
INNOVATION

A challenging future

At ACCIONA, innovation is the tool which allows us to be more efficient, create new business opportunities and lead the market.

2014

Challenges	Advances
<ul style="list-style-type: none">■ Exceed the innovation figure of 70 million euros, in line with the SMP 2015.	<ul style="list-style-type: none">■ Documented figure of 174.9 million euros in 2014.
<ul style="list-style-type: none">■ Boost innovation capacity of suppliers.	<ul style="list-style-type: none">■ The first prototype of caissons made of composite materials was used in the expansion project of the cruise ship pier at Puerto del Rosario.
<ul style="list-style-type: none">■ Foster Spanish and European initiatives related to innovative public procurement.	<ul style="list-style-type: none">■ Various proposals for innovative projects were drawn up and meetings held to ascertain the needs of this mechanism's potential customers, both internal and external, and the roadmap to be followed. Potential customers include the Ministry of Economy and Competition (MINECO) and Local Governments.
<ul style="list-style-type: none">■ Consolidate the IMAGINNE platform by implementing contributions received via social media and feedback from participants.	<ul style="list-style-type: none">■ Over 2,300 users and 1,400 ideas. Specific CHALLENGES proposed in collaboration with the businesses.
<ul style="list-style-type: none">■ Encourage implementation of improvements to key Company processes to generate savings of at least 12 million euros.	<ul style="list-style-type: none">■ Savings from process improvements amounting to 34.4 million euros. Amount verified by an independent company.
<ul style="list-style-type: none">■ Implement "Managing Innovation" corporate regulations, and adapt monitoring tools.	<ul style="list-style-type: none">■ Corporate regulations implemented and successful audit of the R&D and Innovation management system carried out in November. The management system now adheres to the new UNE 166002:2014 standard approved in May 2014.
<ul style="list-style-type: none">■ Complete review and redefinition of business innovation Master Plans.	<ul style="list-style-type: none">■ Master Plans for Energy, Water, Construction and Industrial defined, in collaboration with business heads, R&D and Innovation and senior management.



ACCIONA ranks seventh in Europe for innovation intensity thanks to the certified 174.9 million euros invested in R&D and innovation activity resulting in:

- 25% reduction in the cost of energy of its AW3000 wind turbine
- New assembly processes for wind turbines and wind turbine towers
- European Business Award for the Environment in the 'Product and/or service for sustainable development' category for the use of composites

2015

Challenges

- Commitment to invest over 70 million euros in innovation in 2015 in line with the SMP 2010-2015, previous years' results and the plan submitted to the European Investment Bank.
- Design first large-scale additive manufacturing prototype to be applied across the business.
- Conclude technical validation of our new wind turbine assembly systems and processes.
- Encourage implementation of improvements to key Company processes to generate savings of at least 12 million euros.
- Carry out pilot projects to reduce energy costs at water treatment plants.

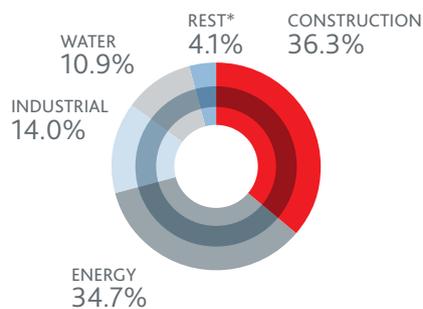
Innovation in order to progress

At ACCIONA, innovation is the main driver of development and key to our growth. That is why our innovation projects are designed to bolster our competitive advantage in all our divisions and offer our customers advanced solutions. Innovation at ACCIONA focuses on improving efficiency, reducing costs and offering added value to projects, thereby putting us ahead of our peers. In short, we assume Innovation challenges and turn them into business opportunities.

ACCIONA is also committed to disruptive technologies and has entered into strategic alliances with various globally-renowned universities and technology centers. A good example of this is, *inter alia*, the addition of modern visualization techniques in our different businesses, the use of nanomaterials, and large-scale additive manufacturing.

In 2014, ACCIONA earmarked 174.9 million euros for R&D and Innovation which is above the figure for 2013. This was allocated as follows:

→ Distribution of R&D and innovation by line of business



* Includes ACCIONA S.A. and other businesses (EROM and Trasmediterranea).

