

INNOVATION

Collaboration and process improvement



ACCIONA realises that technology is developing more and more quickly, turning into a driver of sustainable development. Innovation is a key component in acquiring competitive advantage, creating a ripple effect by generating new business and improving existing business.

CHALLENGES 2016	PROGRESS IN 2016
Maintain an innovation over sales figure that exceeds the European average for the sectors in which ACCIONA is present.	Accreditation of an innovation figure of EUR 193.9 million in 2016 and sales reaching EUR 5.97 billion. This translates into an innovation intensity ratio of 3.2, higher than the European average.
Manufacture the first structural element with additive manufacturing.	Design, manufacture and construction of the first pedestrian bridge completed with additive manufacturing in the municipality of Alcobendas (collaboration between ACCIONA SA Engineering and third parties).
Create the new technological reality capture service via environment digitisation techniques to provide service to customers.	Approval of the technology and its applicability in January 2016. Transfer to ACCIONA Service, which will offer it as one more of its services from now on.
Promote the implementation of improvements in the company's key processes to generate savings of at least 15 million euros.	Savings of EUR 27.7 million for improvements in operational innovation processes, exceeding the planned target.
Create new communication channels and improve the internal innovation platform Imaginne.	Creation and launch of I'MNOVATION, the new communications channel. Completion of the technical configuration of the new collaborative innovation platform and the hardware usability and functionality test. Design and launch of a new e-learning course on creativity and innovation for employees.

CHALLENGES 2017



Maintain an innovation over sales figure that exceeds the European average, to preserve the ACCIONA's innovative leadership.



Develop a water treatment plant project where it is possible to create a support tool for its operation and maintenance using augmented reality.



Justification and completion of reporting for the financing provided by the European Investment Bank (EIB) for the 2013-2016 annual payments.



Improve ACCIONA's processes and generating savings of at least EUR 15 million.

HIGHLIGHTS IN 2016

» ACCIONA has developed a new collaborative innovation process. A pilot has been implemented in the Water division in a project aimed to eliminate organic matter in desalination plants

» ACCIONA has incorporated a new technology service at ACCIONA Facility Services involving the use of reality capture technology

Innovation as the primary tool for value creation

ACCIONA integrates innovation to its businesses as its main tool for gaining competitive advantage, concentrating on guaranteeing sustainability and creating added value for its products and services.

A new trend – the Internet of things or hyper-connectivity – started to become a reality after the development of the Internet of people. This trend, involving interconnection and communication of everyday objects with the Internet, is already a part of the company. It provides the basis for new digital designs that enable supercomputing, digitalisation of processes, *big data* and smart cities. This new paradigm has had a significant impact on ACCIONA, a company that designs, builds and operates infrastructures that people and businesses can use.

ACCIONA has developed and applied new technologies to create value for its clients in this area. For example, virtual reality (VR) is a technology that makes it possible for us to show our clients what an infrastructure will be like before it is completed, experiencing it as if it already physically existed.

Moreover, thanks to collaborative innovation some projects have been carried out providing clear competitive advantages for the company and demonstrating ACCIONA's commitment to advanced technologies.

ACCIONA funded an innovation figure of EUR 193.9 million in 2016, once again achieving a record high. This figure demonstrates the company's commitment to remaining at the forefront of technological innovation. The innovation figure can be broken down into the following percentages:

INNOVATION IN ACCIONA, CLASSIFIED IN WORLD RANKINGS

Efforts in innovation has enabled ACCIONA to maintain a leading position in the main rankings. The *2016 EU Industrial R&D Investment Scoreboard*, developed by the European Commission's Economics of Industrial Research and Innovation (IRI), ranks ACCIONA as the sixth leading Spanish company and 152nd in Europe in RDI investment efforts.

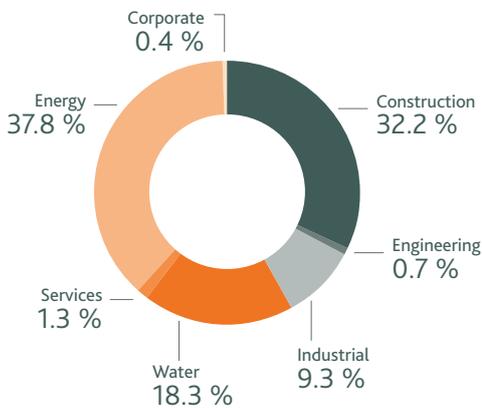
Furthermore, the *2016 Global Innovation 1000 Report*, -prepared by Strategy&, PwC's strategic consultants, the 1,000 companies with the highest investment in RDI worldwide-, cites ACCIONA as one of the seven Spanish companies in the ranking.

