



<b>Fellow</b>	<b>Host Institution No.1:</b> University of Seville <b>Host Institution No.2:</b> Empresarios Agrupados Internacional	<b>Country:</b> Spain <b>Country:</b> Spain
DC01	<b>Supervisor (academic):</b> Prof. David Sánchez Martínez <b>Supervisor (industrial):</b> Luis Javier García de Rozas	<b>WP No:</b> 1
<b>Title:</b> Integration of power systems based on directly-fired oxycombustion sCO <sub>2</sub> power cycles		
<b>Research Objectives:</b> (1) To identify thermal and mechanical integration schemes of the Air Separation Unit and Syngas Production fuel Unit (if any) into direct-fired sCO <sub>2</sub> power cycles. (2) To optimise the performance of power systems based on supercritical Carbon Dioxide cycles with direct oxycombustion of gaseous fuels (natural gas and syngas biofuels), including BoP components and potentially carbon capture systems, through the application of Artificial Intelligence algorithms to system integration. (3) To identify the critical technical challenges for the actual implementation of the technology.		
<b>Mobility rules (eligibility of applicants):</b> more information <a href="#">here</a> <ul style="list-style-type: none"><li>• Researchers funded by Doctoral Networks should comply with the mobility rules: in general, they must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting organisation for more than 12 months in the 36 months immediately before their recruitment date<sup>1</sup>.</li><li>• In addition, they:<ul style="list-style-type: none"><li>○ must not have a doctoral degree at the date of their recruitment.</li><li>○ can be of any nationality.</li></ul></li></ul>		
<b>Applicant - specifications:</b> in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: <ul style="list-style-type: none"><li>• <b>Earned degree:</b><ul style="list-style-type: none"><li>○ MSc in Mechanical Engineering (or related area). Preference will be given to candidates with a major in energy (or related areas)</li></ul></li><li>• <b>Background (mandatory):</b><ul style="list-style-type: none"><li>○ Thermodynamics</li><li>○ Power plant engineering (design and analysis)</li><li>○ Simulation of thermal systems</li><li>○ Matlab/Python/C++ programming</li></ul></li><li>• <b>Additional background that will be valued in the selection process:</b><ul style="list-style-type: none"><li>○ Chemical engineering, in particular in the area of hydrocarbon combustion</li><li>○ Optimisation techniques in engineering systems</li><li>○ Turbomachinery and heat exchanger design and analysis</li></ul></li></ul>		

<sup>1</sup> This rule applies to the first contract only (University of Seville)





<ul style="list-style-type: none"><li>○ Analysis of transient performance of engineering systems</li><li>○ Electrical Engineering</li><li>● <b>English language:</b><ul style="list-style-type: none"><li>○ A certified C1 level of English is required</li></ul></li></ul>
<p><b>Scheme:</b></p> <ul style="list-style-type: none"><li>● M1-M24: the applicant is employed by University of Seville</li><li>● M19-M24: the applicant is seconded to Técnicas Reunidas</li><li>● M25-M36: the applicant is employed by EAI, without undergoing another selection process</li></ul>
<p><b>Locations (place of work):</b></p> <ul style="list-style-type: none"><li>● M1-M18: the applicant will be employed by University of Seville and located at the Department of Energy Engineering: Escuela Técnica Superior de Ingeniería (ETSI) - School of Engineering Camino de los descubrimientos s/n 41092 Seville Google Maps: <a href="#">link</a></li><li>● M19-M24: the applicant will be seconded to Técnicas Reunidas: Técnicas Reunidas Avenida de Burgos 89 28050 Madrid Google Maps: <a href="#">link</a></li><li>● M25-M36: the applicant will be employed by Empresarios Agrupados Internacional Empresarios Agrupados Internacional (EAI) c/ Magallanes 3 28015 Madrid Google Maps: <a href="#">link</a></li></ul>
<p><b>Planned secondments:</b> DC1 is expected to carry out the following secondment:</p> <ul style="list-style-type: none"><li>● Técnicas Reunidas: carry out a comparative analysis of state-of-the-art and innovative Carbon Capture Technologies.</li></ul>
<p><b>How to apply:</b> submit application package (see below) to Prof. David Sánchez <a href="mailto:ds@us.es">ds@us.es</a> before May 31<sup>st</sup> 2023, 17:00 h CET.</p> <p>The Application Package is comprised of:</p> <ul style="list-style-type: none"><li>● CV Europass (<a href="https://europa.eu/europass/en/create-europass-cv">https://europa.eu/europass/en/create-europass-cv</a>)</li><li>● Letter of motivation</li><li>● <i>Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development</i> (max 3 pages)</li><li>● Short video (less than 2min): <i>why I should be selected for the position</i>. The candidates should address some of the following questions:<ul style="list-style-type: none"><li>○ D1: Why did you decide to apply for a position in ISOP?</li><li>○ D2: What do you expect/want to gain from an MSCA programme?</li><li>○ D3: How do you think you can add value to an MSCA programme?</li></ul></li></ul>





- D4: Summarise your strengths and weaknesses.
- D5: Describe a time when you had to deliver a challenging project. What was your role and what was the outcome?
- D6: Where do you see yourself in 10 years?
- D7: Why should you be selected for the position?
- Letters of recommendation (not mandatory)
- The application package must not exceed 15 Mb

**Contract:**

- Start date (estimate): September 2023
- Type: full-time exclusive
- Annual gross salary:
  - University of Seville: € 34,128.59
  - Empresarios Agrupados Internacional: € 34,087.73
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

**Equal Opportunity Employers:**

University of Seville and Empresarios Agrupados Internacional are Equal Opportunity Employers. We believe that no one should be discriminated against because of their differences, such as age, disability, ethnicity, gender, gender identity and expression, religion or sexual orientation. All employment decisions shall be made without regard to age, race, creed, color, religion, sex, national origin, ancestry, disability status, sexual orientation, gender identity or expression, genetic information, marital status, citizenship status or any other basis as protected by European and Spanish laws.