We worked on 225 projects, 105 of which were developed at technology centers while the remainder were innovation projects for works, plants and facilities.

Regarding financing, innovation coverage in the year totaled 240 million euros, up on 2013. This was largely thanks to European programs and ACCIONA's new Innovation program for 2013-2016. Half of these projects were financed through a

120 million euro loan from the European Investment Bank (EIB) which was signed in February 2014.

Against this backdrop, in 2014 the Company continued to justify the investments for 2013-2014, reaching an amount certified by external entities of 148.4 million euros, well in excess of the 50% it needs to justify every two years.

In 2014, the Company began the projects awarded in 2013 under the EU's H2020 Program and was awarded others. ACCIONA was awarded 23 projects in collaboration with some 400 partners, with a budget of 15.3 million euros for the coming years.

R&D AND INNOVATION MANAGEMENT

ACCIONA continued improving its R&D and Innovation management system, adding to the updates made in previous years and remaining alert to other potential improvements to help optimize the system. This enabled the Company to swiftly adapt its system to the updated UNE 166.002 standard which was published in May 2014.

During the year the strategic plans for all Businesses (Energy, Water, Construction and Industrial) were defined and approved.

The respective business heads, R&D and Innovation and Senior Management were involved in this process, underscoring the Company's commitment and that of senior management for Innovation focused on its Businesses, as a lever for future growth.

ACCIONA's ceaseless efforts were rewarded in the first audit carried out by AENOR in November, which concluded that the Company's R&D and Innovation management system is correct and meets the new standard's requirements. This was duly noted in the external audit report.



ACCIONA's position in the main innovation rankings remains solid.

ACCIONA is the fifth ranking Spanish company and the 139th European company in *The 2014 EU Industrial R&D Investment Scoreboard* report carried out by the EC's Economics of Industrial Research and Innovation according to R&D and Innovation investment, an improvement on the previous year.

The world innovation ranking of global consulting firm Strategy&, which selects 1,000 stock market-listed companies with the highest R&D and Innovation figure, ranks ACCIONA at 447, up 14 positions on the previous year.

	2008	2009	2010	2011	2012	2013	2014	
R&D and Innovation in 2014:	71.3	92.2	88.1	93.6	166.2	173.2	174.9	
RANKING	EU	305	213	184	212	212	143	139
	ESP	9	6	6	8	9	5	5
	Strategy&			541	626	620	461	447

Analysis unit: Technology and Competitiveness Observatory

In 2014, the Technology and Competitiveness Observatory worked on the following:

- **Support in decision making.** Using a push & pull approach, issues of interest are explored, such as new technology trends, new competitors or the opening of new market niches which are aligned with ACCIONA's strategy.
- **Consolidation of the external knowledge network.** This is the result of collaboration agreements entered into with international companies, bodies and universities, whereby all ACCIONA divisions have been apprised of disruptive technologies or have looked at how these can be applied within the business area.
- **Research and analysis.** Continuous improvement of analytical processes, conclusion drawing and dissemination of the results.

2014 milestones

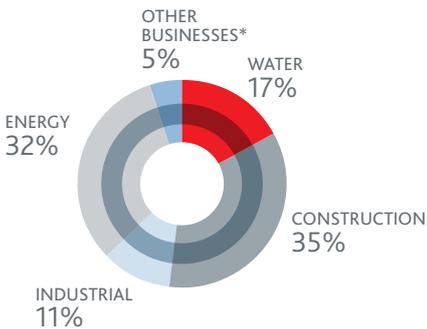
- The Technology and Competitiveness Observatory (T&CO) participated in drawing up Innovation strategic plans by carrying out a study of state-of-the-art and consistency analysis in the various business lines.
- The Observatory is well established as a support tool in the decision-making process. Nearly 66% of all requests come from senior management.
- Internal dissemination: In addition to the reports and periodical publications issued, the T&CO organized three workshops and two seminars on various issues of interest to ACCIONA to assess the possibilities of applying disruptive technologies across the Company.
- Over 8,000 employees receive a weekly newsletter which is a key means for raising awareness of technology and innovation.
- *Signals of Change*: This quarterly document is sent to 3,000 executives and managers to alert them to groundbreaking technology which could affect the businesses in the short term.

