

Potential of SUDOE area



Building
AN EFFICIENT
FUTURE
for electricity 

EUROPEAN COOPERATION NETWORK ON ENERGY
TRANSITION IN ELECTRICITY TR@NSENER

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The SUDOE region points out “south west of Europe”. Particularly dynamic in the renewable energy sector, this region is fed by the FEDER, through the Interreg fund. That is where the project “Transener” is born. Indeed, it aims at fostering the dialogue between several clusters, to arouse the innovative potential in this area. In this frame, some clusters from France, Spain and Portugal has filled the following document to map precisely the innovative potential of the area.

Partners involved in this synthesis:

- France :
 - DERBI (Occitania)
- Spain :
 - FUNSEAM (Catalogne)
 - CIRCE (Aragon)
 - UPM (Madrid)
 - CTA (Andalousie)
- Portugal :
 - UBI (Lisbonne)
 - FCUL (Centre)

I. SUDOE region: an attractive area for innovation, entrepreneurship and investment in R&D

a) France: politic goals aiming at increasing the innovation attractiveness

In the frame of the crossed goals of H2020 strategy and first region to positive energies strategy ("REPOS strategy", launched in 2017 aims at multiplying by 3 the renewable energies production), **Occitania** region set in place financial and research supports so that make it becoming an attractive region for innovation in environment area.

b) Spain: differentiated regions

Each region surveyed highlighted a specific asset that makes it attractive for innovation in the area of renewable energies. Indeed, **Aragon** takes advantage of its geostrategic position: with 136 km of border with France, it is the central gateway to Europe from Spain and Portugal. Aragon's strategic position means that it's only two hours away from air, sea and road connections with the main national and international logistical points. Moreover, the high concentration of inhabitants (250 million people) on a restricted sector (1000km²), combined to a great electricity purchasing power make this region being very attractive for an entrepreneur, especially in the electricity sector.

Madrid puts forward the public funds allocated to the R&D&I activities. Furthermore, the high number of researchers with international projection and the high and diversified number of agents (universities, IMDEA, research centers, biomedical research foundations, public research organizations, etc.) constitute two of the most outstanding elements of the regional R&D&I system.

In **Andalusia**, the climate is the obvious asset to attract innovation businesses in the region. The main sources of renewable energy are wind power and solar energy,

particularly photovoltaics and concentrated solar power (CSP). The region is also the national leader in the biomass sector. But the region has developed other characteristics to enhance the general attractiveness of its territory. For example, it's a strategic place thanks to its position, at the crossroads of European and African markets. There is also good transportations infrastructures, a numerous and highly skilled workforce, financial incentives for innovation and special networks to boost R&D&I.

c) Portugal

The country is "innovation-friendly", thanks to a high number of universities and thanks to the Competitiveness and International Operation Program (COMPETE 2020) which is involved in the areas of research and innovation strategy for smart specialization. Finally, the Portuguese government has declared to be fully committed to the energy transition, prioritizing, among the national and regional innovation ecosystems, the renewable energies, sustainable energies and energy efficiency.

Lisbon city, claiming to be an important innovation knot, is fully dedicated to energy transition. Indeed, the city is going through a deep transformation in the direction of sustainability development and has been chose as European Green City 2020.

The Regional Operational Program (**Centro 2020**) aims at promoting the competitiveness of Centro region's economy, its sustainable development and internal cohesion. So, 5.064 projects have been approved, corresponding to a total budget of 1.294 million euros. An important share of the funded projects aims developing R&D activities and promoting innovative and environmental-friendly energies.

II. Overview of innovation and R&D&I in the region

a) Occitania

With a GDP of 170 billion euros, the Region displays itself as the 4th richest one in France. Generating the strongest economic growth at the National level, it positions itself as a leading region in research and development effort (3.7% of its GDP is dedicated to R&D). It is also involved in the set in place of “Smart Specialization Strategy” defined jointly with the European Union about agriculture, agri-food, aeronautics, water, renewable energy and green chemistry, health and biotechnology, digital and industry.

b) Spain

With 1, 46% of its GDP dedicated to R&D (2016), **Catalonia** aim at being a key innovation hub in Europe. For proof, it concentrates the main portion of innovative technological companies in Spain, with 9,449 companies (23.6% of the total). Moreover, Catalan requests for European patents increased by 15.7% in 2016.