Innovation figure

		2012	2013	2014	2015	2016
R&D figure (EUR million)		166.2	173.2	174.9	180.4	193.9
	EU	212	143	139	144	152
Ranking	SPA	9	5	5	5	6
	Strategy&	620	461	447	468	*

* Not reported in the 2016 Global Innovation 1000 Report

Distribution of innovation figure by business line

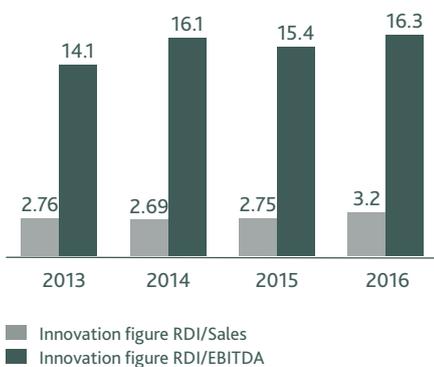


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Evolution of innovation intensity

(%)

The company's commitment to innovation is reflected in its innovation figure of EUR 193.9 million and its innovation intensity ratio of 3.2, higher than the European average (which is 1.2)*.



■ Innovation figure RDI/Sales
■ Innovation figure RDI/EBITDA

* Calculation derived from dividing the innovation figure by EUR 5,977.4 million in sales.

FIRST PEDESTRIAN BRIDGE IN THE WORLD MADE WITH A MICRO-CONCRETE 3D PRINTER. ALCOBENDAS (MADRID)

3D printing has made a significant impact on the production of construction elements, making it possible to produce complex geometrical elements without increased costs for the manufacture of moulds for small numbers of parts.

Development in this to date consists of the design of large scale 3D printing equipment (>1m³), material for printing (micro-concrete) and design and calculation procedures.

The bridge, which is 13 metres long and 1.75 metres wide, was built in eight pieces that were later assembled and installed in the Parque de Castilla-La Mancha, in the city of Alcobendas (Madrid).

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 has perpetuated the R&D&I Management System (SGIDi) under the UNE 166002:2014 guidelines. As part of the SGIDi, in 2016 the Satisfaction of Interested Parties innovation instruction was launched and the new Risk and Opportunity Management instruction was approved to evaluate the strengths and weaknesses of the activities developed by ACCIONA and to enable the implementation of measures.

As part of ongoing follow-up activities, Committees of Analysis and Evaluation of the Contribution of R&D&I to the Business were held in 2016 to review the proper progress of the Annual Innovation Plans and update the Strategic Plans for the coming years.

ACCIONA's continuous efforts and its commitment to innovation have been rewarded in the re-certification audit of the group performed by AENOR.

TECHNOLOGICAL AND COMPETITIVE OBSERVATORY

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

As part of the objective of compliance with the Innovation Corporate Standard, in 2016 the Observatory participated in the development of strategic innovation plans for the next few years. Equally, efforts to discover opportunities from the analysis of information generated in social networks and their possible application in specific lines of business were also undertaken.

DECISION-MAKING TOOLS. 2016 HIGHLIGHTS:

- **Support in decision-making.** From the push & pull perspective, areas of interest for various business units are addressed. New trends in technology are analysed, new stakeholders are identified and market niches and business models in line with ACCIONA strategy are studied. More than half of the documents produced by the Observatory are strategic for the company.
- **Consolidation of the external knowledge network.** As a result of collaboration agreements with international companies, agencies and universities, disruptive technologies for the various ACCIONA divisions have been identified and the capacity to analyse these technologies has been expanded.
- **Monitoring of the company's competitive environment.** Initial reports resulting from the monitoring process established by the Observatory last year have been distributed. The monitoring areas -agreed upon with the business units- address both technologies and markets, competitors and other stakeholders for ACCIONA.

Analysis of the information produced in **social networks** has made it possible to detect opportunities

Technology Centres and main fields of research

ACCIONA has three Technology Centres in Spain:

Technology Centre of Madrid

It 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, infrastructures for transport and mining, and the improvement of processes.