BUSINESS INNOVATION AND INTERNATIONAL EXPANSION

Innovation is present in the majority of the countries where ACCIONA is present, resulting in a pipeline with 15 international projects amounting to 40.7 million euros. Thanks to ACCIONA's efforts, innovation outside Spain accounts for 23% of the Group's total today.

In 2014, projects were undertaken in numerous countries including Australia, Brazil, USA, Mexico, Colombia, Morocco and Turkey. This allowed the Group to assess the results of these activities with a view to generating new opportunities and incorporating these results in other projects and businesses.

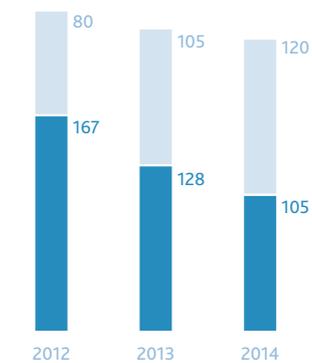
→ Business innovation by business line in 2014 (%)



Thanks to ACCIONA's efforts, innovation outside of Spain accounts for **23% of the Group's total today.**

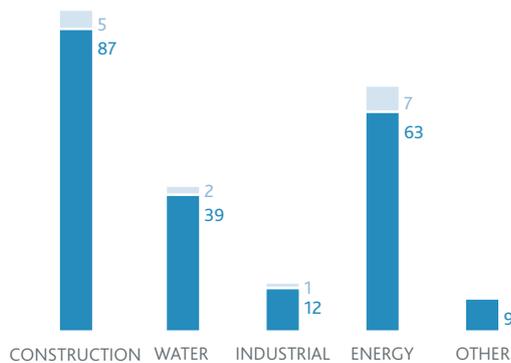
*ACCIONA SA, Trasmediterranea and EROM are considered Other Businesses.

→ Pipeline (no. projects)



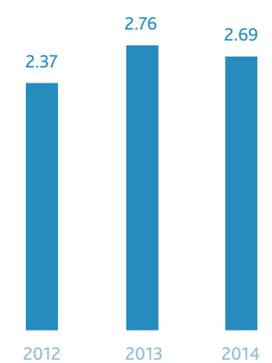
■ RESEARCH PROJECTS
■ BUSINESS INNOVATION

→ Geographical breakdown of innovation projects 2014



■ SPAIN
■ INTERNATIONAL

→ Innovation intensity (%)



