ISOP

Innovation in Supercritical CO_2 Power Generation Systems

UNIVERSIDAD D SEVILLA 1505

Recruitment – Call for applications

The ISOP project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement no. 101073266

Marie Skłodowska-Curie Actions

ISOP - Aim

- The AIM of this four-year work programme is to undertake cutting edge multidisciplinary research and development to make a step change in **understanding and advancing Supercritical CO2 based power generation systems' technology**.

- This will enable a step change in the **role played by power and heat cycles to become major contributors to achieving the 2050 zero emissions** targets.

- ISOP will achieve this goal while **providing specialised training for 17 doctoral researchers** to help establish the backbone of an important industry.

ISOP – Specific (technical) objectives

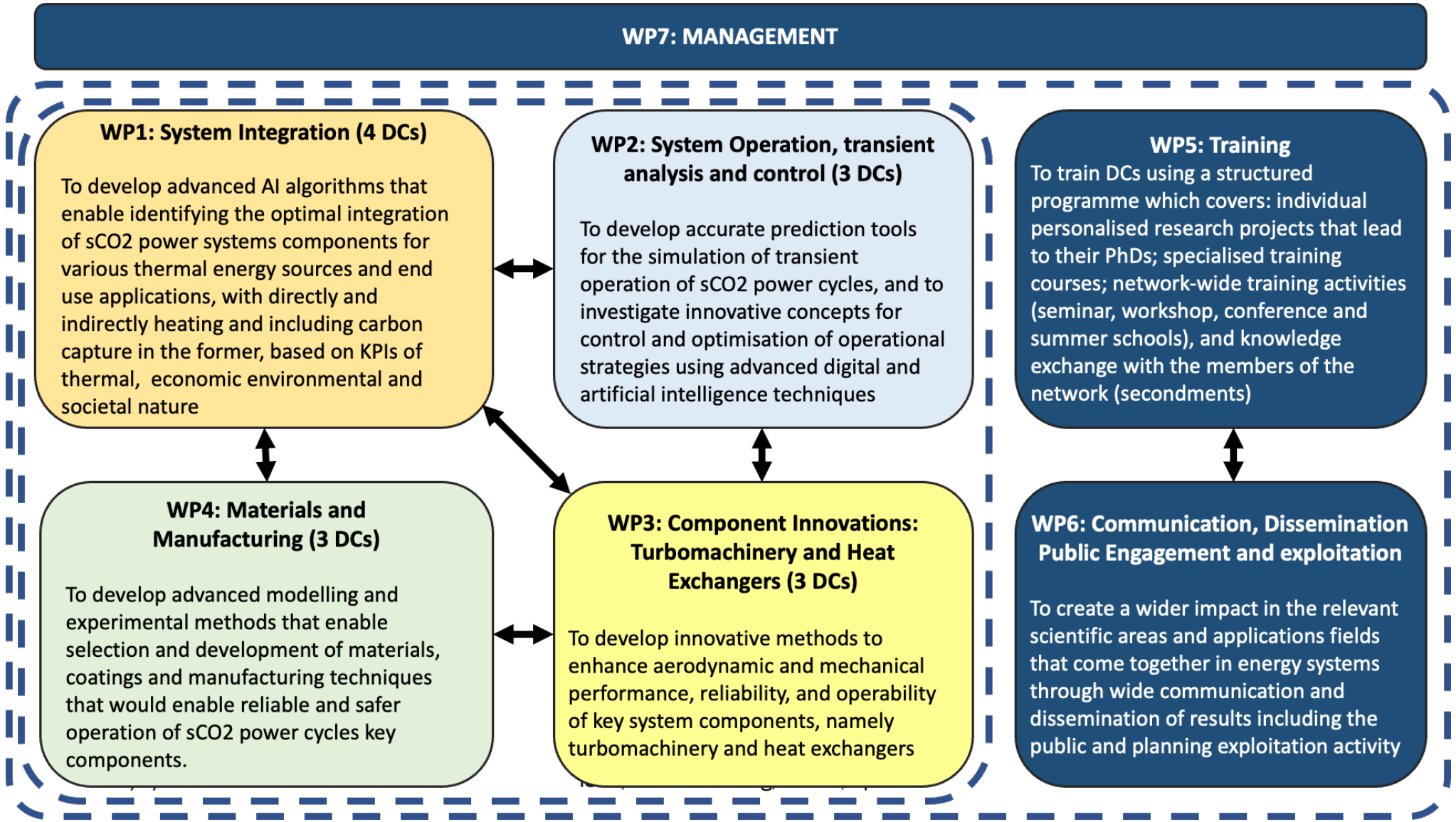
1. Develop advanced models and design tools that enable the optimal integration of sCO_2 power systems components for various thermal energy sources and end use applications

2. Develop accurate prediction tools for the simulation of transient operation of sCO_2 power cycles and investigate innovative concepts of control and optimisation of operation

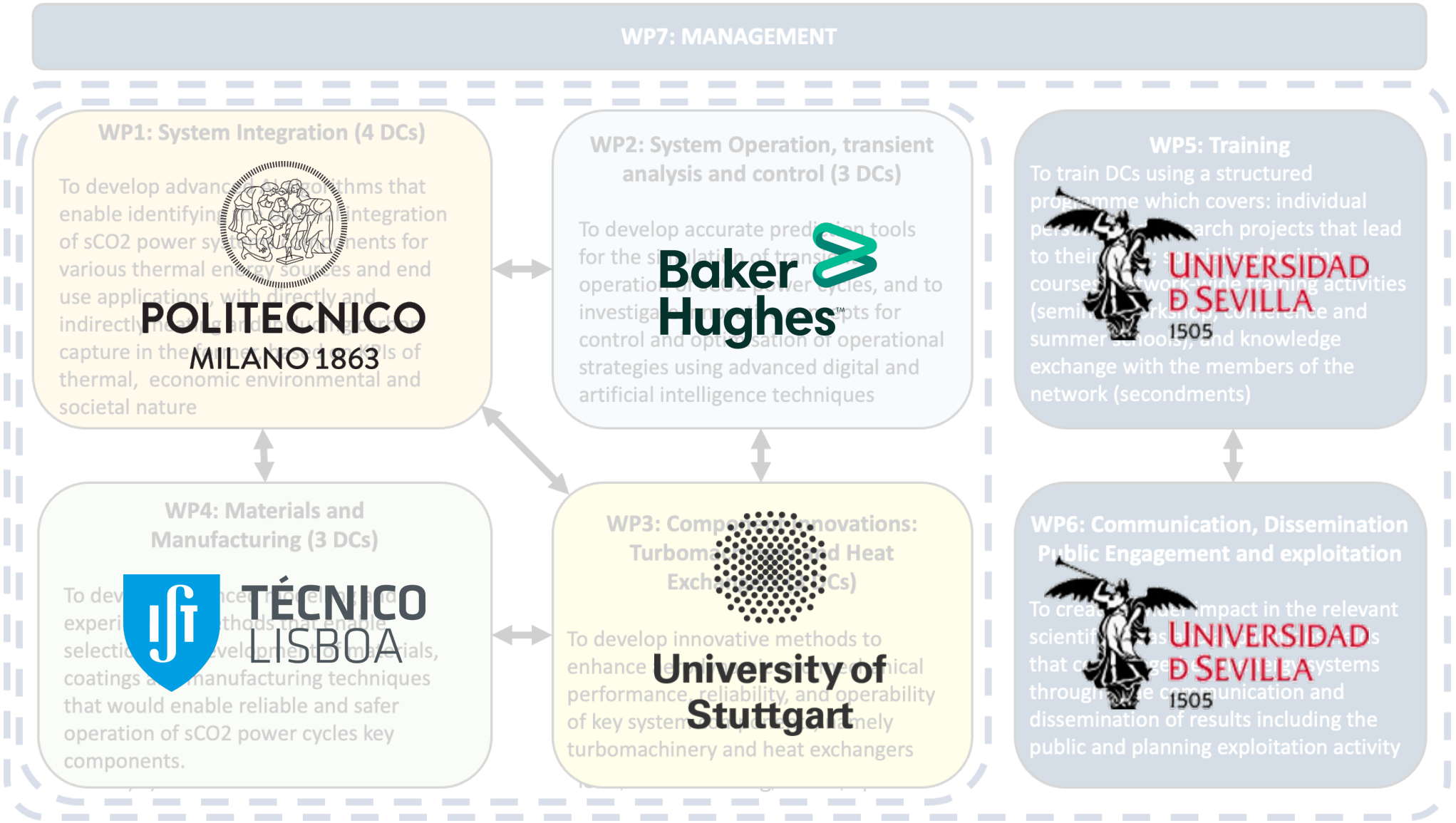
3. Develop innovative methods to enhance aerodynamic and mechanical performance, reliability, and operability of key system components

