
INNOVATION

Technology and progress

ACCIONA is committed to advanced technologies, developing business initiatives in the fields of the Internet of Things (IoT), mobility, Big Data, Advanced Analytics and digitisation, which place it at the forefront of innovation.

SMP 2015

Challenges	Advances
<ul style="list-style-type: none">■ Surpassing an innovation figure of 70 million euros, in line with the SMP 2015.	<ul style="list-style-type: none">■ Documented figure of 180.4 million euros in 2015.
<ul style="list-style-type: none">■ Designing the first large-scale additive manufacturing prototype for business application.	<ul style="list-style-type: none">■ Development of ACCIONA's first large-scale additive manufacturing machine, for which the prototype has been built.
<ul style="list-style-type: none">■ Finalising the technical validation of new wind turbine assembly systems and processes.	<ul style="list-style-type: none">■ Technical validation of new concrete tower manufacturing and wind turbine assembly systems, which make it possible to surpass the state of technology as regards the height of the towers, the cost of raising the wind turbine and logistics.
<ul style="list-style-type: none">■ Fostering the implementation of improvements in the Company's key processes to generate savings of at least 12 million euros.	<ul style="list-style-type: none">■ Achievement of savings of 26.2 million euros as a result of improvements to operational innovation processes.
<ul style="list-style-type: none">■ Executing pilot projects for the reduction of energy costs in water treatment plants.	<ul style="list-style-type: none">■ A peak power optimisation system has been successfully implemented at the Lorquí WWTP, which is expected to decrease energy costs. Furthermore, in August the execution of a pilot project at the Archena WWTP finalised, achieving a reduction of contracted power at the water treatment plant. In addition, with the hybridisation of renewable energies in the plant, it is expected that energy costs will be reduced by 30%.

»» The Company confirms its commitment to RDI, increasing the investment figure to 180 million euros in 2015

- ACCIONA has carried out the design and development of its first large-scale additive manufacturing prototype, which will make it possible to print elements on cementitious material, in a size that is appropriate for application to real scale construction
- The Company works together with entrepreneurs, start-ups and suppliers, making it easier for their innovations to reach the market thanks to the Group's purchasing policy. This initiative carried out in recent years has received the Comprendedor Award from the Fundación Empresa y Sociedad
- Improvements to the Company's operational innovation processes have brought about savings of 26.2 million euros

SMP 2020

2016 Challenges

- Maintain an innovation sales figure that exceeds the European average for the sectors in which ACCIONA is present, to preserve the Company's innovative leadership.
- Manufacture the first structural element with additive manufacturing.
- Create the new technological reality capture service via environment digitisation techniques to provide service to customers.
- Promote the implementation of improvements in the Company's key processes to generate savings of at least 15 million euros.
- Create new communication channels and improve the internal innovation platform Imagine.

Value creation through Technological Differentiation

ACCIONA maintains its firm commitment to innovation as the main tool for guaranteeing sustainability, competitive advantages and improving efficiency in all business units.

Every year, the Company challenges its innovative capacity with the aim of creating value in products and services through technological differentiation, anticipating its customers needs and requirements.

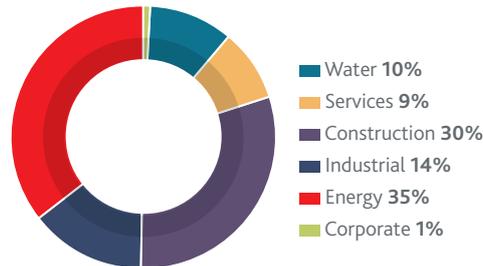
For this reason, the General Management of the Department of Innovation, Environment and Quality promotes the application of new generation technologies in business, deploying the opportunities they bring across the entire organisation, such as, for instance, new display technologies known as mixed reality (captured reality, augmented reality, virtual reality, 360° videos, etc.). Thanks to this drive, all of ACCIONA'S businesses already have proven experience with customers in Australia, Brazil and South Africa, and a new business line will soon be established.