Over the last few years, the region of **Aragon** has made significant efforts to promote its public-private R&D system, which is the focus of the *Aragon Research and Innovation Strategy for an Intelligent Specialisation (RIS3 Aragon)* and includes the objective of reaching an expenditure on R&D that represents 1.30% of the GDP in 2020. Furthermore, Aragon has saw growing the expenditure on R&D and the number of researchers in the last 20 years.

Madrid’s region allocates 26, 5% of its resources to R&D. This help has been decisive to encourage the R&D in the region.

Andalusia’s skilled workforce and R&D environment are supported by a great technological infrastructure. There are 18,000 researchers in Andalusia and more than 4,500 PhD’s engaged in R&D at the local universities. Andalusia is one of

the top 3 Spanish regions in terms of R&D expenditure, next to Madrid and Catalonia (source: INE 2016).

The region's composition also reveals the Andalusian's will to enhance R&D. Indeed, it counts 11 science and technology parks, 3 European businesses and innovation centres, 18 agricultural and fishing research and training centres (IFAPA) and the Technological Corporation of Andalusia (CTA) and 5 other knowledge and technology transfer organisations.

c) Portugal

According to the "Regional Innovation Scoreboard 2017", the **Centre** region is ranked as the second Portuguese region with the best performance in terms of innovation; the report outlines that Centro is a "Moderate + Innovator".

In terms of regional R&D investment, as reported in the "Barometer of the Centre of Portugal", published in February 2019, by the agency Centro Regional Coordination and Development Commission (CCDRC-Centro), the investment in R&D activities reached 447 million euros in 2016, representing 18,7% of the national expenses in R&D (7,5% more than in 2015). The private initiative plays an important role on the investment of the region in R&D. The proportion of regional investment in R&D carried out by the private sector in 2016 reached 52,6% out the total, surpassing the national average of 50%.

III. Talents in the region

a) Occitania

The Occitania region is the 2nd region of France in terms of renewable energy production. This context, accentuated by institutional support, led to the installation

in the region of the headquarters of a large number of French developers covering all the value chain. This industrial ecosystem, backed by the expertise of the laboratories, allows a proliferation of collaborations and the development of innovative projects for the energy market. There are now more than 600 companies active in the energy transition, excluding installers.

b) Spain

Spain is the 3rd destination for European tech talent and the 5th for all international movers to Europe. Spain is also exporting IT, being a great source of talent for top digital innovation hubs.

Catalonia combines highly attractive factors that make it a great location for R&D activities; its capital Barcelona, is a magnet for young professionals, students and researchers from all over the world due to a combination of quality of education and quality of life. There are more than 236,000 university students.

According to a recent report (*COTEC Foundation for Innovation, 2019*), **Aragon** is a representative of Spanish talent, with an outstanding ability to keep workers thanks to a great environment. The region is above national average in 6 of the 14 areas analysed in this report; the pillars where it stands out the most are 'Knowledge' of its workers and 'Retention' of talent. Key indicators like favourable regulatory environment, high average of qualification and high proportion of exports with high added value make the region attractive for talents.

The region of **Madrid** makes the proof of an intellectual emulation which is revealing a real pool of talents. Indeed, the region represents 36.7% of Spanish scientific production, with 34.3% of high education people out of the population over 16 years. Finally, Madrid concentrates 23.8% of total Spanish employment in R&D&I: 1.81% of total employment in Madrid is related to R&D&I activities, a ratio higher than the national average (1.19%).

About 65% of **Andalusia's** working population have a secondary or higher education,

the region has the third largest number of graduate employees among Spanish regions and it has a younger population than the European average. Over 200,000 young people are currently enrolled at universities in Andalusia, continuously increasing the pool of qualified labour. Finally, there are 10 public universities, two of which belong to the top ten Spanish public universities in terms of research productivity. This dynamism is a great proof of the pool of talents which abounds in Andalusia.

c) Portugal

Lisbon is fully committed to attract talent and investment, prove of this is that in the next 10 years it will be the host of the Web Summit, the largest technology conference in Europe. Also, the municipality of Lisbon has created the platform *Startup Lisbon* to support the creation of startup companies that will develop activity in the region.

For **Centre's** region, according to the previously mentioned "Barometer of the Centre of Portugal", it is ranked as the second Portuguese region with the higher share of young population holding a higher education academic degree. The document also reports that, in the academic year 2016/2017, 417 Doctorates were completed in the higher education institutions of the Centro Region (University of Aveiro, University of Coimbra and University of Beira Interior), representing 19, 5% of the country's total number of concluded Doctorates.

