

Business lines

1

Environment

Sector analysis_49

Activities and geographic areas_52

Contracting_58

Service excellence_63

Innovation and Technology_64

FCC Environment is the FCC Group area that provides environmental services to almost 60 million people in over 5,000 municipalities in 13 countries. It has over a century of experience and this is reflected in the diversity of services provided: collection, treatment, recycling, energy recovery and disposal of urban solid waste, public street cleaning, maintenance of sewage systems, maintenance and conservation of green areas; treatment and disposal of industrial waste, and the recovery of contaminated soils.

FCC Environment is structured in three divisions: Spain, International (United Kingdom, Central Europe, Portugal and Egypt), and Industrial Waste, which is also responsible for the activity in the United States.

In 2017, revenues in this area grew 0.29% to reach 2,736 million euros and the Pre-tax Profit grew to 132.6 million euros, which represents a 6.68% increase compared to 2016

The **revenue** of the area **grew 0.29%**, reaching **2,736 million euros**, and Pre-tax Profit increased to **132.6 million euros**, which represents an **increase of 6.68% on 2016**, and goes from 4.56% to **4.85% of revenues**

FCC Environment manages 24 million tonnes of waste annually and produces more than 2.9 million tonnes of recyclables and 600,000 tonnes of fuel derived from waste (WDF). It has more than 700 waste management facilities in operation, of which nearly 200 are environmental facilities used for treating and recycling wastes, including 10 waste to energy projects with an annual capacity of 2.6 million tonnes and 300 MW.

Sector analysis



Self-loading, 100% electric waste collection vehicle (Madrid).

Spain Environment

Throughout 2017, budgetary restraints remained in force in town halls and supra-municipal and regional entities. However, a slight improvement has been seen and a return to the technical and quality criteria in the calls for tenders. In spite of this situation, annual revenue was 1,466 million euros, which supposes an increase of 3.27% over 2016, and the services order book stands at 6,040.7 million euros for the activities of street cleaning, the collection, transport, treatment and disposal of waste, the maintenance of green areas, the maintenance of sewage networks, beach cleaning and energy efficiency services, among others.

The need to optimise municipal budgets is witnessing various urban services, until now contracted separately, grouped into larger bids.

On the other hand, the remodelling of waste management master plans in the different autonomous regions represents business opportunities.

The **revenues of Spain Environment** reached **1,466 million euros**, which supposes an **increase of 3.27% over 2016**, and the **services order book stands at 6,040.7 million euros**



EnviRecover Energy Recovery Plant in Hereford and Worcester (United Kingdom).

International Environment

Environment sector, in the countries where FCC operates, is undergoing a transformation process due to the environmental demands of national governments, driven by European Directives. On the other hand, it is subject to a consolidation process with an increase in concentration and the entry of new players, mainly Chinese companies.

In this context, annual revenues stood at 1,132.7 million euros and the gross operating profit reached 165.8 million euros, which represents a slight increase of 0.18% compared to 2016 and 14.64% in terms of revenues.

The **revenues** of **International Environment** stood at **1,132.7 million euros** and gross operating profit reached **165.8 million euros**, which represents a slight **increase of 0.18%** compared to 2016 and **14.64%** in terms of revenues.

A slowdown in economic activity is expected in this sector in the United Kingdom due to budgetary reductions of Public Administrations. In central and eastern Europe, moderate growth is expected with risks of greater state intervention of services in certain countries, such as Hungary.



ECODEAL industrial waste environmental complex. Chamusca (Portugal).

Industrial Waste (Ámbito) and USA

The **annual revenues of Industrial Waste and USA** reached **137.2 million euros**, an **increase of 6.03% on 2016**, and the **gross operating profit of 20.6 million euros** represents an **increase of 25.61%** on the previous year and **15.01%** on revenues.

The production of industrial and commercial waste stabilised throughout 2017 in the Spanish market. This aspect has been noticed in FCC Industrial Waste's own activity with the tonnes managed being stable in almost all the offices, in a context, however, which continues to be characterised by the intense competitiveness established by the waste producers themselves.

As for the United States, the market continues to be characterised by significant opportunities in the urban sector in both collection and processing. With regard to the industrial sector, the producer's responsibility for managing the waste ensures the pursuit for quality services. A clear trend has been observed

regarding the concentration of companies through mergers and acquisitions.

In Portugal, there is an increase in the tonnes managed largely due to the management of environmental liabilities.