Technology Centre of Pamplona

It is the core of the innovation activity in renewable energies, where most of the strategic lines of research are developed: wind, solar photovoltaic and thermal electric, biomass, integration of renewable energies into the electricity grid, storage of energy and manufacture of wind turbines.

Technology Centre of Barcelona

This centre does research and development of cutting edge solutions for purification, desalination, drinking water treatment and management of distribution grids throughout the entire water cycle value chain.

Strategic R&D&I lines in ACCIONA's core businesses



INNOVATION IN BUSINESS AND INTERNATIONALISATION

The entire ACCIONA group is involved in the creation of value through innovation to satisfy its objective of maintaining a leading position in the development of sustainable solutions for major global challenges.

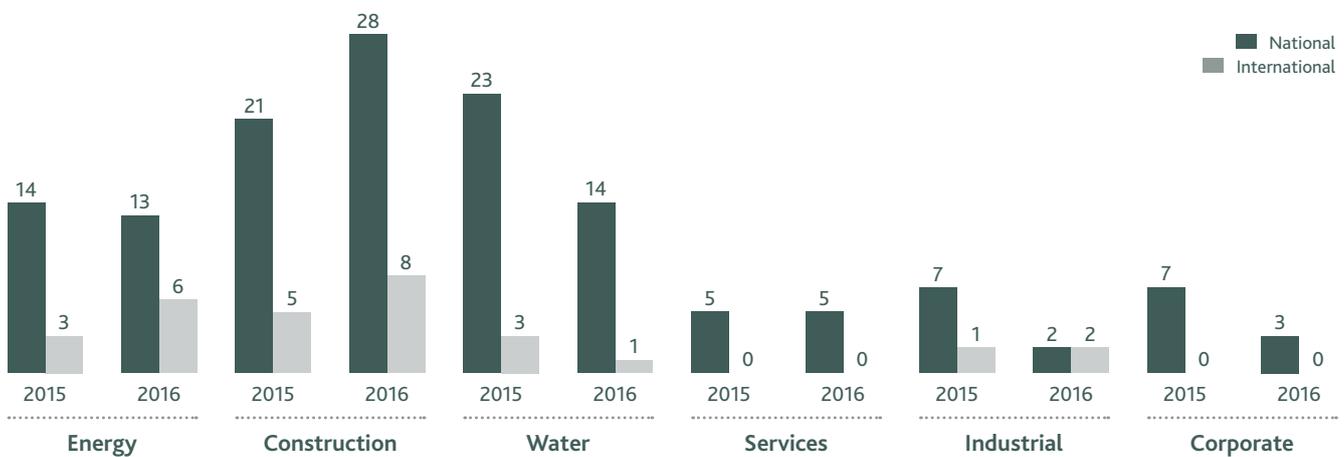
With this premise, the group carries out its activities by providing innovative solutions in the development of its businesses , anticipating the needs of the clients and differentiating itself from the competition.

The portfolio of international innovation projects rose to 17 with an associated figure of EUR 138.8 million in 2016. The efforts to internationalise innovation in ACCIONA have been successful, the international investment represents 71.8 % of the of the ACCIONA group innovation figure.

Innovation figure by country in 2016

	(€M)
Spain	55.2
Chile	33.3
Norway	28.5
United Arab Emirates	27.1
South Africa	25.8
Canada	10.6
Poland	7.4
Australia	3.5
North America	1.5
Brazil	1
Total	193.9

Geographical breakdown of innovation projects in 2016



CONTINUOUS IMPROVEMENT OF PROCESSES, GREATER EFFICIENCY IN OPERATIONS

During 2016, 87 process innovation initiatives have been recorded, resulting in a savings of EUR 27.7 million for process operational improvements (total verified figure).

These savings continue with the SMP 2020 target of reaching a figure of EUR 75 million in savings through improvements in group processes, at a rate of 15 million per year. The company has been incorporating this commitment to improve its processes since 2012.

Sharing innovation

The IMAGINNE platform is an innovation space where all employees can share their innovative ideas and talents for generating new products and solutions to make ACCIONA a more dynamic, flexible and innovative organisation. The technical configuration and the usability and functionality testing of the platform were completed in 2016. An innovation pilot programme was held with ACCIONA Agua to resolve a technical challenge (see more information in the ACCIONA Infrastructure's Commitment Section).