Likewise, the Company continues to maintain its commitment to other advanced technologies. Having understood the progress being made in the fields of the Internet of Things (IoT), mobility, Big Data, Advanced Analytics and digitisation, business initiatives have been developed that put ACCIONA at the forefront of innovation. Furthermore, certain strategic agreements with world renowned universities and technological centres have been renewed and extended.

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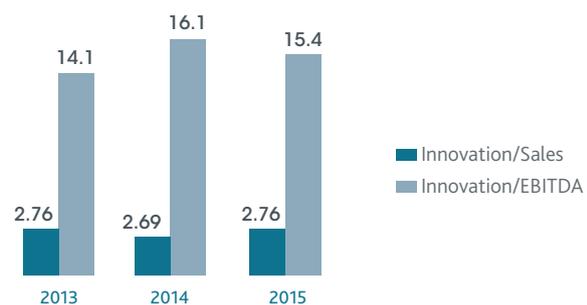
During 2015, 180.4 million euros was assigned to R&D&I in ACCIONA, which is around 3.14% more than the previous year, amounting to 876.4 million euros in the 2010-2015 period. This figure comfortably surpasses the goal of 500 million marked in the SMP 2015, and thus reflects ACCIONA's commitment to maintain itself at the vanguard of technology. In 2015, innovation was distributed according to the following percentages:

→ Innovation distribution figure by business line



During 2015, work has been carried out on 141 projects, of which 52 were developed in the Technological Centres, and the rest refer to innovation projects in the works, plants and installations.

→ Evolution of innovation intensity (%)



Innovation in ACCIONA, classified in the world rankings

ACCIONA stands out on the global scene as the 5th Spanish company and the 144th in Europe that makes most effort for the R&D&I figure, according to the report *2015 EU Industrial R&D Investment Scoreboard*, drafted by the European Commission's Economics of Industrial Research and Innovation (IRI).

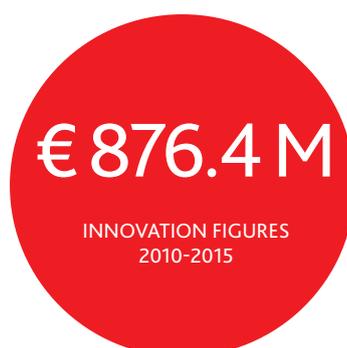
The Strategy& firm, strategy consultancy from PwC's, selects the 1,000 companies with the highest R&D&I figures and places them in a world innovation ranking. This ranking only features eight Spanish companies and ACCIONA ranks at 468, making it the 5th Spanish company. The evolution of the innovation figure and the commitment thereto is reflected in the following table:

	2008	2009	2010	2011	2012	2013	2014	2015	
R&D&I figure (M€)	71.3	92.2	88.1	93.6	166.2	173.2	174.9	180.4	
RANKING	EU	305	213	184	212	212	143	139	144
	SP	9	6	6	8	9	5	5	5
	Strategy&	-	-	541	626	620	461	447	468

R&D&I Management

ACCIONA works with documented methodologies that make it possible to structure, quantify and qualify its processes. Since 2013, the year in which the "Management of Innovation" Corporate Standard was approved, new procedures and instructions have been adapted and developed with the aim of aligning them with the Company's strategy.

ACCIONA's commitment to innovation was compensated in the 2nd monitoring audit carried out by AENOR during November 2015, where once again it was established that the R&D&I Management System complies with the requirements specified in regulation UNE166002:2014. In application of said standard, the Strategic Innovation Plans for each business unit have been reviewed and approved for a three-year period.



Technological and Competitive Observatory

The Technological and Competitive Observatory has adapted its strategy to the needs of its customers, improving the surveillance process with the incorporation of new monitoring services that complement the work carried out by the businesses in this field. This extension of services is the result of the new capacities

generated by new information gathering and semantic analysis tools, adapted to the cycle of technological surveillance. One should note the dissemination of periodical publications of a technological and strategic nature, the contents of which were reinforced through the development of workshops that bring technological trends closer to its businesses.

Some milestones of 2015

Increase in the number of internal customers compared to the previous year, with the number of reports made increasing by 16%.