4. Develop advanced modelling and experimental methods that enable selection and development of materials, coatings and manufacturing techniques

Project at a glance - Concept



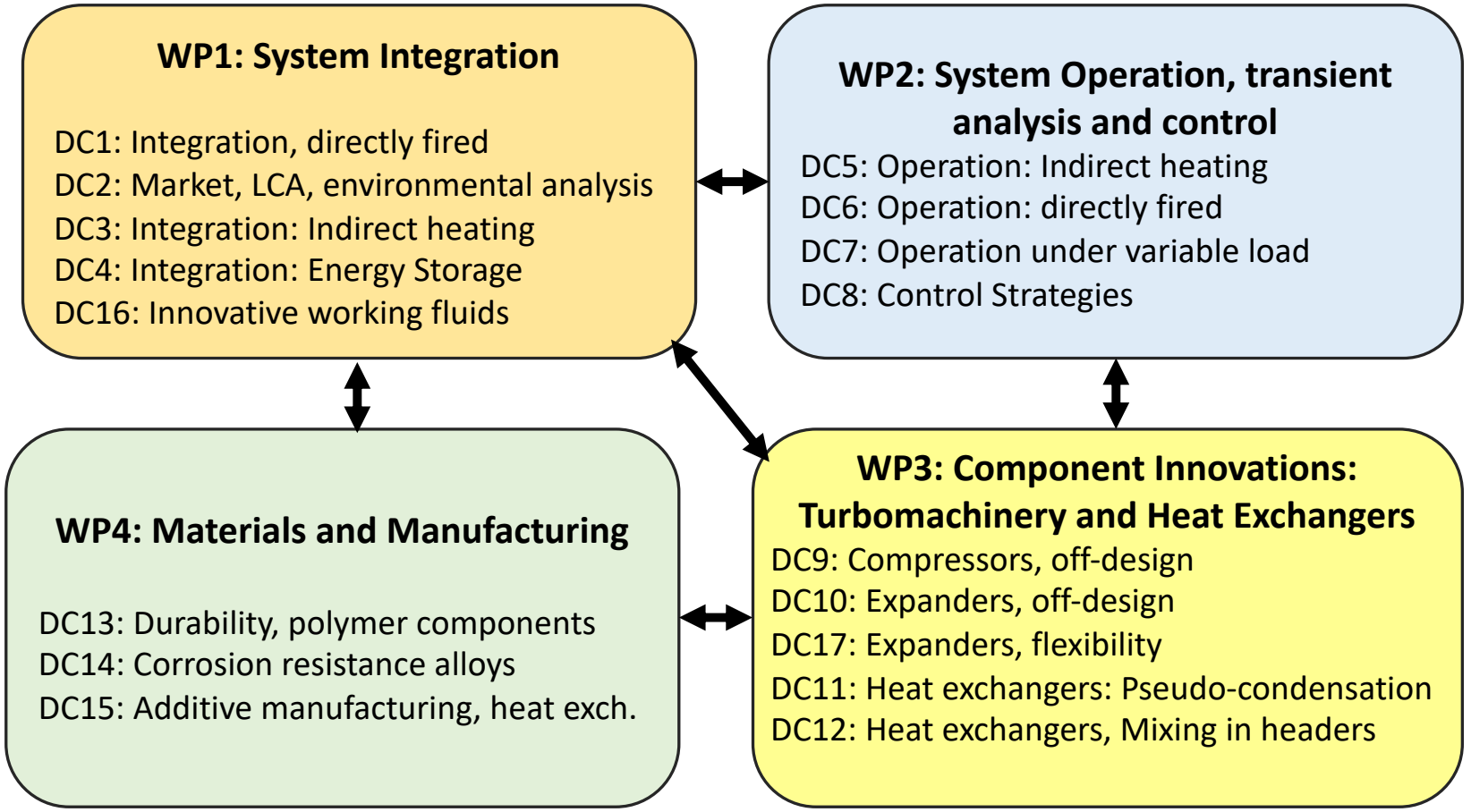
Project at a glance - Concept



Project at a glance - Concept

- DC1 Integration of power systems based on directly-fired oxycombustion sCO2 power cycles
- DC2 Market uptake of supercritical CO2 power systems to enable carbon-neutrality by 2050
- DC3 Integration of power systems based on indirect supercritical Carbon Dioxide power cycles
- DC4 Large Scale Energy Storage based on sCO2 systems
- DC5 Operation of power systems based on indirect supercritical Carbon Dioxide power cycles
- DC6 Operation of power systems based on directly-fired sCO2 power cycles with carbon capture
- DC7 Dynamic operation of sCO2 power generation systems under variable load and variable energy input
- DC8 Control strategies and optimisation of control of sCO2 power generation systems for direct and indirect heating configurations
- DC9 Fundamental studies to enhance off-design performance of megawatt scale sCO2 compressors
- DC10 Megawatt scale axial sCO2 turbine flow path enhancements to improve off-design performance
- DC11 Fundamental study of pseudo-condensation of sCO2
- DC12 Numerical investigation of mixing process in headers of sCO2 heat exchangers
- DC13 Advancing the durability of polymeric parts and coated components in sCO2 power systems
- DC14 Advancing the durability of corrosion resistant alloys for sCO2 power systems
- DC15 Additive manufacturing technologies of heat exchangers
- DC16 Utilisation of sCO2 mixtures to expand the deisgn space of sCO2 power systems
- DC17 Innovative turbine designs for enhanced flexibility

Project at a glance - Concept



Project at a glance – Interaction

		WP1: System Integration					WP2: Operation, Performance, Control				WP3: Component Innovations					WP4: Materials, Manufacturing		
	Doctoral Candidates	**DC1**	**DC2**	**DC3**	**DC4**	**DC16**	**DC5**	**DC6**	**DC7**	**DC8**	**DC9**	**DC10**	**DC17**	**DC11**	**DC12**	**DC13**	**DC14**	**DC15**
	Hosts	POLIMI EAI	USE ETN	CVUT EAI	TUW EAI	POLIMI RPOW	CVUT BH	TUW BH	USE SIW	CITY	CITY	POLIMI BH	USE SIEMENS	USTUTT TR	USTUTT FIVES	IST CATEC	IST CATEC	USTUTT CATEC
	Secondments	System Integration	LCA/Env, Market	System Integration	Energy Storage	sCO2 Mixtures	Operation - direct	Operation - indirect	Transient Perfo.	System Control	Compress.	Expansion - Off-design	Expansion - Flexibility	Heat Exch. - Condenser	Hext Exch. - Recuperat.	Materials - Polymeric	Materials - Corrosion	Additive Manuf.
WP1	DC1 (TR)																	
	DC2 (ACO2)																	
	DC3 (INERCO)																	
	DC4 (ETN)																	
	DC16 (CIEMAT)																	
WP2	DC5 (DSPW)																	
	DC6 (SIW)																	
	DC7 (DSPW)																	
	DC8																	
WP3	DC9																	
	DC10 (EASY)																	
	DC17 (SIW)																	
	DC11 (FIVE)																	
	DC12 (TR)																	
WP4	DC13 (BH)																	
	DC14 (ROSS)																	
	DC15 (ROSS)																	

Type of Interaction				
	Share cycle parameters		Share models and validation data	Share material properties
	Secondments		Share component characteristics	Share manufacturing limitations
	Share design parameters		Market and cost limitations	Share transient behaviour

Fellow	Host Institution No.1: University of Seville Host Institution No.2: Empresarios Agrupados Internacional	Country: Spain Country: Spain
DC01	Supervisor (academic): Prof. David Sánchez Martínez Supervisor (industrial): Luis Javier García de Rozas	WP No: 1
Title: Integration of power systems based on directly-fired oxycombustion sCO2 power cycles		
Research Objectives: (1) To identify thermal and mechanical integration schemes of the Air Separation Unit and Syngas Production fuel Unit (if any) into direct-fired sCO2 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.		

Mobility rules (eligibility of applicants): more information here
• 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[1].
• In addition, they:
  ○ must not have a doctoral degree at the date of their recruitment.
  ○ can be of any nationality.		