■ INNOVATION/SALES

EFFICIENCY IN OPERATIONS, ENHANCING PROCESSES

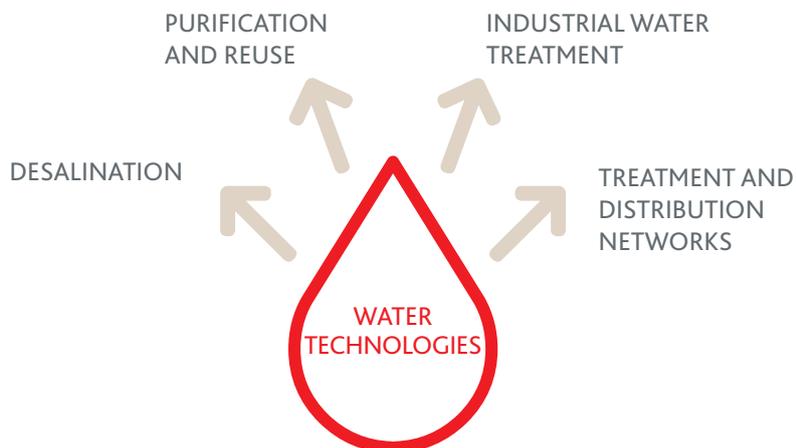
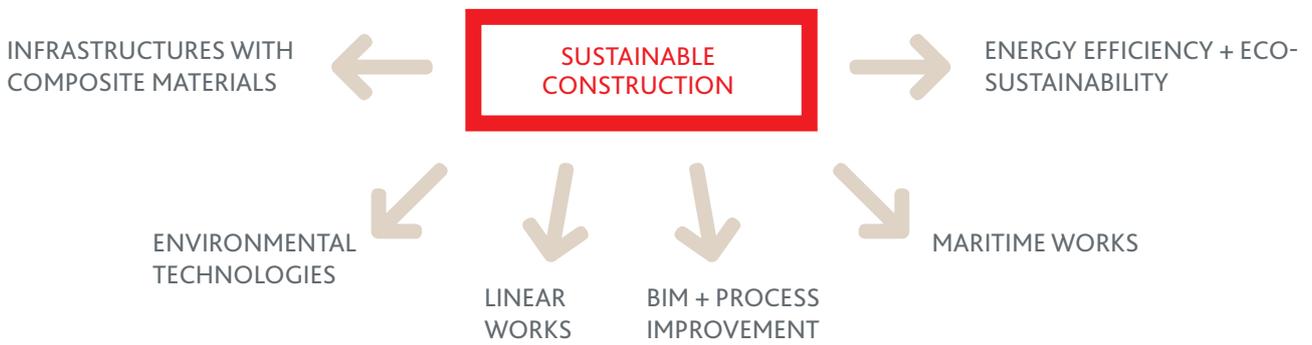
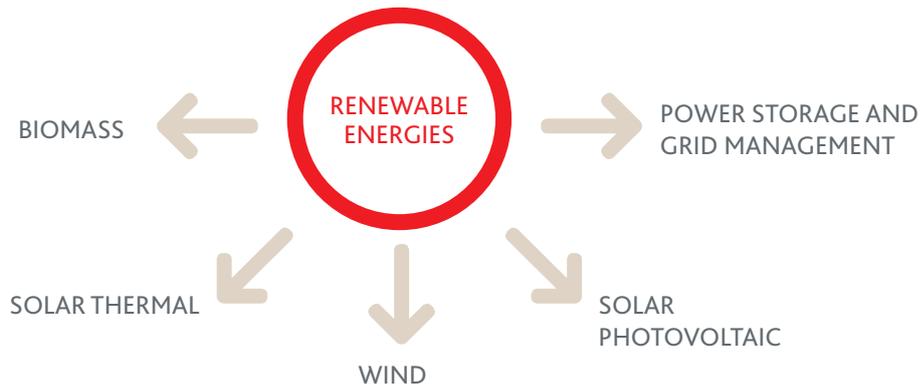
Improving efficiency in operations is one of ACCIONA's long-term goals, as set out in its 2015 Sustainability Master Plan. 286% above the 2014 target of 12 million euros.

In 2014, ACCIONA invested 34.4 million euros on improving certain processes, 20.3 million euros more than in 2013. This is Cumulative savings for the 2012-2014 period totaled 60 million euros, well in excess of the 36 million euros target set for 2012-2015.

The most noteworthy process improvements in 2014 were:

<p>ACCIONA Agua: Improvement of the pre-treatment phase at desalination plants</p>	<p>Thanks to the introduction of an in-house optimized Dissolved Air Flotation system (DAF) in the pre-treatment phase which removes floating particulates and seaweed, economic savings amounting to 1.6 million euros were obtained.</p>
<p>ACCIONA Service: Heat recovered in a combined cycle plant can be used in the manufacturing process for an important customer in the automotive sector</p>	<p>A project to improve energy efficiency at the combined cycle plant was developed which saw a bypass fitted to the exhaust smoke stack. The recovered heat is used to supply the factory's process heating. Energy saving: 25,723 MWh/year</p>
<p>ACCIONA Construcción Chile: Construction of ventilation tunnels at the Chuquicamata mine</p>	<p>Strengthening work: using synthetic fiber the work cycles were streamlined and the execution period reduced without affecting the bearing capacity. This meant savings of 5% of the cost per cubic meter of shotcrete (sprayed concrete) as the amount used was optimized, giving greater early resistance.</p>
<p>ACCIONA Energy: COE optimization</p>	<p>ACCIONA Windpower obtained savings equivalent to 18.7 million euros through COE (cost of energy) optimization. Savings were made in the design, manufacturing and assembly costs (investment costs for the customer) and the operation and maintenance of the AW3000 wind turbines, resulting in increased output thanks to improvements made to the process of extracting the kinetic power from the wind as well as improving the reliability and availability of the power.</p>
<p>Other businesses: Automation of business support processes</p>	<p>Automated expenses management at Hijos de Antonio Barceló: using a photo sent from a smartphone of each expenditure the main variables of the document are identified via an interface, and then automatically included in the Company's enterprise resource planning (ERP). ACCIONA Trasmediterranea automated its invoicing process, resulting in less time spent on this process and freeing up time for other tasks thereby eliminating non-value generating activities. As all movements can now be easily tracked, it is possible to identify bottlenecks in the process as well as tasks in progress.</p>