Implementation of a new monitoring platform with semantic technology that makes it possible to increase the amount of data stored and improve the speed of analysis of large amounts of internal and external information, making it possible to optimise the technological and competitive surveillance process.

Internal dissemination via the technical and innovative weekly news publication (newsletter) and through a quarterly publication that covers the technological trends and progress made in different fields (Signals of Change).

Organisation of workshops targeted at employees from different businesses and profiles, where technological trends are analysed. The topics were: INDUSTRY 4.0, Robotics & Advanced Automation, Big Data, IoT-Handling.

Presence in international forums on strategic and competitive intelligence such as Strategic and Competitive Intelligence Professionals (SCIP).

Business innovation and internationalisation

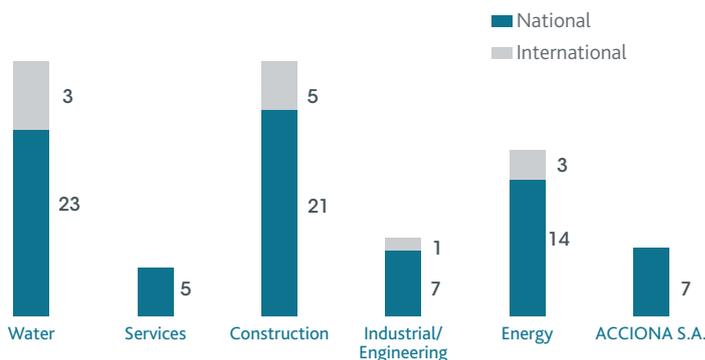
ACCIONA is involved in the creation of value through innovation, in compliance with its mission to be pioneers in development and sustainability, having reached in 2015 the highest figure in its history of innovation with 89 projects of this kind. With this premise, the Group carries out its activity providing innovative solutions in the development of its business, anticipating the needs of the customers and setting itself apart from the competition.

The figure relating to all business innovation activities, as certified and audited by external bodies during the year, amounted to 147.2 million euros, which represents more than 80% of ACCIONA's total R&D&I figure.

The portfolio of international business innovation projects rose to 12, with an associated figure of 82.6 million euros. The efforts to internationalise innovation in ACCIONA have translated into 45.8% of the total innovation of the ACCIONA Group now being carried out outside our country.

The portfolio of **international business innovation projects** rose to **12**, with an associated figure of **82.6 million euros**

→ Geographical breakdown of the number of business innovation projects in 2015



Innovation figure in 2015 (million euros)

	Innovation figure
Spain	97.8
Australia	0.8
Brazil	9.1
Colombia	8.8
South Africa	10.4
Mexico	37.7
Poland	5.6
UAE	0.3
Norway	9.9
Total	180.4

Continuous improvement of processes, greater efficiency in operations

During 2015, a verified figure of 26.2 million Euro was saved as a result of operational improvements to ACCIONA processes, exceeding the target of 12 million euros established for this financial year.

Of the 59 initiatives on which work has been carried out, the following especially stand out (broken down by business line):

Infrastructure

- Improvements in the building processes in national and international projects and implementation of R&D&I in works.
- Improvements in the co-digestion and deodorisation processes in WWTP.
- Integration of renewable energies (photovoltaic and wind) in water treatment plants, to reduce energy consumption.
- Energy efficiency initiatives for customers --, managing to optimise energy costs. Process re-engineering of integral logistics services in automotive plants.
- Implementation of new concepts of 3D review in the design phase for large EPC projects in industrial plants.

	Verified Savings (million euros)	Achievement%
Infrastructure	16.3	262%
Energy	7.9	158%
Other Businesses*	2.0	253%
ACCIONA Total	26.2	218%

(*) It includes Bestinver, Hijos de Antonio Barceló, Real Estate and Logistics and Transport.