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:
• **Earned degree:**
  ○ MSc in Mechanical Engineering (or related area). Preference will be given to candidates with a major in energy (or related areas)
• **Background (mandatory):**
  ○ Thermodynamics
  ○ Power plant engineering (design and analysis)
  ○ Simulation of thermal systems
  ○ Matlab/Python/C++ programming
• **Additional background that will be valued in the selection process:**
  ○ Chemical engineering, in particular in the area of hydrocarbon combustion
  ○ Optimisation techniques in engineering systems
  ○ Turbomachinery and heat exchanger design and analysis		

[1] This rule applies to the first contract only (University of Seville)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- Analysis of transient performance of engineering systems
- Electrical Engineering

- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by University of Seville
- M19-M24: the applicant is seconded to Técnicas Reunidas
- M25-M36: the applicant is employed by EAI, without undergoing another selection process

Locations (place of work):

- 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: link
- M19-M24: the applicant will be seconded to Técnicas Reunidas:
  Técnicas Reunidas
  Avenida de Burgos 89 28050 Madrid
  Google Maps: link
- M25-M36: the applicant will be employed by Empresarios Agrupados Internacional
  Empresarios Agrupados Internacional (EAI)
  c/ Magallanes 3 28015 Madrid
  Google Maps: link

Planned secondments: DC1 is expected to carry out the following secondment:

- Técnicas Reunidas: carry out a comparative analysis of state-of-the-art and innovative Carbon Capture Technologies.

How to apply: submit application package (see below) to Prof. David Sánchez ds@us.es before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?

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- 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.

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Fellow	**Host Institution No.1:** University of Seville **Host Institution No.2:** European Turbine Network	**Country:** Spain **Country:** Belgium
DC2	**Supervisor (academic):** Prof. David Sánchez Martínez **Supervisor (industrial):** Rene Vijgen	**WP No:** 1

Title: Market uptake of supercritical CO_2 power systems to enable carbon-neutrality by 2050

Research Objectives: (1) To understand and characterise the roles of different thermal energy sources (renewable and non-renewable) in the transition towards a future carbon-neutral power generation. (2) To identify relevant business cases for the technology and the associated costs of energy in different scenarios. (3) To assess the social and environmental impacts of directly and indirectly heated sCO_2 technologies in terms of Life Cycle Assessment and Natural Capital Valuation. (4) To develop a roadmap towards the commercialization of direct sCO2 systems.

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Mechanical or Environmental Engineering (or related area). Preference will be given to candidates with a major in energy or related areas
- **Background (mandatory):**
  - Thermodynamics
  - Power plant engineering (design and analysis)
  - Simulation of thermal systems
  - Matlab/Python programming
- **Additional background that will be valued in the selection process:**
  - Optimisation techniques in engineering systems
  - Project appraisal and finance
  - Environmental Life Cycle Assessment

[1] This rule applies to the first contract only (University of Seville)

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- Energy markets and policy
- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by University of Seville
- M19-M24: the applicant is seconded to Azzero CO_2
- M25-M36: the applicant is employed by European Turbine Network, without undergoing another selection process

Locations (place of work):

- M1-M18: the applicant will be hired 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 (Spain)
  Google Maps: link
- M19-M24: the applicant will be seconded to Azzero CO_2:
  Azzero CO_2
  Via Genova 23 00184 Rome (Italy)
  Google Maps: link
- M25-M36: the applicant will be hired by European Turbine Network
  European Turbine Network
  Chau. de Charleroi 146/148, 1060 Brussels (Belgium)
  Google Maps: link

Planned secondments: DC2 is expected to carry out the following secondment:

- Azzero CO_2: define the legal, regulatory and financial boundary conditions of future power systems in a carbon-neutral society.

How to apply: submit application package (see below) to Prof. David Sánchez ds@us.es before May 31st 2020, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?

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- 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
  - European Turbine Network: € 38,114.00
- 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 European Turbine Network 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 laws.

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Fellow	**Host Institution No.1:** CTU in Prague **Host Institution No.2:** Empresarios Agrupados Internacional	**Country:** Czech R. **Country:** Spain
DC3	**Supervisor:** Prof. Václav Dostál **Co-supervisor:** Soledad Lopez Postiglione	**WP No:** 1
Title: Integration of power systems based on indirect supercritical Carbon Dioxide power cycles		
Research Objectives: (1) To assess the trade-offs between different integration schemes under largely dissimilar boundary conditions, such as those that are typical of WHR, CSP and nuclear. (2) To optimise the performance of power systems based on indirectly heated supercritical Carbon Dioxide cycles in different applications (WHR, CSP, nuclear), including BoP components, through the application of Artificial Intelligence algorithms to system integration. (3) To identify the critical technical challenges for the actual implementation of the technology.		
Mobility rules (eligibility of applicants): more information here • 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[1]. • In addition, they: ○ must not have a doctoral degree at the date of their recruitment. ○ can be of any nationality.		
Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: • **Earned degree:** ○ MSc in Mechanical Engineering (or related area). Preference will be given to candidates with a major in energy or related areas • **Background (mandatory):** ○ Thermodynamics ○ Power plant engineering (design and analysis) ○ Simulation of thermal systems. ○ Matlab/Python programming. • **Additional background that will be valued in the selection process:** ○ Optimisation techniques in engineering systems ○ Turbomachinery and heat exchanger design and analysis ○ Matlab Simulink		

[1] This rule applies to the first contract only (CTU in Prague)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- Electrical Engineering
- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by CTU in Prague.
- M19-M24: the applicant is seconded to INERCO
- M25-M36: the applicant is employed by EAI, without undergoing another selection process.

Locations (place of work):

- M1-M18: the applicant will be employed by Czech Technical University in Prague and located at the Department of Energy Engineering:
  České vysoké učení technické v Praze, Fakulta strojní, Technická 4, 160 00 Praha 6
  Google Maps: link
- M19-M24: the applicant will be seconded to Inerco Ingenieria, Tecnologia Y Consultoria:
  INERCO Building, La Cartuja Science and Technology Park, C. Tomás Alva Edison, 2, 41092 Sevilla, ŠpanělskoGoogle Maps: link
- M25-M36: the applicant will be employed by Empresarios Agrupados Internacional:
  Empresarios Agrupados Internacional
  C/ de Magallanes, 3, 28015 Madrid
  Google Maps: link

Planned secondments: DC3 is expected to carry out the following secondment:

- Inerco Ingeniería, Tecnología Y Consultoría, Sevilla (Spain): characterize the requirements and boundary conditions set by the future energy system (2050) on storage technologies.

How to apply: submit application package (see below) to Prof. Václav Dostál vaclav.dostal@fs.cvut.cz before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?

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- 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?

- The application package must not exceed 15 Mb

Contract:

- Start date (estimate): September 2023
- Type: full-time exclusive
- Annual gross salary:
  - Czech Technical University in Prague: € 29,239.11
  - 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:

Czech Technical University in Prague 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, colour, 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, Czech and Spanish laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** TU Wien **Host Institution No.2:** Empresarios Agrupados Internacional	**Country:** Austria **Country:** Spain
DC4	**Supervisor:** Prof. Markus Haider **Co-supervisor:** Soledad Lopez Postiglione	**WP No:** 1

Title: sCO_2-based pumped thermal energy storage (Carnot batteries)

Research Objectives:

(1) develop innovative system integration concepts for large-scale energy storage systems relying on sCO2 power cycles. (2) assess energy storage concepts which could be built around sCO2 power cycles aiming at providing support to larger shares of variable renewable energies. (3) assess the impact on accelerating the transition towards a future, carbon-neutral energy system. (4) identify the critical challenges for the implementation.

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Mechanical Engineering (or related area, like Process Engineering). Preference will be given to candidates with a major in energy or related areas
- **Background (mandatory):**
  - Thermodynamics and Power plant engineering (design and analysis)
  - Simulation of thermal systems.
  - Matlab/Python programming.
- **Additional background that will be valued in the selection process:**
  - Optimisation techniques in engineering systems
  - Turbomachinery and heat exchanger design and analysis
  - Matlab Simulink, Ebsilon Plus, Apros
- **English language:**
  - A certified C1 level of English is required

[1] This rule applies to the first contract only (TU Wien, Austria)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Scheme:

- M1-M24: the applicant is employed by TU Wien, Austria.
- M19-M24: the applicant is seconded to ETN, Brussels, Belgium
- M25-M36: the applicant is employed by EAI, Spain, without undergoing another selection process.

