

**Marie Skłodowska-Curie Early Stage Researcher ITN project EASYGO:
PhD position in the field of “Design and operation of a binary ORC plant for the
exploitation of different geothermal sources, including two-phase sources”**

ORGANISATION/COMPANY

Politecnico di Milano

RESEARCH FIELD

Engineering – Energy Engineering
Engineering – Industrial Engineering
Engineering – Mechanical Engineering

APPLICATION DEADLINE

31/10/2020 23:59 - Europe/Milano

LOCATION

Italy › Milano

TYPE OF CONTRACT

Temporary

JOB STATUS

Full-time

OFFER STARTING DATE

15/09/2020

EU RESEARCH FRAMEWORK PROGRAMME

H2020 / Marie Skłodowska-Curie Actions

MARIE CURIE GRANT AGREEMENT NUMBER

956965

General information about the ITN EASYGO project

Given the challenges in geothermal operations and the ambitious expansion plans for geothermal energy in many countries, there is an urgent need for experts with a broad understanding of geothermal systems. How can such systems be operated in the most efficient and safe manner? Within the ITN EASYGO, funded by the European Commission, the IDEA League universities TU Delft (TUD), ETH Zurich (ETH), RWTH Aachen University (RWTH), Politecnico di Milano (PoliMi) and 10 industry partners are addressing this question from different perspectives, integrating geology, geophysics, geochemistry, advanced modelling and process and power engineering. In this framework, EASYGO is looking forward to train tomorrow's leading geothermal energy experts.

EASYGO is seeking 13 highly qualified and enthusiastic individuals holding a relevant Master degree (or equivalent) to conduct state-of-the-art research within the projects specified below. Please find additional information on EASYGO as well as detailed project descriptions on www.idealeague.org/geothermal-energy and do not hesitate to contact the associated supervisors in case of questions. Successful applicants will conduct their research work at two universities and in close collaboration with industrial partners. They

will also benefit from the various training and networking opportunities within the ITN and large-scale infrastructure by the consortium partners across Europe.

Offer description

The successful candidate will be enrolled within the STEN (Doctoral Programme in Energy and Nuclear Science and Technology) PhD program within the Department of Energy and will join the research group Gecos (<http://www.gecos.polimi.it/>).

The Department of Energy is at the forefront of research in the energy sector and its implications on the environment and society. The Department is active along the entire energy supply chain and deals with fossil, nuclear and renewable primary energy sources, conversion systems for generating energy carriers (electricity and oil derivatives and gas) and their build-up, end-use energy in the field of domestic, industrial and transport applications. In the energy supply chain, the topic of energy efficiency becomes the common denominator in order to promote a rational and sustainable use of the planet's resources, reduce the environmental impact linked to local pollution and limit greenhouse gas emissions. Energy scenarios forecasts, as well as energy strategies and policies, play a strategic role in the national and international scene which can help to direct the penetration of different technological solutions in future scenarios.

The Group of Energy Conversion Systems (GECOS) is involved in research activities covering the whole spectrum of advanced technologies to generate electrical/mechanical energy ranging from small scale applications to large power stations. The research analyzes various aspects of power generation, related to energy efficiency, economics and environmental impact.

Secondment stays of several months are foreseen at ETH Zurich to extend knowledge and benefit from the expertise with regard to CO₂ mixtures simulation; shorter stays at Turboden offices and plants to gain experience in power plant design and operation.

Abstract of research project

Aim of the project is to develop a general design strategy for the power plant with particular reference to the geothermal fluid features, to enlarge the consolidated application range, including two phase (liquid and steam) geothermal sources. Furthermore, the goal is to increase knowledge on the thermodynamic properties of liquid, steam and non-condensable gases mixtures with different salinity, improve plant design, improve knowledge on the salt precipitation mechanism so as to prevent a decrease of the plant performance, investigate the solubility of CO₂ in the geothermal fluid, including the energy cost of CO₂ compression, and optimise the reinjection process. It aims to optimise the overall power plant configuration and the design of plant components using available real data from existing power plants built by Turboden and to predict real operating conditions of ORC binary plants.

Expected Results

- Thermodynamic model of mixtures of liquid water, steam, salts and non-condensable gases.
- Numerical model of the miscibility of CO₂ in liquid mixtures.

- Optimization of the overall power plant configuration
- Model validation with respect to available experimental data of an existing plant
- Optimization of the plant operating strategies under different working conditions
- Yearly energy balances for electricity generation
- Procedure to establish a predictive maintenance strategy

Eligibility criteria

REQUIRED EDUCATION LEVEL: Engineering Master's degree or equivalent

REQUIRED LANGUAGES: ENGLISH: Excellent

Marie Skłodowska-Curie Actions Eligibility rules apply. Particularly:

Please be aware of the ITN mobility rule, which says: you must not have resided or carried out your main activity (e.g. work, studies) in the country where you will be recruited "for more than 12 months in the 3 years immediately before the recruitment date.

Qualifications

The successful candidate should demonstrate to possess:

- Strong logical reasoning capabilities;
- Scientific writing and reporting skills;
- Capability to deal with data processing and programming;
- Ability to work both independently and in a project team and take responsibility for own research tasks;
- Fluency in communicating and reporting in English.

Previous knowledge or experience in thermodynamics, energy systems, heat transfer, fluid dynamics, power engineering and ability to develop simulation tools and use commercial simulation softwares are considered relevant.

The enrolment is subject to academic approval and fulfilment of the requirements for admission to a doctoral program at POLIMI. In addition to a Master of Science, candidates are required to present an English Language Certification, complying with the rules and regulations of the PhD School of Politecnico di Milano, as stated in page five of the following document:

http://www.dottorato.polimi.it/fileadmin/files/dottorato/concorso_linkweb/Bando_ENG.pdf

Starting Date: February 1st, 2021.

Duration: 36 months.

Approval and Enrollment. The selected candidate must receive academic approval and will be enrolled within the STEN PhD Programme of Politecnico di Milano. Additional rules and regulations can be found here:

<http://www.dottorato.polimi.it/en/phd-programmes/active-phd-programmes/energy-and-nuclear-science-and-technology/index.html>

Application

Please apply for maximum 3 positions within the EASYGO project and indicate on each application all other applications and a clear order of preference.

Please submit your application to:

paola.bombarda@polimi.it

as a PDF file named EASYGO_ESR13_Lastname_Firstname.pdf containing a CV, motivation letter, certificates and a list of courses/study plan with grades including range, highlighting the most important courses for the position. An English language certificate is mandatory for this ESR while certificates of practical experience are desirable.

Please note that this file will be shared with members of the EASYGO recruitment committee at all four participating IDEA League universities and one industry representative.

Salary and appointment terms

Benefits will be according to Marie Curie fellowship stipends and allowances. In general, the selected candidate will be appointed a temporary contract for 36 months, to be renewed annually; the salary will be in line with the funding schemes of MSCA action, and in accordance with Italian rules and regulations within this regard, and Country specific requirements, as stated in the Grant Agreement and Guide for Applicants, following Italian specific contract conditions for MSCA candidates.

Moreover:

- Following the "Women and Science" movement, the EASYGO encourages and promotes the participation of women within the project.
- The workplace will be Politecnico di Milano, Department of Energy, located in Bovisa Campus in Milano, Italy.

Further information

<http://www.dottorato.polimi.it/en/looking-for-a-phd/call-for-positions-and-scholarships/index.html>

Alternatively, you can contact directly:

paola.bombarda@polimi.it

paolo.silva@polimi