Energy

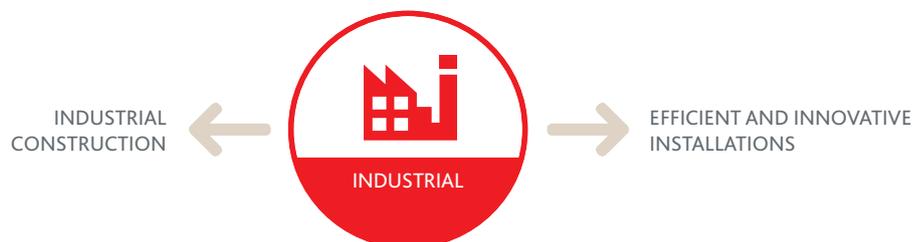
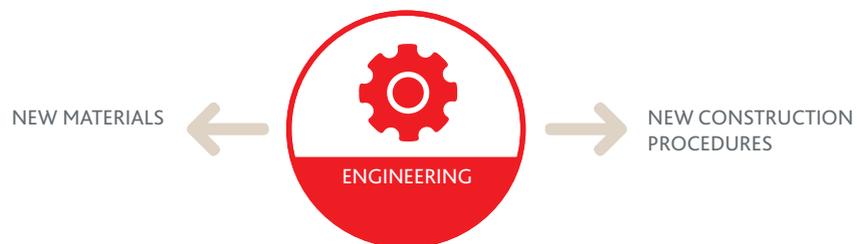
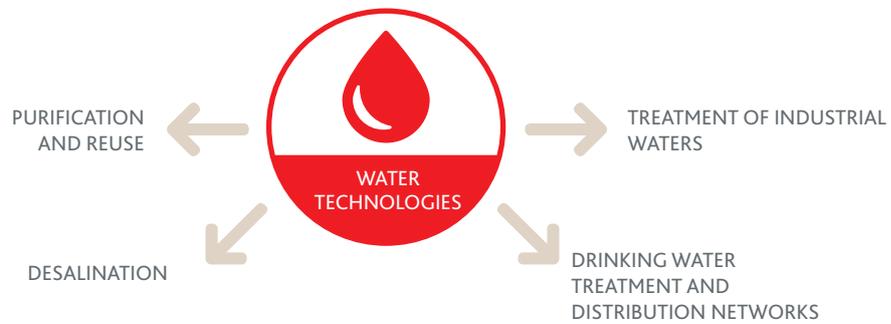
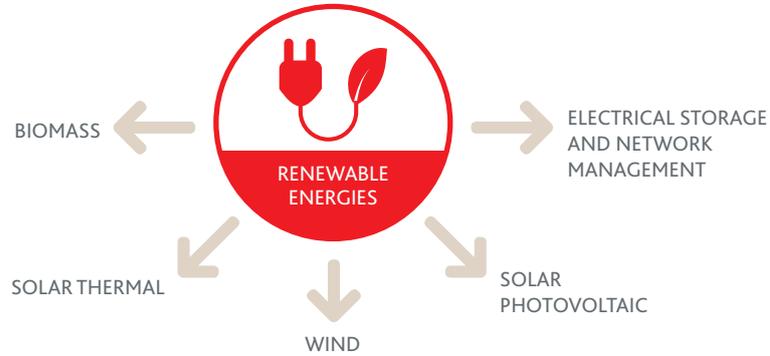
- In 2015, the CoE 1616 project was launched, with a view to reducing the cost of energy in the AW3000 range by a further 16% in addition to the 27% drop reached at the end of 2014. Some of the innovations that the new range incorporates to achieve this target have been protected by means of six patents that have been registered this year.

Other businesses

- At Trasmediterranea two ships have been painted with fluoropolymer coatings, reducing friction and therefore energy consumption and CO₂ emissions.
- Real Estate has improved its process of hiring professional services, relating it with the land's maximum buildable area.