Locations (place of work):

- M1-M24: the applicant will work at TU Wien, Institute of Energy Systems and Thermodynamics:
  Getreidemarkt 9, 1060 Wien, Austria
- M19-M24: the applicant will be seconded to ETN, European Turbine Network:
  Chau. de Charleroi 146/148, 1060 Brussels, Belgium
- M25-M36: the applicant will be employed by Empresarios Agrupados Internacional:
  Empresarios Agrupados Internacional
  C/ de Magallanes, 3, 28015 Madrid
  Google Maps: link

Planned secondments: DC4 is expected to carry out the following secondment:

- ETN, European Turbine Network (Brussels, Belgium): focus on future energy storage requirements

How to apply: submit application package (see below) to Prof. Markus Haider markus.haider@tuwien.ac.at before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - 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?
- The application package must not exceed 15 Mb

Contract:

- Start date (estimate): September 2023

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- Type: full-time exclusive
- Annual gross salary:
  - TU Wien: € 42,820.40
  - 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:

TU Wien 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, colour, 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, Austrian and Spanish laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** CTU in Prague **Host Institution No.2:** Nuovo Pignone Tecnologie Srl	**Country:** Czech R. **Country:** Italy
DC5	**Supervisor:** Prof. Václav Dostál **Co-supervisor:** Dr. Marco Ruggiero	**WP No:** 2

Title: Operation of power systems based on indirect supercritical Carbon Dioxide power cycles

Research Objectives: (1) To define the operational strategies of indirect (externally heated) cycles in off-design and high partial loads. (2) To assess the constraints set by the operational strategies on the design specifications of major equipment for each energy source considered: nuclear, WHR, CSP. (3) To define the exceptional operating procedures of indirect sCO2 power cycles: start-up, shutdown, emergency shutdown (tri: Market up).

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Mechanical Engineering (or related area). Preference will be given to candidates with a major in energy or related areas
- **Background (mandatory):**
  - Thermodynamics
  - Power plant engineering (design and analysis)
  - Simulation of thermal systems.
  - Matlab/Python programming.
- **Additional background that will be valued in the selection process:**
  - Optimisation techniques in engineering systems
  - Turbomachinery and heat exchanger design and analysis
  - Matlab Simulink
  - Electrical Engineering
- **English language:**

[1] This rule applies to the first contract only (CTU in Prague)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by CTU in Prague.
- M19-M24: the applicant is seconded to DSPW
- M25-M36: the applicant is employed by BH, without undergoing another selection process.

Locations (place of work):

- M1-M18: the applicant will be employed by Czech Technical University in Prague and located at the Department of Energy Engineering:
  České vysoké učení technické v Praze, Fakulta strojní, Technická 4, 160 00 Praha 6
  Google Maps: link
- M19-M24: the applicant will be seconded to Doosan Skoda Power:
  Doosan Skoda Power
  Tylova 1, 301 28 Plzeň 3
  Google Maps: link
- M25-M36: the applicant will be employed by Nuovo Pignone Tecnologie Srl
  Nuovo Pignone Tecnologie Srl (BH)
  Via Felice Matteucci, 2 - 50127 Firenze (FI)
  Google Maps: link

Planned secondments: DC5 is expected to carry out the following secondment:

- Doosan Skoda Power, Plzeň (Czech Republic): define the requirements set by the energy source (application) on the operational procedures of indirect sCO2 power cycles: nuclear, WHR and CSP.

How to apply: submit application package (see below) to Prof. Václav Dostál vaclav.dostal@fs.cvut.cz before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - D4: Summarise your strengths and weaknesses.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- 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?

- The application package must not exceed 15 Mb

Contract:

- Start date (estimate): September 2023
- Type: full-time exclusive
- Annual gross salary:
  - Czech Technical University in Prague: € 29,239.11
  - Nuovo Pignone Tecnologie s.r.l.: € 37,930.00 (BH – level B1 of the "National Collective Bargaining Agreement – CNNL in force for employees in the private engineering and system installation industry, including € 31,000.00 annual salary, post-employment/performance and additional benefits)
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

Czech Technical University in Prague and Nuovo Pignone Tecnologie Srl 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, colour, 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, Czech and Italian laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** TU Wien **Host Institution No.2:** Nuovo Pignone Tecnologie Srl	**Country:** Austria. **Country:** Italy
DC6	**Supervisor:** Prof. Markus Haider **Co-supervisor:** Dr. Marco Ruggiero	**WP No:** 2

Title: Operation of directly-fired supercritical CO_2 power systems

Research Objectives: (1) define the operational strategies for directly-fired supercritical CO_2 power systems. (2) assess the constraints set by the operational strategies on the design specifications of major equipment for each energy source considered. External air separation units – where applicable - will also be taken into consideration. (3) define the exceptional operating procedures of directly-fired supercritical CO2 power systems: start-up, shutdown, emergency shutdown.

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Mechanical Engineering (or related area like Process Engineering). Preference will be given to candidates with a major in energy or related areas
- **Background (mandatory):**
  - Thermodynamics and Power plant engineering (design and analysis)
  - Simulation of thermal systems.
  - Matlab/Python programming.
- **Additional background that will be valued in the selection process:**
  - Optimisation techniques in engineering systems
  - Turbomachinery and heat exchanger design and analysis
  - Matlab Simulink, Ebsilon Plus, Apros, Aspen
- **English language:**
  - A certified C1 level of English is required

[1] This rule applies to the first contract only (TU Wien)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Scheme:

- M1-M24: the applicant is employed by TU Wien, Institute of Energy Systems and Thermodynamics.
- M19-M24: the applicant is seconded to SIW.
- M25-M36: the applicant is employed by BH, without undergoing another selection process.

Locations (place of work):

- M1-M18: the applicant will work at TU Wien:
  Getreidemarkt 9, 1060 Wien
- M19-M24: the applicant will be seconded to SoftInWay Switzerland (SIW)
  Baarerstrasse 2, 6300 Zug, Schweiz
- M25-M36: the applicant will be employed by Nuovo Pignone Tecnologie Srl
  Nuovo Pignone Tecnologie Srl (BH)
  Via Felice Matteucci, 2 - 50127 Firenze (FI)
  Google Maps: link

Planned secondments: DC6 is expected to carry out the following secondment:

- SIW: characterise off-design performance of major equipment found in Air Separation Units and biomass/coal gasification systems.

How to apply: submit application package (see below) to Prof. Markus Haider markus.haider@tuwien.ac.at before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - 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?
- The application package must not exceed 15 Mb

Contract:

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- Start date (estimate): September 2023
- Type: full-time exclusive
- Annual gross salary:
    - TU Wien: € 42,820.40
    - Nuovo Pignone Tecnologie s.r.l.: € 37,930.00 (BH – level B1 of the "National Collective Bargaining Agreement – CNNL in force for employees in the private engineering and system installation industry, including € 31,000.00 annual salary, post-employment/performance and additional benefits)
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

TU Wien and Nuovo Pignone Tecnologie Srl 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, colour, 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, Austrian and Italian laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** University of Seville **Host Institution No.2:** SoftInWay	**Country:** Spain **Country:** Switzerland
DC7	**Supervisor (academic):** Prof. David Sánchez Martínez **Supervisor (industrial):** Dr. Eugenio Rossi	**WP No:** 2

Title: Dynamic operation of sCO_2 power generation systems under variable load and variable energy input

Research Objectives: (1) To develop a dynamic model to simulate transient operation of the sCO_2 power generation system. (2) To validate the developed dynamic model based on existing experimental data and verified analytical models of components at system level. (3) To evaluate the robustness of sCO_2 power systems at the megawatt scale in responding to load variations and emergency trips. (4) To assess the impact of transient operation on the mechanical integrity of critical components.

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Mechanical or Aerospace Engineering (or related area). Preference will be given to candidates with a major in energy or related areas
- **Background (mandatory):**
  - Thermodynamics
  - Power plant engineering (design and analysis)
  - Simulation of thermal systems
  - Matlab/Python programming
- **Additional background that will be valued in the selection process:**
  - Optimisation techniques in engineering systems
  - Transient simulation and analysis of energy systems
  - Control engineering
  - Turbomachinery design and analysis

[1] This rule applies to the first contract only (University of Seville)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- Fundamentals of rotordynamics
- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by University of Seville
- M19-M24: the applicant is seconded to Doosan Skoda Power
- M25-M36: the applicant is employed by SoftInWay, without undergoing another selection process

Locations (place of work):

- 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 (Spain)
  Google Maps: link
- M19-M24: the applicant will be seconded to Doosan Skoda Power:
  Doosan Škoda Power s.r.o.
  Tylova 1/57, 301 28 Plzeň (Czech Republic)
  Google Maps: link
- M25-M36: the applicant will be employed by SoftInWay
  SoftInWay Switzerland Gmbh
  Baarerstrasse 2, 6300 Zug (Switzerland)
  Google Maps: link

Planned secondments: DC7 is expected to carry out the following secondment:

- Doosan Škoda Power: characterise transient operation and define safe operating maps of turbomachinery