IV. Top Universities leading the energy transformation and providing solutions

a) Occitania

The region of Occitania includes the 2 academies of Toulouse and Montpellier, which totalize more than 240,000 students. The most important universities in terms of energy training are:

- Université Toulouse III - Paul Sabatier (UT3 PS)
- Université de Montpellier (UM)
- Institut National Polytechnique de Toulouse (INP)
- Institut National des Sciences Appliquées de Toulouse (INSA)
- École Nationale d'Ingénieurs de Tarbes (ENIT)
- Université de Perpignan Via-Domitia (UPVD)

b) Spain

Catalonia counts more than 1,050 degrees and masters and more than 236,000 university students. Its main universities are the following:

- The Catalan university system is the 3rd in Europe, only behind The Netherlands and Switzerland (The Times Higher Education, 2015).
- Three Catalan public universities (UAB, UPF & URV) are among the Top 50 universities under 50 years old in the world.
- The three best Catalan universities (UAB, UB & UPF) stand out in knowledge transfer and internationalization.
- UB & UPC are ranked 69 and 87 among the top 100 innovative universities in Europe (Reuters Top 100: Europe's Most Innovative Universities, 2018).

With a smaller population than most regions in Spain, the number of university students enrolled yearly in **Aragon** is close to 50,000. The University of Zaragoza is

the central element of the university system in Aragon with over 39,000 students, with campuses in Huesca, Teruel and Zaragoza, as well as five affiliated centres. In 2018, University of Zaragoza counted with 16 research institutes and centres, 170 Research groups, almost 3,000 researchers in research groups, 66 institutional and business Chairs, and 47 spin-offs and start-ups. According to the Shanghai Ranking of World Universities, it is among the top 500 in 27 knowledge fields.

Madrid counts 6 public universities: Alcalá, Autónoma, Carlos III, Complutense, Polytechnic and Rey Juan Carlos. The city homes also 8 private ones: Alfonso X el Sabio, Antonio de Nebrija, Camilo José Cela, European of Madrid, Francisco de Vitoria, CEU San Pablo, UDIMA and one of the Catholic Church, Pontificia Comillas. These institutions all together gather about 310,433 students, from Spain but also from America and Europe.

Located in the **Andalusian** territory there are ten Universities public and one private, and together they cover more than 250,000 students, around 17,000 teachers and 9,500 people who work as administration staff and services.

- Universidad de Almería
- Universidad de Cádiz
- Universidad de Córdoba
- Universidad de Granada
- Universidad de Huelva
- Universidad de Jaén
- Universidad de Málaga
- Universidad de Sevilla
- Universidad Internacional de Andalucía
- Universidad Pablo de Olavide
- Universidad Privada Loyola de Andalucía

The university system of **Andalucia** is quality, ranking among the 500 best institutions in 94 disciplines. Thus, in addition to Granada and Seville, the universities of Málaga

(9 disciplines), Córdoba (8), Pablo de Olavide (5), Cádiz (4), Almería (3) and Jaén (2) are in the ranking. The ten Andalusian universities offer their students more than 350 official master's degrees, behind the autonomous communities whose universities have the largest offer, Catalonia and Madrid. Finally, the leading agent of knowledge generation in Andalusia is the CSIC, which its 23 centres and more than 100 research groups, in which they carry out their activities about 1,400 people, with more than 900 doctors.

c) Portugal

Lisbon has three public universities. The region has also a polytechnical institute and some private universities. In the Lisbon region there are in total more than 135.000 students in higher and polytechnical education. "Universidade de Lisboa" is the biggest university in the country and ranks every year among the list of the best universities in the world (~150 in the world rank).

The most important schools in terms of energy education are:

- Faculdade de Ciências – Universidade de Lisboa
- Instituto Superior Técnico – Universidade de Lisboa
- Faculdade de Ciências e Tecnologia – Universidade Nova de Lisboa

For **Centre's** region, the Institutions of the region offering academic training in the scientific domain of energy are the following ones:

- University education:
 - University of Aveiro
 - University of Beira Interior
 - University of Coimbra
- Polytechnic education:
 - Polytechnic Institute of Castelo Branco
 - Polytechnic Institute of Coimbra

- Polytechnic Institute of Leiria
- Polytechnic Institute of Tomar
- Polytechnic Institute of Viseu
- Polytechnic of Guarda

