: deadline for submission of documents related to the 2nd year, with evaluation by the Board of Professors in October 2023;
- first week of October 2024: deadline for submission of documents related to the 3rd year, with evaluation by the Board of Professors in the second half of October 2024.

Any changes (and any further detail) regarding these deadlines will be communicated to all candidates by both the Coordinator of the PhD Programme and the tutors in due time

6.6 PhD thesis preparation

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

The resulting theses need to be coherent with the research issues developed in the Department where the PhD programme is developed.

The candidate must present an original thesis, discuss its contribution to the state of the art in the research field in the research community.

The PhD research is developed following the lead of a supervisor, who supports the candidate in the setting out and in the everyday activities regarding the thesis development.

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).

7. Laboratories, PhD Secretary Services

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>

PhD Secretary:

Ester Dall'Aglio

Department of Energy

Phone: +39 02 2399 3803

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Operation Manager and Administrative Secretary:

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8. Internationalisation and inter-sectoriality

Carrying out study and research activities at external laboratories is strongly recommended.

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 PhD programme website.

Attachment A1 – PhD Programme Coordinator: 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) since 2017. Head of the Laboratory of Fluid Machines (LFM).

The scientific research activity is mainly aimed at the study of fluid dynamics and performance of fluid machines and their components. Particular attention has been devoted to turbomachines operating with organic fluids (ORC). In 2016 Prof. Dossena was one of the founders 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.

Further areas of scientific interest concern wind turbines, particularly vertical axis wind turbines (VAWT), 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 a cycle of lectures entitled "Flow characteristics and performance of safety valves".

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 81 scientific publications, counting for more than 1000 citations and a Hirsh index of 18 (source Scopus 2021).

Attachment A2 – PhD Faculty Board

Description of the composition of the Faculty Board

Name	Affiliation	SDS/ Title of SDS
DOSSENA Vincenzo (Coordinator)	Politecnico di Milano, ENERGY	ING-IND/08 Fluid machinery
CAMPANARI Stefano	Politecnico di Milano, ENERGY	Adjunt Professor
CASALEGNO Andrea	Politecnico di Milano, ENERGY	ING-IND/10 Thermal engineering and industrial energy systems
CASARI Carlo Spartaco	Politecnico di Milano, ENERGY	FIS/03 Physics of matter
CHIESA Paolo	Politecnico di Milano, ENERGY	ING-IND/09 Energy systems and power generation
COLOMBO Luigi	Politecnico di Milano, ENERGY	ING-IND/10 Thermal engineering and industrial energy systems
DI MAIO Francesco	Politecnico di Milano, ENERGY	ING-IND/19 Nuclear power plants
GIACOBBO Francesca Celsa	Politecnico di Milano, ENERGY	ING-IND/18 Nuclear reactor physics
GIULINI CASTIGLIONI AGOSTEO Stefano Luigi Maria	Politecnico di Milano, ENERGY	ING-IND/20 Nuclear measurements and instrumentation
GROPPI Gianpiero	Politecnico di Milano, ENERGY	ING-IND/27 Chemical technologies
JOPPOLO Cesare Maria	Politecnico di Milano, ENERGY	ING-IND/11 Building physics and building energy systems
LUZZI Lelio	Politecnico di Milano, ENERGY	ING-IND/19 Nuclear power plants
MARIANI Mario	Politecnico di Milano, ENERGY	ING-IND/20 Nuclear measurements and instrumentation
MAZZARELLA Livio	Politecnico di Milano, ENERGY	ING-IND/11 Building physics and building energy systems
MEREU Riccardo	Politecnico di Milano, ENERGY	ING-IND/10 Thermal engineering and industrial energy systems
ONORATI Angelo	Politecnico di Milano, ENERGY	ING-IND/08 Fluid machinery
PASSONI Matteo	Politecnico di Milano, ENERGY	FIS/03 Physics of matter
PERSICO Giacomo Bruno Azzurro	Politecnico di Milano, ENERGY	ING-IND/08 Fluid machinery
POLA Andrea	Politecnico di Milano, ENERGY	ING-IND/20 Nuclear measurements and instrumentation
RICOTTI Marco	Politecnico di Milano, ENERGY	ING-IND/19 Nuclear power plants
RINALDI Fabio	Politecnico di Milano, ENERGY	ING-IND/10 Thermal engineering and industrial energy systems
ROMANO Matteo Carmelo	Politecnico di Milano, ENERGY	ING-IND/09 Energy systems and power generation
RUSSO Valeria	Politecnico di Milano, ENERGY	FIS/03 Physics of matter
ZAVELANI ROSSI Margherita	Politecnico di Milano, ENERGY	FIS/03 Physics of matter

Attachment A3 – PhD Advisory Board

Description of the composition of the Advisory Board

<i>Surname</i>	<i>First name</i>	<i>Institute</i>
BRUNA	Gianni	IRSN
LONTANO	Maurizio	Istituto di Fisica del Plasma - CNR
ROMER	Arturo	Nuklearforum
LOMBARDI	Carlo	EnergyLab Foundation
ORTIS	Alessandro	Fondaz. Einaudi/OPEF
GENTILE	Daniela	Ansaldo Energia, Executive Vice President R&D
PAPA	Carlo	Enel Foundation, Director
MUZZIO	Adriano	Unione Italiana Termofluidodinamica

The advisory board meeting will be held during the next cycle: for the present one, as no substantial change has been introduced in the project, there was no need for the above meeting.