

Position	ESR2.1		
Title	Energy flexible and smart grid/energy ready buildings		
Centre	Catalonia Institute for Energy Research (IREC, www.irec.cat)		
Location	Barcelona, Spain		
Start date	1 July 2016	Duration	36 months
Closing date for applications	6 March 2016		
Communications of results	15 May 2016		

Job description

Individual Research Project

The foreseen large deployment of renewable energy sources may seriously affect the stability of energy grids. It will be necessary to control energy consumption to match instantaneous energy production. The built-in Energy Flexibility in buildings may be utilized for stabilizing the energy grids and allow for a larger roll out of renewable energy sources as buildings can be controlled in order to shift energy demand in time. The Energy Flexibility of a building is the ability to manage its demand and generation according to local climate conditions, user needs and grid requirements. The objective of this Individual Research Project is to investigate, propose and test control strategies to exploit the potential energy flexibility in buildings together with assessing the benefits for the future smart energy systems.

Tasks

- Determining of the flexibility potential both at building and at aggregated level in Mediterranean climates and others. Definition of building types of interest (incl. retrofitting options), specially nearly-zero energy buildings.
- Modelling of the impact of energy flexible buildings on the low voltage grid incl. integrations of renewable energies, storage systems and change in electrical/thermal load patterns.
- Investigating control strategies and algorithms, which can facilitate smart usage of the flexibility potential at building or aggregated level.
- Testing of systems and control strategies proposed in full-scale semi-virtual laboratory

Career

In Marie Skłodowska-Curie Actions, ESRs are paid a competitive salary, including a Mobility Allowance and a Family Allowance (subject to family situation). The successful candidate will be working on an Individual Research Project (IRP) at IREC (Thermal Energy and Building Performance Department) and will have secondments related to their research at 3E (3E, www.3e.eu) and Flemish Institute for Technological Research NV (VITO, www.vito.be). She/he will be enrolled in an UPC PhD programme and conduct the research corresponding to the IRP at IREC as part of her/his thesis. Tuition fees will be covered by the fellowship and the network will also support training activities and periodical events, which will allow the ERSs to develop their career in a multi-sectorial environment and to obtain a wide knowledge on energy systems integration and control in buildings.

PhD Programme

The successful candidate will be enrolled in the PhD programme - Automatic control, Robotics and Computer Vision (www.ioc.upc.edu/students/darv) or in the PhD Programme - Sustainability (is.upc.edu/teaching/phd-sustainability/academic-information) at the Universitat Politècnica de Catalunya (UPC).

Supervisor

Dr. Jaume Salom



Planned secondments (compulsory)

The ESR will perform secondments at 3E (Brussels, Belgium) and VITO (Genk, Belgium), which will be less than 30% of the total employment time.

Eligibility conditions

1. The candidate must not have resided or carried out his/her main activity (work, studies, etc.) in **SPAIN** for more than 12 months in the 3 years immediately prior to his/her recruitment under the project (short stays such as holidays are not counted).
2. The candidate must be within 4 years of the diploma granting you access to doctorate studies at the time of recruitment and has not yet been awarded the doctorate degree.
3. The candidate may be of any nationality.
4. The candidate must work exclusively for the project during the employment contract.
5. The candidate must fulfil the conditions to be admitted in the PhD programme - Automatic control, Robotics and Computer Vision or the PhD programme - Sustainability at the UPC.

These conditions must be fulfilled at the starting date of the contract. The starting date for each position is tentative.

General requirements

Education Degree

To be eligible for the PhD programme - Automatic control, Robotics and Computer Vision or the PhD programme - Sustainability at the UPC, the candidate must be in any of the following circumstances:

1. Individuals holding an official university degree from Spain or any other country in the European Higher Education Area that qualifies holders for master's degree courses, provided they have also completed a minimum of 300 ECTS credits of official university coursework overall, of which at least 60 must be at the master's degree level.
2. Individuals holding a degree from a foreign education system, providing that it can be shown that the university in question offers a level of training equivalent to that of the official Spanish master's degree and that, in the issuing country, individuals holding the degree in question are eligible for doctoral degree courses.

Qualifications

Preference will be given to candidate with a master degree (or equivalent) in Mechanical, Electronics or Control Engineering or other relevant disciplines related with the aim of the Individual Research Project.

Language(s)

- **English:** Good communication skills both oral and written.
- **Spanish:** Basic level (desirable).

Experience

Desirable background in:

- Thermodynamics and HVAC systems and equipments
- Building physics: heat and mass transfer in buildings
- Control systems theory



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- Programming and modelling softwares: TRNSYS, Matlab, Fortran, C++, Modelica
 - Data acquisition and analysis of lab experiments. Software: Labview
 - Computer modelling related to buildings and/or HVAC systems

Skills

- Strong motivation to pursue a PhD degree.
- Ability to work independently and as part of a team.
- Excellent skills in writing and presentation.
- Highly-motivated with the ability to set and meet deadlines appropriate to the progress of the project.
- Motivation for experimental work
- Willingness to interact closely with the INCITE partners.

Job details

Gross salary	Between €2800 and €3200 per month depending on the family situation (Amounts subject to taxation according to Spanish law). The position covers tuition fees and other training expenses.
Duration	36 months
Type of contract	Full-time
Hours per week	39.5 hours
Place of work	IREC, Jardins de les Dones de Negre, 1, 2 ^a pl., 08930 Sant Adrià de Besòs, Barcelona Short stays at IREC premise in Tarragona are foreseen to perform experimental tests.
Province/State	Barcelona
Local language	Spanish/Catalan
Country	Spain

The contract will be subject to the regulations of the Marie Skłodowska Curie Innovative Training Network Fellowships of the European Commission and in accordance with the work contract regulations of Spain.

Selection criteria

The evaluation committee will take into consideration the academics records, research experience and publications. After the first selection stage, the top five candidates will be invited to a remote interview via video conference.

Equal consideration will be given to female and male applicants.



Applications

All applications must include:

1. The **application form** (INCITE template).
2. A detailed **CV**, including list of publications, a Master thesis summary and the names of two referees (name, title, affiliation, e-mail and telephone number(s)) who are willing to provide detailed recommendation letters about the candidate (INCITE template).
3. One **motivation letter** for each position applied for (INCITE template).
4. **Copies of academic transcripts and degree certificates**, in English.

All applications must be submitted by means of on-line application on the official website of INCITE - www.incite-itn.eu using the templates available in the website.

For further information: coordinator-incite@irec.cat.