Furthermore, ACCIONA has promoted innovation by the creation of an *e-learning* course on Creativity and Innovation with 1,525 employees registered in 2016, making it possible for employees to increase their knowledge of both techniques and innovative methodologies and improve their skills and capabilities at both the individual and team level.

TECHNOLOGY TRANSFER

During 2016 ACCIONA focused on Technology Transfer projects aimed at the application of digital technologies that cross business sectors and apply to all its businesses. To this end, projects completed in the Technology Transfer Area were structured around four cross-disciplinary areas of activity:

- **Mixed Reality Area:** centred on providing tools based on the convergence of the digital world with the physical world that increase our skills, including all initiatives that use reality capture, virtual reality and augmented reality technologies.

	Verified Savings (€M)	Achievement (%)
Energy	5.3	107 %
Infrastructure*	22.3	148 %
Real Estate	0.053	133 %
ACCIONA Total	27.7	138 %

* Including Construction, Concessions, Water, Services and Industrial.

I'MNOVATION

The launch of the public website I'MNOVATION aimed at reinforcing ACCIONA's brand image as a company that drives innovation, while also bringing the latest technological news to the public about energy, construction, water, science and technology, digital transformation and society. In addition, it disseminates and showcases ACCIONA's highly innovative projects through information shared on current technological, industrial and social matters.

- **Industry 4.0 Area:** based on the use of technologies that allow interrelation between any object (Internet of Things) and any worker (Connected Worker) at any time, place and phase of the production process to improve productivity and reduce production processing costs.
- **Process Digitalisation Area:** incorporates digitalisation and industrial automation technologies into processes, allowing ACCIONA to increase productivity in these areas or to facilitate the execution of certain elements in a non-traditional way. This area includes large-scale additive manufacturing technologies

and automated data capturing systems, as well as process and machinery sensors to increase productivity and efficiency.

- **Sustainable Innovation Area:** addresses all innovative technologies, services and models to improve the way in which current social issues –such as demographic change, the financial crisis and environmental degradation– are dealt with using environmentally sustainable technology.

INFORMATIVE EVENTS

Two cross-sector events related to these areas were organised in 2016 in order to display digital technology and its applicability in specific areas of business:

From physical to digital: an event to present ACCIONA's reality capture initiating the new Reality Capture business line developed by ACCIONA Facility Services and sharing the most characteristic experiences, such as the building on Calle Albarracín (Madrid), captured, modelled in Building Information Modelling (BIM) and presented in virtual reality for ACCIONA Inmobiliaria .

Seminar with French suppliers and the French Embassy: ACCIONA's Technology Transfer Department held a demonstration of its Reality Capture projects and a presentation of the possibilities of large scale 3D printing in ACCIONA's businesses.

STRATEGIC PARTNERSHIPS AND ACKNOWLEDGEMENTS

ACCIONA has renewed and extended certain strategic agreements with world-renowned universities and technological centres. Among the main agreements, the following should be noted: Consejo Superior de Investigaciones Científicas (CSIC), Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), Centro Nacional de Energías Renovables (CENER), Centro Tecnológico Avanzado de Energías Renovables de Andalucía (CTAER), Centro de Nanociencia y Nanotecnología (CIN2), Consejo Asesor del Foro de Empresas de la Universidad Carlos III de Madrid, TECNALIA, Centro Tecnológico de Navarra de la Fundación Cetena (CEMITEC), Massachusetts Institute of Technology (MIT), Universidad Politécnica de Cantabria, Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc) and Universidad Politécnica de Catalunya, among others.

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Acknowledgements

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- JEC International World 2016 Innovation Award for the Valencia Composite Material Lighthouse.
- Global Water Intelligence Award to the best desalination company.
- Banco Interamericano de Desarrollo Infraestructuras 360° Award for the Atotonilco WWTP in recognition of the comprehensive implementation of a sustainability strategy.
- XII Scientific Merit Award from the Board of Chemists of Asturias and León.
- B-IWA Award for Best Research: *From the affinity constant to the half-saturation index: Understanding conventional modelling concepts in novel waste water treatment processes.*
- WATINTECH project prize in the Salón iWater of Barcelona for Best Research 2016.
- iAGUA Awards:
 - Best Video: Construction of the Chira submarine outfall.
 - Best technological solution for the GOTA project.
- Best Renewable Energy Project of 2016 Award for the Bokpoort Thermosolar CSP plant, awarded by the South African National Energy Association (SANEA).