V. Technological infrastructures and research centres at the service of business needs

a) Occitania

On the one hand, the main laboratories are listed below:

- Small teams (< 50 researchers):
 - Laboratoire Matériaux et Durabilité des Constructions – LMDC
 - Laboratoire d'Ingénierie des Systèmes Biologiques et des Procédés – LISBP
 - Centre Inter-universitaire de Recherche et d'Ingénierie des Matériaux – CIRIMAT
 - Institut d'Electronique et des Systèmes - IES
 - Laboratoire d'informatique, de robotique et de microélectronique de Montpellier – LIRMM
 - L'École nationale supérieure des mines d'Alès
 - L'École nationale supérieure des mines d'Albi-Carmaux
 - EPF Ecole d'Ingénieur-e-s
 - Laboratoire Génie de Production de l'École Nationale d'Ingénieurs de Tarbes – LGP
- Medium teams (between 50-100 researchers):
 - Laboratoire d'analyse et d'architecture des systèmes - LAAS
 - Institut de Recherche en Informatique de Toulouse - IRIT
- Large teams (> 150 researchers):
 - Laboratoire plasma et conversion d'énergie – LAPLACE

- Procédés, matériaux et énergie solaire - PROMES

On the other hand, the several technology platforms are the following ones:

- Toulouse :
 - Synergy Laas-CNRS (renewable energies, microgrid, smart energy management, living lab)
 - Pac AeroPile à combustible dans l'AERONautique (technologies H2)
- Perpignan :
 - CESP – UPVD – PROMES-CNRS (Solar energy)
 - Themis solaire innovation PROMES-CNRS (Solar Energies, Concentred Solar Power, Photovoltaic, Thermodynamic, Fluid Transfert, Energy Storage, Electrical and Thermal, BIP)
- Tarbes :
 - PRIMES : Platform for Research and Innovation on Mechatronics, Energy and Systems (power mechatronic, integration, etc....)

b) Spain

Aragon counts with numerous state-of-the-art technological infrastructures and research centres developed to address business needs. Some examples in the energy field are featured below:

- [Advanced Microscopy Laboratory \(AML\)](#): Represents a unique initiative at national and international level, bringing together electron microscopy and local probe techniques for atomic scale matter research.
- [Aula Dei Experimental Station](#): With the mission of providing the environmental sector with materials and technologies to increase its competitiveness and sustainability, based on knowledge of the processes involved in plant production.
- [CaesarAugusta Supercomputer](#): Part of the Spanish Supercomputing Network (RES), their activities include applied and technological research, technology transfer to industry and dissemination to society.
- [Canfranc Underground Laboratory \(LSC\)](#): Facility dedicated to research on the physics of astroparticles and innovations in observational subterranean

physics.

- [CIRCE's Energy Laboratories](#): CIRCE's infrastructures are at the forefront of technology in energy efficiency, renewable generation systems and electric grids, and are leading new solutions for electric vehicle charging at international level.
- [Institute of Carbochemistry](#): Develops its research activity mainly in the lines of energy, environment, chemical processes and related materials.
- [Pyrenean Institute of Ecology](#): Researching the changes occurring because of global change, which includes climate variability and human activities, and providing scientific basis for conservation and management.
- [Research Laboratory on Fluid Dynamics and Combustion Technologies \(LIFTEC\)](#): Dedicated to studying phenomena related to fluid mechanics with applications to energy and environmental issues, including experimental techniques.
- [Technological Institute of Aragón \(ITAINNOVA\)](#): Research centre and innovation agency, which also offers technological and consultancy services with the aim of promoting research, development and innovation applied to the business sector.
- [Zaragoza Climate Change Research Institute \(I2C2\)](#): Its mission is to develop scientific and technological research focused on climate change.
- [Zaragoza Centre for Advanced Scientific Modelling \(ZCAM\)](#): Promoting the development of research using computer simulation and theoretical modelling in interdisciplinary issues such as physics, chemistry, biology and technology.

Madrid hosts almost 5,000 research groups and more than 11,000 research projects. In the region, there is an important provision of science and technology parks, as well as an extensive network of clusters and transfer offices (OTRIs). All this eases the application of the research results of Madrid's universities.