How to apply: submit application package (see below) to Prof. David Sánchez ds@us.es before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*.
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - D4: Summarise your strengths and weaknesses.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- 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
  - SoftInWay: € 53,676.00
- 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 SoftInWay 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, colour, 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 laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	Host Institution No.1: City, University of London	Country: United Kingdom
DC8	**Supervisor:** Prof. Abdulnaser Sayma **Co-supervisor:** Dr Jafar Al-Zaili	**WP No:** 2
Title: Control strategies and optimisation of control of sCO2 power generation systems for direct and indirect heating configurations		
Research Objectives: (1) To develop a tool to simulate the performance of the control system of direct and indirect heating systems. (2) To model the performance of the sCO2 systems under different control strategies. (3) To develop an optimisation framework for the control system of the sCO2 power systems. (4) To assess the performance of the optimised control system for critical operation scenarios.		
Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: • **Earned degree:** ○ MSc in Mechanical or Electrical Engineering (or related area). Preference will be given to candidates with a major in energy or related areas • **Background (mandatory):** ○ Thermodynamics ○ Turbomachinery design and analysis ○ Optimisation techniques in engineering systems ○ Matlab/Python programming • **Additional background that will be valued in the selection process:** ○ Simulation of thermal systems ○ Electrical control systems ○ Turbomachinery and heat exchanger design and analysis ○ Matlab Simulink ○ Materials science and engineering • **English language:** ○ An IELTS qualification of minimum 6.5		
Scheme: • M1-M36: the applicant is hired by City, University of London		
Locations (place of work): • M1-M36: the applicant will be eomployed by City, University of London: Northampton Square, London EC1V 0HB Google Maps: link		

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Planned secondments: No planned secondments but will be revised according to career development plan.
How to apply: apply online via the City, University website: https://www.city.ac.uk/about/jobs/apply/details.html?jobId=2831&jobTitle=Marie%20Curie%20Doctoral%20Position%3A%20Control%20of%20sCO2%20Power%20cycles The Application Package is comprised of: • CV • Letter of motivation • Copy of transcripts and of their degree, and a copy of a thesis or any other publication (if available)
Contract: • Start date (estimate): September 2023 • Type: full-time exclusive • Gross salary: £36,386 • An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)
Equal Opportunity Employers: City, University of London is committed to promoting equality, diversity and inclusion in all its activities, processes, and culture, for our whole community, including staff, students, and visitors. We welcome applications regardless of gender, sexual orientation, disability, marital status, race, nationality, ethnic origin, religion or social class. For more information on our approaches to encouraging an inclusive environment, please see our Equality, Diversity and Inclusion Pages.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	Host Institution No.1: City, University of London	Country: United Kingdom
DC9	**Supervisor:** Prof. Abdulnaser Sayma **Co-supervisor:** Dr Tala El Samad	**WP No:** 3
Title: Fundamental studies to enhance off-design performance of megawatt scale sCO_2 compressors		
Research Objectives: (1) To explore the optimisation of the overall compressor flow path including inlet, impeller, diffuser, volute, and secondary flow paths to maximise performance of the compressor. (2) To validate the different compressor flow path modules numerically and experimentally. (3) To investigate design modifications and operational strategies to enhance part-load control such as inlet guide vanes.		
Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: • **Earned degree:** ○ MSc in Mechanical Engineering (or related area). Preference will be given to candidates with a major in energy or related areas • **Background (mandatory):** ○ Thermodynamics ○ Turbomachinery design and analysis ○ Optimisation techniques in engineering systems ○ Matlab/Python programming • **Additional background that will be valued in the selection process:** ○ Simulation of thermal systems ○ Turbomachinery and heat exchanger design and analysis ○ Matlab Simulink ○ Materials science and engineering • **English language:** ○ An IELTS qualification of minimum 6.5		
Scheme: • M1-M36: the applicant is hired by City, University of London		
Locations (place of work): • M1-M36: the applicant will be employed by City, University of London: Northampton Square, London EC1V 0HB Google Maps: link		
Planned secondments: No planned secondments but will be revised according to career development plan.		

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

How to apply: apply online via the City, University website: https://www.city.ac.uk/about/jobs/apply/details.html?jobId=2828&jobTitle=Marie%20Curie%20Doctoral%20Position%3A%20Control%20of%20sCO2%20Power%20cycles

The Application Package is comprised of:

- CV
- Letter of motivation
- Copy of transcripts and of their degree, and a copy of a thesis or any other publication (if available)

Contract:

- Start date (estimate): September 2023
- Type: full-time exclusive
- Gross salary: £36,386
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

City, University of London is committed to promoting equality, diversity and inclusion in all its activities, processes, and culture, for our whole community, including staff, students, and visitors.

We welcome applications regardless of gender, sexual orientation, disability, marital status, race, nationality, ethnic origin, religion or social class. For more information on our approaches to encouraging an inclusive environment, please see our Equality, Diversity and Inclusion Pages.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** Politecnico di Milano **Host Institution No.2:** Baker-Hughes	**Country:** Italy **Country:** Italy
DC10	**Supervisor:** Prof. Giacomo Persico **Co-supervisor:** Eng. Lorenzo Cosi	**WP No:** 3
Title: Megawatt scale axial sCO_2 turbine flow path enhancements to improve off-design performance		
Research Objectives: (1) To explore the optimisation of the turbine flow path including inlet chamber, flow path, gland seals, tip seals and diffuser to maximise the performance of the machine. (2) To assess and quantify secondary losses in sCO_2 turbines and investigate the impact of low aspect ratio blading. (3) To evaluate strategies to enhance the mechanical and rotordynamic integrity of highly loaded blades. (4) To produce off-design performance maps for the optimised flow path		
Mobility rules (eligibility of applicants): more information here • 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[1]. • In addition, they: ○ must not have a doctoral degree at the date of their recruitment. ○ can be of any nationality.		
Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: • **Earned degree:** ○ MSc in Energy, Mechanical or Aerospace Engineering (or related area). In the latter two cases, preference will be given to candidates with a specialization in energy/power/propulsion or related areas ○ MSc with a final score no lower than 95/110 (or 86/100) or minimum average score in exams indicated below:		

[1] This rule applies to the first contract only (Politecnico di Milano)

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COUNTRY	MINIMUM GPA
BANGLADESH	3,3/4
CHINA	70/100
COLOMBIA	3,5/5
European Countries (ECTS grading system)	C+
EGYPT	65/100
ETHIOPIA	3/4
GHANA	65/100
INDIA	70/100
INDONESIA	2,8/4
IRAN	14,5/20
NIGERIA	3/5
PAKISTAN	3,3/4,0
SERBIA	7,5/10
TURKEY	3/4
VIETNAM	7/10

(for the Countries not included in this list, the evaluation will be carried out directly by the Selection Committee).

- **Background (mandatory):**
  - Thermodynamics
  - Turbomachinery design and analysis
  - Power plant engineering (design and analysis)
  - Matlab/Python programming
  - Fundamentals of CFD and FEM
- **Additional background that will be valued in the selection process:**
  - Optimization techniques in engineering
  - Rotordynamics
  - Material science
- **English language:**
  - A certification of the level of English is required. A list of the certifications accepted by the Politecnico di Milano and the corresponding levels is given below:

TEST	MINIMUM LEVEL REQUIRED
CAMBRIDGE	≥ FCE grade B
CAMBRIDGE IELTS (International English Language Testing System) (Academic)	≥ 6
ETS - TOEFL (Test of English as a Foreign Language)	paper based (total score): ≥ 547
ETS - TOEFL (Test of English as a Foreign Language)	computer based (total score): ≥ 210
ETS - TOEFL (Test of English as a Foreign Language)	internet based (total score): ≥ 78
ETS - TOEIC (Test of English for International Communication - Listening and Reading Test)	≥ 720
TRINITY COLLEGE LONDON	≥ ISE II

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Scheme:

- M1-M24: the applicant is employed by Politecnico di Milano
- M19-M24: the applicant is seconded to Easy Energy Consulting & Technology SA
- M25-M36: the applicant is employed by Baker Hughes (Nuovo Pignone Tecnologie SRL), without undergoing another selection process

Locations (place of work):

- M1-M18: the applicant will be employed by Politecnico di Milano and located at the Department of Energy:
  Building BL25, Via Lambruschini 4, 20156 Milano (Italy)
  Google Maps: https://goo.gl/maps/VNXoxeHir3cSs99z7
- M19-M24: the applicant, while being hired by Politecnico di Milano, will be seconded to Easy Energy Consulting and Technology SA and located at:
  Via Industria 18, 6814 Lamone (Switzerland)
  Google Maps: https://goo.gl/maps/uX3mZaczhj6ei6z18
- M25-M36: the applicant will be employed by Baker-Hughes (Nuovo Pignone Tecnologie SRL) and located at:
  via Felice Matteucci 2, 500127 Firenze (Italy)
  Google Maps: https://goo.gl/maps/p9uXuyjwoLbdaDTLA

Planned secondments: DC10 is expected to carry out the following secondment:

- Easy Energy Consulting and Technology SA: investigate off-design and part-load performance of sCO_2 turbines

How to apply: submit application package (see below) to Prof. Giacomo Persico via the form at the following link https://forms.office.com/e/Rqb5X3ce5d before May 31st 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - 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?