In 2015 the figure saved as a result of operational improvements to processes was 26.2 million euros

STRATEGIC R&D&I LINES IN ACCIONA



Throughout the financial year numerous projects have taken place, including the following:

- **Continuation of the programme for reduction of the cost of energy (CoE) in wind turbines:** in the period 2013-2014, the goal to achieve a 20% drop in the cost of energy market was exceeded, reaching 27%. In 2015, the project was relaunched as CoE 1616 with the aim of reducing the cost of energy during the 2015-2016 period by a further 16% in addition to the already achieved reduction, maintaining the quality of the product and its features. This financial year it has been possible to achieve a reduction in the cost of energy of more than 9% compared to the target of 7%.
- **Configuration and launch of New Hybrid Energy Storage for Wind Integration (HYWINDESS):** this project aims to develop a demonstrator for a hybrid storage system (energy and power modules) with new converters and a control system incorporating advanced models of prediction in the Experimental Barasoain farm (Navarra, Spain). This project has already been awarded the Eurogia+ label, and is in the phase for approval on a national scale.
- **Implementation of the VETRA®DEC process:** this process allows a significant increase of the plant conversion (water catchment/water production), thus allowing for prior processes such as catchment and pre-treatment to be smaller in size, reducing both OPEX and CAPEX. For this reason, it has already been offered on two occasions at the SWRO plant in Namibia (for water supply to the uranium mines) and at the SWRO plant of the Petroperú Talara refinery.
- **Construction and operation of the anaerobic biological reactor pilot plant (OptiAnMBR):** during 2015, the pilot demo plant that will serve to optimise the process and validate the technology used has been designed, built and commissioned at the waste water treatment plant in Archena.
- **Development and application of display technology to projects:** a multiplatform display has been developed that allows instant remote access to virtual models of the works and installations, from any location and without the need to install additional software. In addition to 3D browsing, the display has different tools such as the section of models through cross sections and the measurement of elements, and also makes it possible to add comments, images, files, links and areas of interest that can be shared between the different users.

■ **Demonstration and validation of operating conditions of Microgrids in real scenarios at a building or neighbourhood level:** during 2015, a microgrid was installed in a building in Barcelona belonging to ACCIONA Service with the aim of supplying up to 60kWh/day. The results obtained during the validation that was carried

out this year in different scenarios, show that it is possible to reach an electric supply contribution of up to 40% of the building's consumption during the favourable days of radiation, while in the less favourable months 10% of the total necessary amount was reached. This project was developed in the Technological Construction Centre.

Sharing innovation

The Imagine platform is an innovation space in which all employees can share their innovative ideas and talents in order to generate new products, solutions and/or services that make ACCIONA a more dynamic, flexible and innovative organisation.

During 2015 different initiatives were undertaken, which were aimed at improving and encouraging all of ACCIONA to make the most of the Imagine initiative:

- Design of a new innovation methodology, the aim of which is to promote employee creativity, channelling their talents in order to achieve innovative solutions that provide an answer to the new and specific challenges faced by each business unit.
- Selection of a new online tool with greater functionalities that makes it possible to carry out expert analyses of the viability of ideas to ensure that they are correctly assessed and selected, giving them greater potential for becoming projects within ACCIONA.
- Design and integration of the innovation channel that will form part of the online tool.
- Design of a course with specific contents on issues of creativity and innovation to promote and stimulate the abilities of the Company's employees in these areas.

More than 200 employees from all of the business units attended and interacted with applications built using the latest technology at the Big Data conference

Technology Transfer

Technologically, 2015 has been characterised by the execution of projects of fast implementation, and has been focused on advanced display technologies, including the Captured Reality technology, which, following its use in the ACCIONA businesses, is being put at the disposal of customers.

With the aim of disseminating the technological capacities and the experiences gathered in the field of advanced display, different stands were presented within the Big Data conference held in the last quarter of the year, attended by more than 200 employees from all business units, who were able to find out about different projects carried out at ACCIONA, as well as having the chance to interact with applications built using the latest technology. The conference was attended by first class technology companies who specialise in Big Data and who are developing projects in different parts of the world in the field of Internet of Things (IoT), which showcase current perspectives and trends in data capture, storage, analysis and simulation.

HIGHLIGHTED PROJECTS:

- **Reality capture and digital terrain modelling with drones (UAVs) in B-40 (Barcelona):** via the use of drones, a topographic survey of the B-40 motorway in Barcelona was carried out, making it possible to validate this

technology and extend its use to other ACCIONA Construction works. The great potential of this technology can be found in its flexibility, precision, resolution, time savings, lower operating costs and safety in the workplace, which make it a very versatile tool for creating digital models of the terrain or carrying out the monitoring of projects.