The IMDEA (Madrid Institute of Advanced Studies) network has been set with the aim of satisfying social needs through R+D+I (Research, Development and Innovation) and passing them on to society. In its design, Public Administrations, universities, well-renowned scientists and companies have participated since its inception, at the initiative of the regional Government. This network is composed of seven areas:

- IMDEA Water
- IMDEA Food
- IMDEA Energy: The relevance of energy and its environmental impact led the Region of Madrid to create this IMDEA, which has become an important research institute in energy-related matters.
- IMDEA Materials
- IMDEA Nanoscience
- IMDEA Networks
- IMDEA Software

But the region has also other noteworthy organisms to support innovation:

- Madrid Institute of Research and Rural, Agrarian and Food Development (IMIDRA)
- Health Centers with an independent research management structure of the Government of the Region. In this regard, the 13 Foundations for Biomedical Research and the 9 Institutes for Health Research stand out.
- The Singular Scientific-Technical Infrastructures (ICTS) are large facilities equipped with resources, equipment and services, unique in their field of knowledge, and are dedicated to state-of-the-art research and technological development of the highest quality. In total in the region there are currently 9 ICTS (one of them devoted to the energy sector).
- 5 Scientific and Technological Parks, with different levels of development and integration in the regional innovation system.

In terms of scientific and technological infrastructures, **Andalusia** has 11 technological

parks, with more than 1,400 companies installed, 38,800 jobs and a turnover overall of more than 4,800 million euros. Likewise, there are technological centres, easing the exploitation of knowledge and bringing it closer to the productive sector, and foundations and centres of innovation and technology. There are also 8 Singular Scientific Technical Facilities (ICTS) located in Andalusia. To all this we must add the scientific-technological infrastructure and documentation present in public Universities such as central services of research or libraries. In particular, Almeria ([PSA – CIEMAT, www.psa.es](https://www.psa.es)) plays an important role in the region in the energy field. The Plataforma Solar de Almería (PSA), a dependency of the Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), is the largest concentrating solar technology research, development and test centre in Europe. Its research activities are inspired by several goals:

- Contribute to establishing a sustainable clean world energy supply.
- Contribute to the conservation of European energy resources and protection of its climate and environment.
- Promote the market introduction of solar thermal technologies and those derived from solar chemical processes.
- Tighten cooperation between business and scientific institutions in the field of research, development, demonstration and marketing of solar thermal technologies.
- Strengthen cost-reducing technological innovations contributing to increased market acceptance of solar thermal technologies.
- Promote North-South technological cooperation, especially in the Mediterranean Area.
- Assist industry in identifying solar thermal market opportunities.

Main research units are: Concentrating Solar Systems Unit, Thermal Storage & Solar Fuels Unit, Solar Desalination Unit and Solar Treatment of Water Unit

c) Portugal

The region of **Lisbon** has several high-level platforms and research centres that can respond to the business needs.

The main research labs with an important activity on energy are:

- LNEG – National laboratory for energy and geology
- LNEG – National laboratory for civil engineering
- CENIMAT– Universidade Nova Lisboa
- INESC – Institute for engineering and systems.
- Instituto Dom Luiz – Earth sciences research lab
- IN+ Center for Innovation, Technology and Policy Research
- IPFN – Institute of plasmas and nuclear fusion
- Wave Energy Group- IST/Universidade de Lisboa
- Center for Environmental and Sustainability Research – FCT/Universidade Nova Lisboa

In the **Centre's** region, the R&D Units developing research activities in scientific subjects related to energy are the following:

- CISE – Electromechatronic Systems Research Centre
- INESC Coimbra – Institute for Systems Engineering and Computers at Coimbra
- ISR – Institute of Systems and Robotics

There is also two others R&D centres and laboratories developing research activities in scientific domains related to energy:

- CBE – Biomass Centre for Energy (Solid Biofuels Laboratory)
- RAIZ – Forest and Paper Research Institute.

VI. Leading energy companies developing the technologies of future

a) Occitania

In the field of electrical energy systems, companies in Occitania that are developing future technologies are:

- GE grid
- EDF Renouvelables
- Engie green
- Arkolia energies
- SCLE SFE
- Snam
- Sirea
- Tecsol
- Enedis
- RTE

b) Spain

Aragon has seen the birth of many leading energy companies and centres that are currently developing the future of clean energy technologies and their applications.