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- The application package must not exceed 15 Mb

Contract:

- Start date (estimate): October 2023
- Type: full-time exclusive
- Annual gross salary:
  - Politecnico di Milano: € 38,052.72
  - Baker-Hughes (Nuoco Pignone Tecnologie SRL): € 37,930.00 (BH – level B1 of the "National Collective Bargaining Agreement – CNNL in force for employees in the private engineering and system installation industry, including € 31,000.00 annual salary, post-employment/performance and additional benefits)
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

Politecnico di Milano and Nuovo Pignone Tecnologie SRL 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 Italian laws. For details, read the Gender Equality Plan of Politecnico di Milano.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** University of Stuttgart **Host Institution No.2:** Técnicas Reunidas SA	**Country:** Germany **Country:** Spain
DC11	**Supervisor (academic):** Prof. Joerg Starflinger **Supervisor (industrial):** Carlos Gutiérrez Muñoz	**WP No:** 3

Title: Fundamental study of pseudo-condensation of sCO_2

Research Objectives: (1) To investigate the pseudo-condensation of sCO_2. (2) To experimentally investigate the condensation near the pseudo-critical point. (3) To thoroughly assess the data incl. error propagation analysis. (4) To develop a best practice correlation (or look-up table) for designers of heat rejection unit (cooler).

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Mechanical Engineering (or related area). Preference will be given to candidates with a major in energy or related areas
- **Background (mandatory):**
  - Thermodynamics
  - Fundamentals of Heat Transfer
  - Fundamentals of Measurement Technology
  - Matlab/Python programming
  - Fundamentals of CFD
- **Additional background that will be valued in the selection process:**
  - Experience in performing experiments
  - Data acquisition (e.g. Labview)
  - Sensitivity and uncertainty analyses
- **English language:**
  - A certified C1 level of English is required

[1] This rule applies to the first contract only (University of Stuttgart)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Scheme:

- M1-M24: the applicant is employed by University of Seville
- M19-M24: the applicant is seconded to Fives Cryo
- M25-M36: the applicant is employed by Técnicas Reunidas SA, without undergoing another selection process

Locations (place of work):

- M1-M18: the applicant will be employed by University of Stuttgart and located at the Institute of Nuclear Technology and Energy Systems:
  Pfaffenwaldring 31, D-70569 Stuttgart (Germany)
  Google Maps: https://goo.gl/maps/sPvuz18QvuAzpuUFA
- M19-M24: the applicant will be seconded to Fives Cryo and located at:
  25B Rue du Fort, 88190 Golbey (France)
  Google Maps: https://goo.gl/maps/HxhPacN91b6y8D9S9
- M25-M36: the applicant will be employed by Técnicas Reunidas SA and located at:
  Parque Empresarial Adequa, Edificio 6.
  Avenida de Burgos 89, 28050 Madrid (Spain)
  Google Maps: https://goo.gl/maps/vE12ngXUGso7rqEw8

Planned secondments: DC11 is expected to carry out the following secondment:

- Fives Cryo: Finite elements modelling of thermomechanical stresses in the heat exchangers. Investigate fatigue issues of the heat exchangers due to high thermal gradients in sCO_2 applications

How to apply: submit application package (see below) to Prof. Jörg Starflinger (joerg.starflinger@ike.uni-stuttgart.de) before May 31st 2020, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*.
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - 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)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- The application package must not exceed 15 Mb

Contract:

- Start date (estimate): September 2023
- Type: full-time exclusive
- Annual gross salary:
  - University of Stuttgart: € 38,400.00
  - Técnicas Reunidas S.A.: € 33,800.00
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

University of Stuttgart and Técnicas Reunidas S.A. 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 laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	Host Institution No.1: University of Stuttgart Host Institution No.2: Fives Cryo		Country: Germany Country: France
DC12	Supervisor (academic): Supervisor (industrial):	Prof. Joerg Starflinger Dr. Sarah Tioual-Demange	WP No: 3
Title: Numerical investigation of mixing process in headers of sCO_2 heat exchangers			
Research Objectives: (1) To investigate the mixing of sCO_2 flows with different temperature in headers of heat exchangers. (2) To set-up a numerical model for the mixing plena of heat exchanger, e.g. using OpenFOAM. (3) To thoroughly assess the numerical data. (4) To derive recommendation for designers			
Mobility rules (eligibility of applicants): more information here • 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[1]. • In addition, they: ○ must not have a doctoral degree at the date of their recruitment. ○ can be of any nationality.			
Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: • **Earned degree:** ○ MSc in Mechanical or Mechanical Engineering (or related area). Preference will be given to candidates with a major in energy or related areas • **Background (mandatory):** ○ Thermodynamics ○ Fundamentals of Heat Transfer ○ Fundamentals of CFD ○ Linus/UNIX and Matlab/Python programming • **Additional background that will be valued in the selection process:** ○ Experience in running numerical simulation on Linux clusters or high-speed computers ○ Data analysis ○ Sensitivity and uncertainty analysis • **English language:** ○ A certified C1 level of English is required			

[1] This rule applies to the first contract only (University of Stuttgart)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Scheme:

- M1-M24: the applicant is employed by University of Stuttgart
- M19-M24: the applicant is seconded to Técnicas Reunidas SA
- M25-M36: the applicant is employed by Fives Cryo, without undergoing another selection process

Locations (place of work):

- M1-M18: the applicant will be employed by University of Stuttgart and located at the Institute of Nuclear Technology and Energy Systems:
  Pfaffenwaldring 31, D-70569 Stuttgart (Germany)
  Google Maps: https://goo.gl/maps/sPvuz18QvuAzpuUFA
- M19-M24: the applicant will be seconded to Técnicas Reunidas SA:
  Parque Empresarial Adequa, Edificio 6.
  Avenida de Burgos 89, 28050 Madrid (Spain)
  Google Maps: https://goo.gl/maps/vE12ngXUGso7rqEw8
- M25-M36: the applicant will be employed by Fives Cryo and located at:
  25B Rue du Fort, 88190 Golbey (France)
  Google Maps: https://goo.gl/maps/HxhPacN91b6y8D9S9

Planned secondments: DC12 is expected to carry out the following secondment:

- Técnicas Reunidas SA: to investigate the impact of flow patterns on the heat transfer characteristics of sCO_2 heat exchangers

How to apply: submit application package (see below) to Prof. Prof. Jörg Starflinger (joerg.starflinger@ike.uni-stuttgart.de) before April 10th 2020, 17:00 h CET.

The Application Package is comprised of:

- CV
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*.
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - 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

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Contract:

- Start date (estimate): September 2023
- Type: full-time exclusive
- Annual gross salary:
  - University of Stuttgart: € € 38400.00
  - Fives Cryo: € 38623.00
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

University of Stuttgart and Fives Cryo 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 laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** Instituto Superior Técnico **Host Institution No.2:** CATEC	**Country:** Portugal **Country:** Spain
DC13	**Supervisor (academic):** Prof. F. Montemor **Supervisor (industrial):** Dr. Fernando Lasagni	**WP No:** 4

Title: Advancing the durability of polymeric, metallic parts and coated components in sCO2 power systems

Research Objectives: (1) To understand the mechanisms of degradation of different polymer chemistries (Polyolefin, PTFE, urethanes) in environments simulating sCO_2 conditions. (2) To study an innovative system based on the introduction of self-healing polymer ability to minimize mechanical damage and formation of voids and cracks. (3) To select the most corrosion-resistant coatings applied on steel plates for coated parts. (4) To recommend the most suitable polymer matrix for coated components. (5) To investigate metallic alloys and post treatments (including coatings but not limited) for additive manufacturing technologies with corrosion resistance. (6) To understand different quality inspection techniques for nondestructive evaluation of the components. (7) To investigate the applicability of NDTs depending on the type and size of the allowable defect.