KEY R&D AND INNOVATION LINES AT ACCIONA



ACCIONA, through its company EROM, has designed a new set of wind turbine maintenance tools that result in longer operating lifetime, increased efficiency and employee security

Key projects carried out during the year include:

- In order to reduce the cost of energy (COE) of its AW3000 wind turbine by 20% by the end of 2014, in November 2012 ACCIONA Windpower launched the COE 20/14 project, seeking to become one of the market's most competitive products.

By 2014, it had cut the COE by 25%, amply exceeding its target.

- In 2014, the Company launched the CSP-Efficiency project to improve efficiency and increase daily output. In conjunction with GE, the turbine manufacturer, the first stage of this project has seen daily start-up times at CSPs cut by 10 minutes, resulting in a huge impact on efficiency and output at the Majadas and Palma del Río 1 and 2 CSPs, all of which have 50 MW nameplate capacity.
- The SMARTWATER 4 EUROPE project, *Demonstration of integrated smart water supply solutions at 4 sites across Europe*, aims to develop a network platform (hardware and software) to monitor

the control and automated operation of infrastructures in the core water grid supplying urban areas, to allow for predictive maintenance in order to reduce consumption and optimize the efficiency of infrastructures.

- ACCIONA Agua's R&D and Innovation Center has constructed and operated the pilot plant of the ULTRADAF® system which will operate the pre-treatment system at the Al Jubail desalination plant in Saudi Arabia. This pilot plant will showcase the process to the customer and help specify the plant's final operating parameters.
- The Technology Center has developed the integration of a standalone hybrid system for power output, storage and use at ACCIONA's Facility Services building in Barcelona as part of the EU's ARROWHEAD project.
- ACCIONA, through its company EROM (operation and maintenance of renewable energies) has designed a new set of wind turbine maintenance tools. These tools will help increase the wind turbine's life and improve the efficiency and safety of

the operative carrying out operation and maintenance tasks.

- An automated thermographic inspection of the photovoltaic panels at the Sishen PV plant in South Africa is being carried out. The aerial images are then processed and any faults classified.
- Big-data – SHARP Project: This system builds on decision-making experiences, to maximize output and minimize manufacturing and operating costs. It also analyzes the performance of wind turbines to detect any deviations from the norm and can predict future faults based on trends and optimizes O&M operations etc. In the first phase of the pilot, 100 wind turbines with 100 variables were added.
- The initial results of the APSE Project were released. These show that it is possible to incorporate waste materials from construction, demolition and recycled materials from road milling to be used as support materials to construct layers as per regulatory requirements. Work was also carried out to ascertain the optimum measurement of SBS and NFU-modified bitumen to give a high modulus bitumen

RENEWAT: Optimized renewable mix to save energy at WWTPs

This project intends to reduce energy consumption by 30% at the waste water treatment plants

The Technology Transfer area and ACCIONA Agua were awarded the LIFE "RENEWAT" project which intends to reduce energy consumption at a waste water treatment plant by using renewable energy sources.

The Archena plant in Murcia produces 7,500 m³ of treated water a day, with annual energy consumption of 1,322 MWh. This consumption generates a high level of CO₂ emissions and a high distribution cost of the treated water. Therefore an innovative hybrid renewable generation system will be developed, combining photovoltaic and small-scale wind sources along with a power storage system, intended to cut consumption from the grid by 10%.

