

## CALL FOR GRANT APPLICATIONS (AE2024-0516)

INESC TEC is now accepting grant applications to award 1 Research Grant (BI) on the scope HYNET with reference 101172757 funded by the European Commission under the Horizon Europe program for the period 2021-2027.

### 1. GRANT DESCRIPTION

**Type of grant:** Research Grant (BI)

**General scientific area:** ENGINEERING, COMPUTER SCIENCE

**Scientific subarea:** Electrical engineering, Mechanical engineering, Programming, Informatics

**Area of Work:** Power Systems - Hybrid AC/DC Distribution grids

**Grant duration:** 12 months, starting on 2025-02-19, with the possibility of being renewed until the end of the project.

**Scientific advisor:** Carlos Moreira

**Workplace:** INESC TEC, Porto, Portugal

**Maintenance stipend:** € 990,98 or 1259,64, [according to the table of monthly maintenance stipend for FCT grants](#), paid via bank transfer. Grant holders may be awarded potential supplements, according to a quarterly evaluation process (Articles 19, 21 and 22 of the [Regulations for Grants of INESC TEC](#) and Annex II), up to a maximum limit of 50% of the monthly maintenance stipend.

INESC TEC supports costs with registration, enrolment or tuition fees, during the grant duration, under the terms established in the internal document: "[Payment of Tuition fees to grant holders](#)".

The grant holder will benefit from health insurance, supported by INESC TEC.

### 2. OBJECTIVES:

The interest in direct current (DC) power distribution systems has been increasing due to the proliferation of power electronic-based loads and the rise of distributed energy resources that operate intrinsically in DC. The HYNET project aims to address this challenge and develop innovative technologies for AC/DC hybrid power systems – AC networks that integrate DC networks – and define functional requirements for hybrid AC/DC grids. Specifically, INESC TEC will focus on exploring dynamic and steady-state analysis of hybrid AC/DC distribution networks, and on protection, islanding operation, and service restoration in distribution and hybrid AC/DC networks. In this context, the objectives of this grant are: - Expand the knowledge of the state of the art regarding dynamic and steady-state analysis of distribution networks and hybrid AC/DC microgrids; - Expand the knowledge of the state of the art regarding protection, islanding operation, and service restoration in distribution networks and hybrid AC/DC microgrids; - Develop computational simulation models for hybrid AC/DC networks, including networks representing relevant use cases and constituent models of DC networks such as electrical cables, power converters, protections, among others, that go beyond the state of the art; - Develop innovative control and operation methodologies for hybrid AC/DC distribution networks in the domains of dynamic and steady-state stability, protection, islanding operation, and service restoration.

### 3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

- Survey of the state of the art regarding dynamic and steady-state analysis of AC/DC hybrid distribution networks and microgrids;
- Survey of the state of the art regarding protection, islanding operation, and service restoration in AC/DC hybrid distribution networks and microgrids;

- Identification of use cases for hybrid AC/DC distribution networks and assessment of the technical challenges in the addressed aspects that are still unresolved according to the current state of the art;
- Development of innovative technical and scientific solutions to address the challenges identified for the use cases from the previous point, using computational simulation;
- Contribute to the development of toolboxes for computational simulation, specifically designed for DC networks, considering widely used software in academia and system operators, such as Matlab, PSCAD, PSSE, and DlgSILENT PowerFactory;
- Contribute to the writing of project deliverables, where the developed work should be reported.

#### 4. REQUIRED PROFILE:

##### Admission requirements:

The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

##### Preference factors:

- Proficiency in English (written and spoken).
- Relevant academic or practical knowledge in control theory and power electronics.
- Knowledge of computational simulation tools (for example, Matlab, PSCAD, PSSE or DlgSILENT PowerFactory).

##### Minimum requirements:

Solid academic knowledge in electrical power systems and programming - Matlab - Simulink, Proteus/OpenModelica, Python/C Programming/Microcontrollers, Project Management

#### 5. EVALUATION OF APPLICATIONS AND SELECTION PROCESS:

**Selection criteria and corresponding valuation:** the first phase comprises the Academic Evaluation (AC), based on the criteria referred to in Article 12 of the [Regulations for Grants of INESC TEC](#), while the second phase comprehends the Individual Interview (EI). All factors are evaluated on a scale of 0 to 100, taking into account the applicants' merit, suitability and conformity with the preference factors.

The weight of the AC factors are as follows: Academic Qualifications (FA, 50%), Scientific Publications (PC, 20%), Experience (EX, 20%) and Motivation Letter (CM, 10%).

Candidates who score less than 50 points in the AC average will be considered excluded on absolute merit. The top five candidates approved on absolute merit will be qualified for the individual interview. The Final Grade (CF) is obtained by the weighted average of AC (80%) and EI (20%).

##### DISABILITY INCENTIVE

Candidates who present a degree of disability equal to or greater than 90% will benefit from an incentive (20) in the score of the CV Assessment.

Candidates who present a degree of disability equal to or greater than 60% and less than 90% will also benefit from an incentive (10) in the score of the CV Assessment.

Said score may, in these cases, exceed 100 points.

Candidates must demonstrate the degree of disability during the application, namely through the submission of the Multi-Purpose Medical Certificate of Disability, issued in accordance with Decree-Law no. 202/96, of October 23 - currently in effect.

Candidates must declare, in the application form, the type of disability used throughout the selection process, in order to proceed with the required adaptations.

##### The Selection Jury is composed of the following members:

- President of the Jury: Carlos Moreira
- Full member: Justino Miguel Rodrigues
- Full member: Clara Sofia Gouveia
- Substitute member: Ricardo Jorge Bessa

**Release of results and prior hearing:** the results of the selection process, as well as the terms and procedures for prior hearing, will be released to the applicants by email, under the terms referred to in Article 13 of the Regulations for Studentships and Fellowships of INESC TEC.

## 6. FORMALISATION OF APPLICATIONS:

### Application Documents:

1. Motivation letter;
2. Curriculum Vitae (must include the list of previous fellowships, their type, beginning and end dates, funding entities and host institutions);
3. Certificate or diploma degree;
4. Proof of enrollment in a degree awarding study cycle or in a non degree awarding Higher Education program.
  - The proof of enrollment may be presented just during the grant hiring stage.
5. Signed declaration stating the infringement of the grant holder's duties (article 14, no. 4)
6. Documental evidence to support the country of residence, residence permit or other legally equivalent document, in cases where the applicant is a foreigner or non-resident in Portugal - valid until the beginning of the grant.
7. Other supporting documents relevant to the final assessment.

Failure to deliver the required documents within the 90-day period after the date of the notice of the conditional awarding of the grant implies its cancellation.

**Application period:** From 2024-12-06 to 2025-01-31

**Submission of applications:** the application will be formalised by submitting the form available in the *Work With Us* section of INESC TEC website.

## 7. BINDING LEGISLATION AND REGULATION

The hiring process shall comply with the current legislation regarding the Research Grant Holder Statute, approved by Law no. 40/2004 of August 18, in its current wording, as well as by the [Regulations for Grants of INESC TEC](#) and for [FCT Grants Regulation in force](#).

For more information, please check the [Regulations for Grants of INESC TEC](#) and relevant annexes at [www.inesctec.pt/bolsas](http://www.inesctec.pt/bolsas)



Funded by the  
European Union