Expected Results: A ranking of the corrosion resistance of different polymers. A novel system carrying self-healing for enhanced corrosion protection and parts durability. Knowledge beyond the state of art on the degradation mechanisms and degradation rates of polymer containing and AM metallic alloys parts. A set of guidelines and recommendations towards an optimized selection of polymers for multi-material and metal coating options. A screening of metallic alloys and their feasibility to produce HX for sCO_2 purposes. A comparative analysis of different NDTs where the most suitable technique will be selected.

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

[1] This rule applies to the first contract only (Instituto Superior Técnico)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- **Earned degree:**
  - MSc in Materials or Chemical Engineering (or related area). Preference will be given to candidates with good knowledge on materials.
- **Background (preferential):**
  - Materials science and engineering
  - Polymers
  - Corrosion
  - Additive Manufacturing
- **Additional background that will be valued in the selection process:**
  - Laboratory experience
- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by Instituto Superior Técnico
- M19-M24: the applicant is seconded to Nuovo Pignone Tecnologie Srl
- M25-M36: the applicant is employed by CATEC, without undergoing another selection process.

Locations (place of work):

- M1-M18: the applicant will be employed by Instituto Superior Técnico and located at the Research Centre CQE:

  Instituto Superior Técnico
  Av Rovisco Pais, Lisbon, Portugal
  Google Maps: https://goo.gl/maps/t5zUn93PS8U5dTf5A
- M19-M24: the applicant will be seconded to Nuovo Pignone Tecnologie Srl

  Nuovo Pignone Tecnologie Srl (BH)
  Via Felice Matteucci, 2 - 50127 Firenze (FI), Italy
  Google Maps: https://goo.gl/maps/qtdksCCsMXrNPKxNA
- M25-M36: the applicant will be employed by CATEC and located at:

  Parque Tecnológico y Aeronáutico de Andalucía
  C/ Wilbur y Orville Wright 19 - 41309 La Rinconada (Sevilla), Spain
  Google Maps: https://goo.gl/maps/wPR1TqniJN7Y7qyi6

Planned secondments: DC13 is expected to carry out the following secondment:

- Nuovo Pignone Tecnologie: explore advanced coating application methods for sCO_2.

How to apply: submit application package (see below) to Prof. Fatima Montemor (mfmontemor@tecnico.ulisboa.pt) before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
    - D1: Why did you decide to apply for a position in ISOP?
    - D2: What do you expect/want to gain from an MSCA programme?
    - D3: How do you think you can add value to an MSCA programme?
    - 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:
    - Instituto Superior Tecnico: € 34,395.00
    - CATEC: € 33,650.00
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

IST and CATEC 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 laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** Instituto Superior Técnico **Host Institution No.2:** CATEC	**Country:** Portugal **Country:** Spain
DC14	**Supervisor (academic):** Prof. João Salvador Fernandes **Supervisor (industrial):** Dr. Fernando Lasagni	**WP No:** 4

Title: Advancing the durability of corrosion resistant alloys for sCO_2 power systems

Research Objectives: (1) To study the performance of a high cost nickel alloy (800H) and to compare it with that of stainless steel (316) in supercritical CO_2 at temperatures around 650°C. (2) To study the processes of formation of protective corrosion scales and the respective mechanisms; (3) to carry out a comparative corrosion resistance assessment based on electrochemical impedance spectroscopy complemented with microscopic studies. (4) to create a set of guidelines to better select corrosion resistant alloys for sCO_2. (5) To investigate the possibilities of additive manufacturing technologies for stainless steel (or other alloys) for HX purposes in sCO_2. (6) To investigate design limitations related to different additive manufacturing technologies for the purpose of the HX applications.

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Materials or Chemical Engineering (or related area). Preference will be given to candidates with good knowledge on materials
- **Background (preferential):**
  - Materials science
  - Corrosion
  - Electrochemical Techniques
  - Additive manufacturing
- **Additional background that will be valued in the selection process:**
  - Laboratory experience

[1] This rule applies to the first contract only (Instituto Superior Técnico)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by Instituto Superior Técnico.
- M19-M24: the applicant is seconded to Rosswag GmbH
- M25-M36: the applicant is employed by CATEC, without undergoing another selection process.

Locations (place of work):

- M1-M18: the applicant will be employed by Instituto Superior Técnico and located at the Research Centre CQE:

  Instituto Superior Técnico
  Av Rovisco Pais, Lisbon, Portugal
  Google Maps: https://goo.gl/maps/t5zUn93PS8U5dTf5A
- M19-M24: the applicant will be seconded to Rosswag GmbH:

  Rosswag Engineering GmbH
  August Roßwag Str. 1, 76327 Pfinztal, Alemania
  Google Maps: https://goo.gl/maps/6CtiGgsNNp3kYtAe8
- M25-M36: the applicant will be employed by CATEC and located at:

  Parque Tecnológico y Aeronáutico de Andalucía
  C/ Wilbur y Orville Wright 19 - 41309 La Rinconada, Sevilla (SPAIN)
  Google Maps: https://goo.gl/maps/wPR1TqniJN7Y7qyi6

Planned secondments: DC14 is expected to carry out the following secondment:

- Rosswag GmbH: carry out studies related to material ageing under different operating conditions.

How to apply: submit application package (see below) to Prof. João Salvador (joao.salvador@tecnico.ulisboa.pt) before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- 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:
  - Instituto Superior Técnico: € 34,395.00
  - CATEC: € 33,650.00
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

IST and CATEC 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, colour, 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 laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** University of Stuttgart **Host Institution No.2:** CATEC	**Country:** Germany **Country:** Spain
DC15	**Supervisor (academic):** Prof. Stefan Weihe **Supervisor (industrial):** Dr. Fernando Lasagni	**WP No:** 4

Title: Additive Manufacturing technologies for heat exchangers applications in sCO_2 power systems

Research Objectives: (1) To evaluate design methodologies and geometry optimization through simulations for enhancing HX applications in sCO_2 power systems. (2) To investigate different alloys for its processability through additive manufacturing technologies. (3) To analyse the optimum AM process parameters for desired application. (4) To characterize the material: thermo-mechanical and chemical properties as well as microstructure. (5) To investigate post processing steps, including thermal treatments, surface finishing, weldability, etc. (6) To evaluate the best AM technology for producing the targeted components and geometries through representative samples. (7) Investigate on non destructive evaluation techniques for highly complex geometries validation. (8) To investigate the functional capacity of HX demonstrators with special focus on sCO_2 power systems. (9) To derive recommendation for designers and manufacturers.

Mobility rules (eligibility of applicants): more information here

- 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[1].
- In addition, they:
  - must not have a doctoral degree at the date of their recruitment.
  - can be of any nationality.

Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements:

- **Earned degree:**
  - MSc in Materials or Mechanical Engineering (or related area). Preference will be given to candidates with good knowledge on materials
- **Background (preferential):**
  - Materials science
  - Additive manufacturing
  - Metallic alloys
  - Material characterization/Materials testing

[1] This rule applies to the first contract only (University of Stuttgart)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- FEM/CFD simulations
- **Additional background that will be valued in the selection process:**
  - Laboratory experience
- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M12: the applicant is hired by CATEC.
- M13-M36: the applicant is hired by Univ. Stuttgart, without undergoing another selection process.
- M19-M24: the applicant is seconded to Rosswag.

Locations (place of work):

- M1-M12: the applicant will be employed by CATEC and located at:
  Parque Tecnológico y Aeronáutico de Andalucía
  C/ Wilbur y Orville Wright 19 - 41309 La Rinconada (Sevilla), Spain
  Google Maps: https://goo.gl/maps/wPR1TqniJN7Y7qyi6
- M13-M36: the applicant will be employed by University of Stuttgart and located (M13-M18 & M25-M36) at:
  Materials Testing Institute University of Stuttgart
  Pfaffenwaldring 32 - 70569 Stuttgart, Germany
  Google Maps: https://goo.gl/maps/7yHUujPiVrktrkZ89
- M19-M24: the applicant will be seconded to Rosswag GmbH:
  Rosswag Engineering GmbH
  August Roßwag Str. 1, 76327 Pfinztal, Germany
  Google Maps: https://goo.gl/maps/6CtiGgsNNp3kYtAe8

Planned secondments: DC15 is expected to carry out the following secondment:

- Rosswag GmbH: assess options to apply AM to high-pressure/temperature equipment in power plants.