In the water treatment system efficiency in the ventilation phase will be improved, representing 80% of total energy consumption. This process aims to provide the optimum energy mix for the biological treatment by working on processes and equipment, cutting energy consumption from the grid by 20%. The innovation aspect of this process involves designing a control system to regulate and prioritize the hybrid renewable energy generation system so that the plant can manage its energy input.

mix (around 11,000 MPa) whose price and mechanical properties are competitive.

- ACCIONA has developed a construction solution using composite materials which allows lighthouses to be built quicker and in an environmentally friendly manner. As a result, building time has been cut by 40% and pollution reduced by a fifth. ACCIONA first used this system to construct the new lighthouse in Valencia which was installed in February 2015.
- The VETRA® Project (Treating desalination waste using reverse osmosis) entails developing a process to treat washed pre-treatment waste at sea water desalination plants using membrane technology. The clean water obtained from treating the waste can be reused in the main process while the dry sludge is treated as end waste.
- The LIFE+ "BRAINYMEM" Project will apply advanced control systems to water treatment plants to reduce energy consumption and slash greenhouse gas emissions. ACCIONA Agua's waste water treatment plant in Almuñécar (Granada) has been chosen for the pilot.

IMAGINNE, AN INNOVATION SPACE

This internal platform has been improved and is used to support the Business when it needs to compile ideas from other areas within the whole ACCIONA Group.

Various promising ideas and challenges were introduced in 2014, including:

- COE 25/14
Capturing ideas for AWP to save on the cost of energy of its wind turbines. This challenge was launched in June and July.
- Additive manufacturing for ACCIONA Agua.
Ideas for the additive manufacturing of certain items were chosen based on their originality, level of development and applicability.
- Advanced visualization techniques for applications at ACCIONA
The ideas challenge was launched in June for advanced visualization techniques for applications at ACCIONA. The "Assistance in workshop production" idea was chosen as the winner based on the criteria of applicability, originality and level of development.

■ "1 idea = 1 tree"

This challenge entailed planting one tree for every idea received in 2014. A total of 380 trees were planted thanks to the ideas received from Imagine users.

TECHNOLOGY TRANSFER

During 2014, the Technology Transfer area particularly focused on identifying synergies between the various business units to leverage the Company's know how and its suppliers so as to set itself apart from the competition. Two technology transfer sessions were therefore set up covering "Intellectual property" and "Composite materials for constructing maritime works" and aimed at stakeholder groups which were defined in conjunction with the businesses. Two seminars were also offered with an external additive manufacturing agent.

In order to offer its customers a fully innovative and unique service, ACCIONA encouraged collaboration agreements between Group companies for common interest issues which may have a favorable impact.

EXTERNAL PARTICIPATION AND COLLABORATIONS IN 2014

ACCIONA belongs to the Universidad Carlos III de Madrid Business Forum, which comprises senior representatives from nine private companies. The forum promotes research projects, practices at companies, new university Chairs and supports the university's EMPRENDE program.

The Company also collaborates with the following technology centers: Spain's Higher Council for Scientific Research (CSIC), Energy, Environmental and Technological Research Center (CIEMAT), National Renewable Energy Institute (CENER), Renewable Energies Advanced Technological Center 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.

ACCIONA belongs to the **Alianza por la Investigación y la Innovación Energéticas (ALINNE)** to tackle challenges faced by the energy sector

ACCIONA, European Business Award for the Environment

In the summer of 2014, ACCIONA successfully launched and anchored the caissons made of composite materials designed to extend the cruise ship pier at Puerto del Rosario, in Fuerteventura. For this project ACCIONA opted for a groundbreaking technique using composite materials to construct large cylindrical caissons which were assembled at the dockside before being launched, towed and anchored at the final site.

Thanks to the collaboration between ACCIONA Construcción, ACCIONA Industrial and the industrial supplier which specializes in manufacturing composite materials, this new product is now available that can be used for port works. Composites are versatile, lightweight, durable and environmentally friendly and have resulted in ACCIONA receiving the *European Business Award for the Environment* (Spanish section) in the *Product and/or service for sustainable development* category. In November, one of the world's largest cruise ships, Mein Schiff 3, was the first to dock at the new Puerto del Rosario pier (Fuerteventura).