- **First virtual reality for mobiles app. ACCIONA Experience:** this technology makes it possible to have immersive experiences via a mobile app that shows all of ACCIONA's flagship projects of recent years. This implies competitive differentiation and a new way of selling the ACCIONA brand and its technological capacity. This technique, implemented at the Department of Corporate Innovation, was used as a marketing and dissemination tool at the Asia Pacific Cities Summit & Mayors' Forum, Brazil Windpower 2015, Windaba 2015 South Africa and the EWEA 2015 Paris.
- **Immersive experiences with 360° videos:** committing to technologies that offer immersive experiences, during the "Fuegos del Apóstol 2015" show, ACCIONA Productions and Design put at the disposal of users a 4k quality 360° video, providing viewers with a chance to relive the live show from the Plaza del Obradoiro.

- **Reduction of electrical consumption costs by taking processes off grid in water treatment plants:** at the waste water treatment plant of Archena, it has been possible to take a 4.8 kW pump off-grid, thanks to the energy supply offered by 12 kW of photovoltaic panels, 72 kWh of batteries and a back up generator.
- **Integration of renewable energies in WWTP and WWPS and energy optimisation algorithms to reduce energy costs in water treatment plants (LIFE Renewat):** the "Renewat" project is framed within the European LIFE+ programme, with the aim of reducing energy consumption in a water treatment plant by means of the introduction of renewable energies. During 2015, an innovative hybrid renewable generation system was developed, combining 5kW of wind energy and 100kW of photovoltaic energy together with an energy accumulation system. The novel control system developed regulates and prioritises the renewable hybrid energy generation system. Since it was commissioned, a total of 63,260 kWh of renewable energy has been generated, which has avoided the emission of 41,119 kg of CO₂.

Technological Centres

Technological Centre of Madrid	Technological Centre of Pamplona	Technological Centre of Barcelona
<p>Aims to lead technological development in the areas of construction, transport and environmental infrastructures. Specifically, it focuses on the improvement of applications of new materials, and infrastructures for transport and mining and the improvement of processes.</p>	<p>Nucleus of the innovation activity for renewable energies where most of the strategic lines of research are developed: wind, solar photovoltaic and thermal, biomass, integration of renewable energies into the electricity grid, storage of energy and manufacture of wind turbines.</p>	<p>Develops and researches cutting edge solutions for the purification, desalination, drinking water treatment and management of distribution grids throughout the entire water cycle value chain.</p>

In addition, ACCIONA collaborates with the following Technological Centres: Spanish National Research Council (CSIC), Energy, Environmental and Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), National Renewable Energy Centre (CENER), Advanced Technology Centre for Renewable Energies of Andalusia (CTAER), Institute of Nanoscience and

Nanotechnology (CIN2), Advisory Board of the Universidad Carlos III de Madrid Business Forum, TECNALIA, Technological Center of Navarre of the Cetena Foundation (CEMITEC), Massachusetts Institute of Technology (MIT), Polytechnic University of Cantabria, Eduardo Torroja Construction Science Institute (IETcc), and the Polytechnic University of Catalonia, among others.

Strategic Agreements and Recognitions

ACCIONA has renewed and extended certain strategic agreements with world-renowned universities and technological centres.

RECOGNITIONS

- 14th Fundación Torres Quevedo award for Business Collaboration for the Company's relationship with the University of Cantabria (UC), which the Foundation forms part of. This award recognises
- ACCIONA's track record of working in collaboration with the research groups of this university.
- OBRA CEMEX Awards for the Development of the Industrial Works and Special Award for Innovation in Processes and Constructive Techniques.
- Eolo Award 2015 for rural wind energy integration awarded to the municipality of Falces, which has three wind farms owned by ACCIONA Energy.
- Comprendedor Award from the Fundación Empresa y Sociedad. The Company received the award as a result of its joint work with entrepreneurs, start-ups and suppliers, which makes it easier for its innovations to reach the market thanks to the Company's purchasing policy.