- [Aragon Energy Cluster \(CLENAR\)](#): Aim at becoming a national and international reference, characterised by their offer of solutions to attend the whole value chain of the Aragonese energy sector.
- [Aula Dei Science and Technology Park \(PCTAD\)](#): Its focus is placed on agro-food, energy, environmental and biotechnological sectors.
- [CIRCE Foundation](#): Leading research centre with more than 25 years creating, developing and transferring innovative solutions and scientific-

technical knowledge to the business sector in the energy field.

- [Endesa Aragón](#): Leader in the Spanish electricity sector and a major operator in the natural gas sector, their core business is the generation, distribution and sale of electricity, as well as providing other energy-related services.
- [Enerland](#): Established in 2007 to be a leader in the international solar energy market, providing turnkey power plant solutions for its clients all over the world.
- [Foundation for the Development of New Hydrogen Technologies in Aragon](#): Working to promote the use of hydrogen as an energy vector, as well as to carry out its generation, storage and transport for application in fuel cells.
- [Forestalia](#): A business group dedicated to renewable energies (wind, PV and biomass), born in Zaragoza in 2011 and grown with a clear international vocation to achieve its current portfolio of 3.6 GW of renewable energies.
- [IASOL](#): Committed to sustainable development and solar power as clean energy sources, experienced in design, installation and maintenance of PV installations, low and medium voltage centres, and industrial processes and installations.
- [Recycling Technology Park](#): Experts in the transformation and production of new mono or multi material products, and the use of industrial and related waste to be converted into new materials or clean sources of energy.
- [SAMCA Group](#): Present in the sectors of renewable energies, plastic polymers, agro-food and logistics. They have several wind power farms with a total power capacity of 250 MWe, positioning them as a leading independent wind power producer.

- **Tervalis Group:** Beginning their journey in Teruel in 1986, they have the most extensive agricultural catalogue of biological fertilizers in Europe as well as alliances with key operators to develop wind power energy and biomass plants.
- **Taim Weser:** Very active in the energy sector, supplying solutions for the thermal industry and for the hydroelectrical sector, with expertise in combined cycles, biomass, alternative fuels and nuclear industries.

Madrid – By scientific-technological field of the RIS3, the highest number of companies is the one corresponding to ICT due to its transversely (more than 16 thousand companies), followed by energy, the environment and transport (more than 14 thousand companies).

Some of the leading energy companies with headquarters in the Region of Madrid are:

- Red Eléctrica de España
- Endesa Energía
- Elecnor
- Naturgy Iberia.

About the energy sector, **Andalusian's** companies that are worth to be mentioned are Abengoa, GPTech, Cobra, Isotrol, REE, Endesa, Iberdrola, Schneider and Naturgy. More specifically and about renewables, there are over 1000 companies operating in Andalusia. There are also several companies manufacturing renewable energy generation equipment, including solar-thermal harnessing elements and wind power generation equipment.

This has contributed to position Andalusia as the first Community in Spain in terms of electrical energy generated with biomass (installed power of 228 MW) and also in Concentrated Solar Power with an installed power of 1000,9 MW. In Photovoltaics, Andalusia has more than 900 MW installed and in Wind Energy more than 3.3 GW.

c) Portugal

The Portuguese largest electricity company EDP has its headquarters placed in **Lisbon**. EDP has a significant activity in technology innovation by itself and also has some activity in the support of small startups.

The highly innovative wind energy company Vestas has a subsidiary in Portugal that is based in Lisbon.

In Lisbon area there also several innovative startups such as GoParity, Finertec, LiveDrive and InnoWave.

Centre – At the national scale, Portugal has companies such as EDP Commercial, Endesa, Galp Power, Gold Energy, Iberdrola for example.

At the regional level, Centre's region count with Alfa Energia, Enat, Hen - Serviços Energéticos which are focusing their activity on the region.

VII. Global energy-related start-up ecosystem

a) Occitania

The Occitania Region benefits from a proven entrepreneurial dynamic that makes it the first French region on the rate of business creation and the 4th region in number of businesses created with more than 52,000 business creations in 2016.

The Region is a true business incubator. 8,400 start-ups are blooming in the territory. Nearly 10 million euros invested to create start-up cities in Montpellier and Toulouse. This is the first French region to have obtained the international label Fab Région for its assistance to the fablabs.

The goal of the Occitanie Region is to create two «Cities of the Start-ups», in Toulouse and in Montpellier, which will bring together the functions of business incubator, a

place of growth and friction for innovation and fablabs around the main regional actors.

Thus, the Region wishes to foster and structure an ecosystem dedicated to supporting these innovative start-ups in order to detect, support and accelerate startup projects.