How to apply: submit application package (see below) to Prof. Stefan Weihe (bewerbung@mpa.uni-stuttgart.de) before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- D3: How do you think you can add value to an MSCA programme?
- 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 Stuttgart: € 38,400.00
  - CATEC: € 33,650.00
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

University of Stuttgart and CATEC 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, colour, 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 laws.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

Fellow	**Host Institution No.1:** Politecnico di Milano - POLIMI **Host Institution No.2:** RPOW Cponsulting	**Country:** Italy **Country:** Italy
DC16	**Supervisor:** Prof.Giampaolo Manzolini **Co-supervisor:** Angel Martinez Quesada	**WP No:**1
Title: Utilisation of CO_2 mixtures to enhance the performance of supercritical Carbon Dioxide systems		
Research Objectives: (1) To explore the potential of utilising CO_2 mixtures to enhance the performance of indirect sCO2 power cycles. (2) To identify and characterise dopants according to the temperature level of interest: nuclear, WHR, CSP. (3) To identify optimal cycle layouts for each mixture-application combination. (4) To identify and assess environmental and mechanical integrity - related issues potentially triggered by the working mixtures.		
Mobility rules (eligibility of applicants): more information here • 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[1]. • In addition, they: ○ must not have a doctoral degree at the date of their recruitment. ○ can be of any nationality.		
Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: • **Earned degree:** ○ MSc in Energy, Chemical, Industrial, Mechanical or Aerospace Engineering (or related area). In the latter two cases, preference will be given to candidates with a specialization in energy/power/propulsion or related areas ○ MSc with a final score no lower than 95/110 (or 86/100) or minimum average score in exams indicated below:		

[1] This rule applies to the first contract only (Politecnico di Milano)

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

COUNTRY	MINIMUM GPA
BANGLADESH	3,3/4
CHINA	70/100
COLOMBIA	3,5/5
European Countries (ECTS grading system)	C+
EGYPT	65/100
ETHIOPIA	3/4
GHANA	65/100
INDIA	70/100
INDONESIA	2,8/4
IRAN	14,5/20
NIGERIA	3/5
PAKISTAN	3,3/4,0
SERBIA	7,5/10
TURKEY	3/4
VIETNAM	7/10

(for the Countries not included in this list, the evaluation will be carried out directly by the Selection Committee).

- **Background (mandatory):**
  - Thermodynamics
  - Power plant engineering (design and analysis)
  - Matlab/Python programming
- **Additional background that will be valued in the selection process:**
  - Optimisation techniques in engineering
  - Equation of state knowledge and calibration
  - Material science
- **English language:**
  - A certification of the level of English is required. A list of the certifications accepted by the Politecnico di Milano and the corresponding levels is given below:

TEST	MINIMUM LEVEL REQUIRED
CAMBRIDGE	≥ FCE grade B
CAMBRIDGE IELTS (International English Language Testing System) (Academic)	≥ 6
ETS - TOEFL (Test of English as a Foreign Language)	paper based (total score): ≥ 547
ETS - TOEFL (Test of English as a Foreign Language)	computer based (total score): ≥ 210
ETS - TOEFL (Test of English as a Foreign Language)	internet based (total score): ≥ 78
ETS - TOEIC (Test of English for International Communication - Listening and Reading Test)	≥ 720
TRINITY COLLEGE LONDON	≥ ISE II

Scheme:

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- M1-M24: the applicant is employed by Politecnico di Milano
- M19-M24: the applicant is seconded to CIEMAT
- M25-M36: the applicant is employed by RPOW Consulting, without undergoing another selection process

Locations (place of work):

- M1-M24: the applicant will be employed by Politecnico di Milano and located at the Department of Energy:
  Building BL25, Via Lambruschini 4, 20156 Milano (Italy)
  Google Maps: https://goo.gl/maps/VNXoxeHir3cSs99z7
- M19-M24: the applicant, while being employed by Politecnico di Milano, will be seconded to and located at CIEMAT:
  Ctra. de Senés, km. 4,5, 04200 Tabernas, Almería, Spain
  Google Maps: https://goo.gl/maps/9pEUHkz8LyMT1Agj8
- M25-M36: the applicant will be employed by RPOW Consulting and located at:
  Av. De Innovacion 3, 308, 41020 Sevilla, Spain
  Google Maps: https://goo.gl/maps/8xbtijGfkCSA5ysf9

Planned secondments: DC5 is expected to carry out the following secondment:

- CIEMAT: characterise the boundary conditions that are relevant for CSP and WHR applications

How to apply: submit application package (see below) to Prof. Giacomo Persico via the form at the following link https://forms.office.com/e/EAuaDrzS8H before May 31st, 17:00 h CET.

The Application Package is comprised of:

- CV
- Letter of motivation
- A short essay (maximum length is 3 pages, including references) on the topic of the *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development*
- Short video clip (less than 2 minutes) where the candidates shall explain why they should be selected for the position. The candidates shall address some of the following questions:
  D1: Why did you decide to apply for a position in ISOP?
  D2: What do you expect/want to gain from an MSCA programme?
  D3: How do you think you can add value to an MSCA programme?
  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?

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101073266

- The application package must not exceed 15 Mb

Contract:

- Start date (estimate): October 2023
- Type: full-time exclusive
- Annual gross salary (yearly):
  - Politecnico di Milano: € 38,052.72 € (research fellowship)
  - RPOW Consulting: € 33,710.00
- An additional (family) allowance is available for candidates who have family obligations (applied from and until this condition applies)

Equal Opportunity Employers:

Politecnico di Milano and RPOW Consulting 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 Italian laws. For details, view the Gender Equality Plan of Politecnico di Milano.

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Fellow	**Host Institution No.1:** University of Seville **Host Institution No.2:** Siemens Energy	**Country:** Spain **Country:** Germany
DC17	**Supervisor:** Prof. David Sánchez Martínez **Co-supervisor:** Dr. Stefan Glos	**WP No:** 3
Title: Innovative turbine designs for enhanced flexibility of megawatt scale axial sCO_2 turbines		
Research Objectives: (1) To explore innovative turbine designs aimed at improving the dynamic characteristics of sCO_2 turbines. (2) To explore flowpath designs enhancing the turndown capabilities of sCO_2 turbines. (3) To explore turbine designs aimed at reducing thermal stress during transients, therefore increasing component lifetime. (4) To produce off-design performance maps for the optimised flow path.		
Mobility rules (eligibility of applicants): more information here • 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[1]. • In addition, they: ○ must not have a doctoral degree at the date of their recruitment. ○ can be of any nationality.		
Applicant - specifications: in addition to the general specifications (eligibility criteria) listed above, the applicant must feature the following requirements: • **Earned degree:** ○ MSc in Mechanical or Aerospace Engineering (or related area). Preference will be given to candidates with a major in energy or related areas • **Background (mandatory):** ○ Thermodynamics / Aerodynamics ○ Turbomachinery design and analysis ○ Power plant engineering (design and analysis) ○ Fundamentals of programming • **Additional background that will be valued in the selection process:** ○ Optimisation techniques in engineering systems ○ Matlab/Python programming ○ Transient simulation and analysis of energy systems ○ Fundamentals of CFD ○ Material science		

[1] This rule applies to the first contract only (University of Seville)

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- **English language:**
  - A certified C1 level of English is required

Scheme:

- M1-M24: the applicant is employed by University of Seville
- M19-M24: the applicant is seconded to SoftInWay
- M25-M36: the applicant is employed by Siemens Energy, without undergoing another selection process

Locations (place of work):

- 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 (Spain)
  Google Maps: link
- M19-M24: the applicant will be seconded to SoftInWay:
  SoftInWay Inc Gmbh
  Baarerstrasse 2, 6300 Zug (Switzerland)
  Google Maps: link
- M25-M36: the applicant will be employed by Siemens Energy and located at:
  Siemens Energy
  Rheinstraße 100, 45478 Mülheim an der Ruhr (Germany)
  Google Maps: link

Planned secondments: DC7 is expected to carry out the following secondment:

- SoftInWay: carry out mechanical analysis in the transient conditions relevant to the DC

How to apply: submit application package (see below) to Prof. David Sánchez ds@us.es before May 31st 2023, 17:00 h CET.

The Application Package is comprised of:

- CV Europass (https://europa.eu/europass/en/create-europass-cv)
- Letter of motivation
- *Analysis of the challenges faced by the energy sector to accomplish Carbon Neutrality by 2050, and the associated needs for technology development* (max 3 pages)
- Short video (less than 2min): *why I should be selected for the position*. The candidates should address some of the following questions:
  - D1: Why did you decide to apply for a position in ISOP?
  - D2: What do you expect/want to gain from an MSCA programme?
  - D3: How do you think you can add value to an MSCA programme?
  - D4: Summarise your strengths and weaknesses.

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- 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
  - Siemens Energy: € 38,378.00
- 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 European Turbine Network 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 laws.

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