Examples of start-ups in the energy sector:

- Kawantech
- Ilek
- Enosis
- Sereema
- Ze-Watt
- BioEnTech

b) Spain

Catalonia is a global start-up ecosystem concentrating more than 1,200 companies. Barcelona is the 5th start-up city in Europe according to renowned international rankings (EU-Startups and Startup Heatmap Europe). Several factors – density of start-ups, presence of incubators/accelerators as well as funding and talent available – explain the location in Catalonia of more than than 1,200 start-ups like Opendomo, iGrid, Idis, Nnergix, Ipsom, which work in the greentech area.

During the past years, **Aragon** has been working hard to foster a supportive start-up ecosystem, thanks to the development of supporting bodies and schemes oriented towards entrepreneurship and new business creation, such as the following:

- [Aragonese Agency for Research and Development Foundation \(ARAID\)](#): Non-profit institution, created in 2005 by the Government of Aragon, to promote R+D+i as a key factor in regional development and at the service of society.
- [Aragon Exterior](#): Foreign trade and investment promotion agency, helping Aragon-based businesses to expand their activity in international markets and

supporting overseas companies to establish and grow their business in the region.

- [European Centre for Enterprise and Innovation of Aragon \(CEEIARAGON\)](#): A leading business incubator whose mission is to support the creation of innovative ventures and advanced services that generate wealth in Aragon.
- [Institute of Development of Aragon \(IAF\)](#): Enhancing the socio-economic development of Aragon, favouring the increase and consolidation of employment, and preventing and correcting intraterritorial imbalances.
- [The Terminal](#): An innovative space for incubation and business acceleration of Zaragoza City Council, quickly becoming the main business accelerator in the Ebro Valley, and consolidating new business projects in the region.
- [Walqa Technology Park](#): Created with the aim of becoming a pole of innovation and R&D in Aragon, with a focus on the field of information technologies, biotechnology and renewable energy.

Additional associations are also supporting new business development and entrepreneurship in Aragon, such as the Confederation of Entrepreneurs of Aragon ([CEOE Aragon](#)), the Confederation of Small and Medium Enterprises ([CEPYME](#)), and the Innovation Provincial Commission of Zaragoza ([INZA](#)).

Madridtech is an initiative of the Region of **Madrid** which aims at supporting and consolidating the innovation ecosystem of Madrid, energizing it, connecting it and making it more collaborative. Madridtech has a special emphasis in three fields: the financing of innovation especially that originated in the best new companies with a scientific and technological base; the connection of large companies in the region with researchers, startups and SMEs of high innovative intensity; and in the support to entities engaged in the intermediation of innovation and technology transfer.

Andalucia – Main spin-off that has emerged in the field are GPTech, Ingelectus and Effergy. Currently, in general terms, there are 18 co-working spaces, 35 incubators,

12 accelerators, 14 start-up communities and 4 main investors groups (Angel investors, family offices and venture capital funds that invest in startups). Most of these incubators and accelerators are placed in the 11 regional technological parks, at least one in each Andalusian province.

Moreover, there are also some initiatives that are a joint effort between the regional government and big companies such as the Minerva entrepreneurship programme (with Vodafone) or Andalusia Open Future (with Telefónica). In parallel, the regional government has a wide network of entrepreneurship centres all over the region thanks to Andalusia Emprende, a public foundation with more than 250 entrepreneurship centers.

c) Portugal

Lisbon area is a high dynamic and entrepreneurship friendly region with the highest concentration of new businesses created in the country.

There are numerous infrastructures to support innovation and the creation of start-ups such as a few fab labs where start-ups can develop their technological ideas. The EDP fab lab dedicated to support innovation in the energy field, is especially noteworthy

Dozens of incubators are spread across the **Centre's** region to support entrepreneurs and companies. Through this mission, the aim is to catalyse the development of the region and the entrepreneurial community by providing qualified spaces, resources and services to companies, supporting entrepreneurs, transferring technology and fostering cooperation between companies, R&D institutions and other relevant actors.

Apart from the incubators, several associations and institutions are fully committed to the development of programs and services that support and manage innovation initiatives, leveraging the competitiveness of companies (in particular SMEs) and the

investment in R&D&I.

Some companies developing research activities related to energy, in the region, are:
AGMA, Ionseed, KLC - Kilometer Low Cost, Pavnext, SCUBIC, Sunaitec, etc...



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