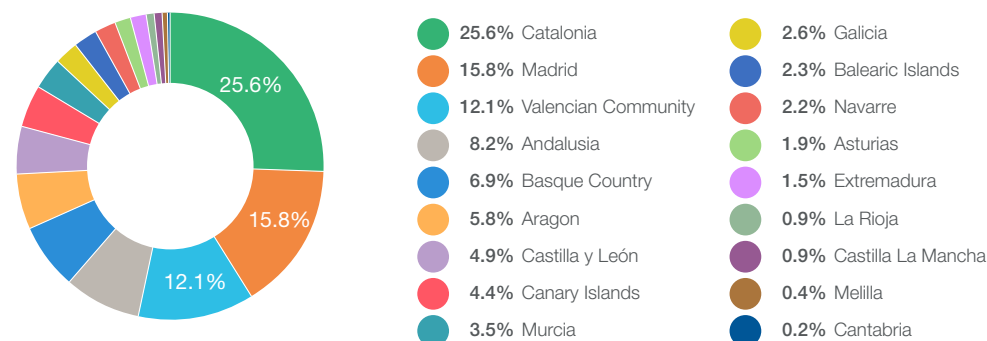
In these circumstances, annual revenues reached 137.2 million euros, an increase of 6.03% on 2016, and the gross operating profit of 20.6 million euros represents an increase of 25.61% on the previous year and 15.01% on revenues.

Activities and geographical areas

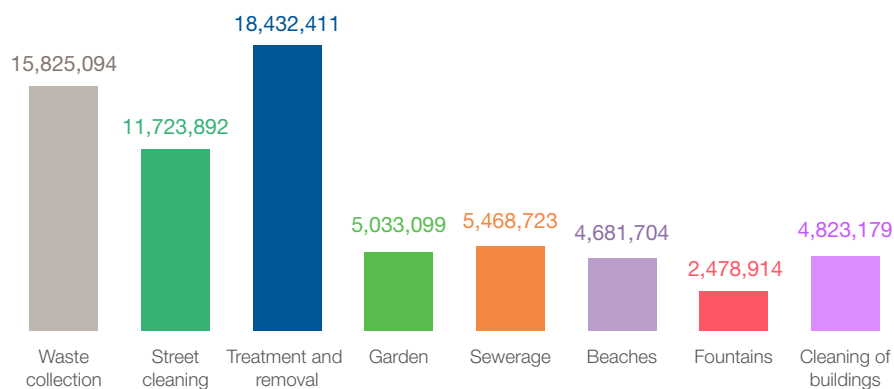
Spain Environment

FCC provides environmental services in 3,660 municipalities throughout Spain, serving a population of almost 30 million inhabitants, for street cleaning, the collection and transport, treatment and disposal of waste, maintenance of green areas, maintenance of sewage systems, beach cleaning, and energy efficiency services, among others. During 2017, FCC Environment collected 5.4 million tonnes of urban solid waste and processed over eight million tonnes.

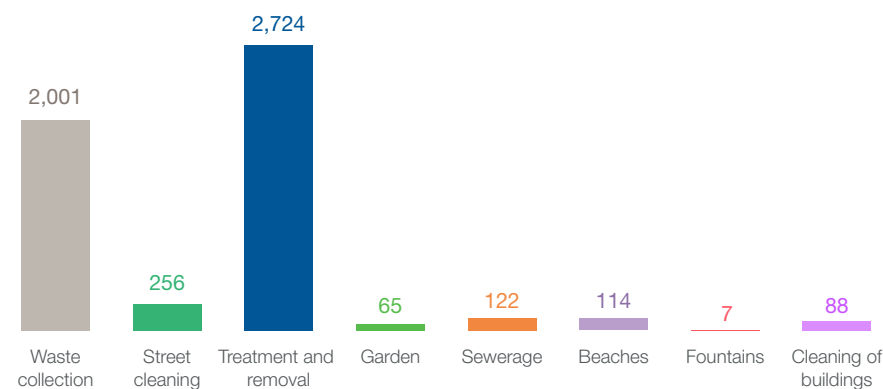
Revenue 2017 Geographic location



Inhabitants served. Spain Environment 2017



Municipalities served. Spain Environment 2017



Most relevant events in 2017



The city of Bilbao awarding contracts for cleaning, collection and management of Mercabilbao, and cleaning of buildings and municipal facilities

Both contracts represent a joint order book of 216.1 million euros for a period of four years, with the possibility of extending for two more years, and managing a workforce which exceeds 1,300 people. FCC Environment has had a presence in Bilbao since 1972 and serves a population of close to 350,000 inhabitants.

Contract for urban cleaning, waste collection and maintenance of green zones for Jaen city hall

Contract awarded for a 12 year period, representing an order book of 143 million euros, with the possibility of two four-year extensions. FCC Environment had provided services in Jaen since 1985 and serves a population of 115,000 inhabitants with a workforce of more than 310 people.



Management service of the Montalbán Environmental Centre (Cordoba)

The Montalbán Environmental Centre processes all domestic waste, some 184,000 tonnes of differing types, which is produced in all municipals in the province of Cordoba (except its capital), serving a population of more than 468,000 inhabitants. The Centre will manage a workforce of 65 people for a period of four years, with the option to extend it an for an additional two years. It represents an order book of over 14.4 million euros.



Awarding of the waste collection and street cleaning contract from the town hall of El Puerto de Santa María (Cadiz)

Contract awarded for a period of three years and one month, representing an order book of 37.3 million euros, with the possibility of an extension of one additional year. FCC Environment began work in El Puerto in 1980 and currently manages a workforce of more than 240 people dealing with almost 90,000 inhabitants.



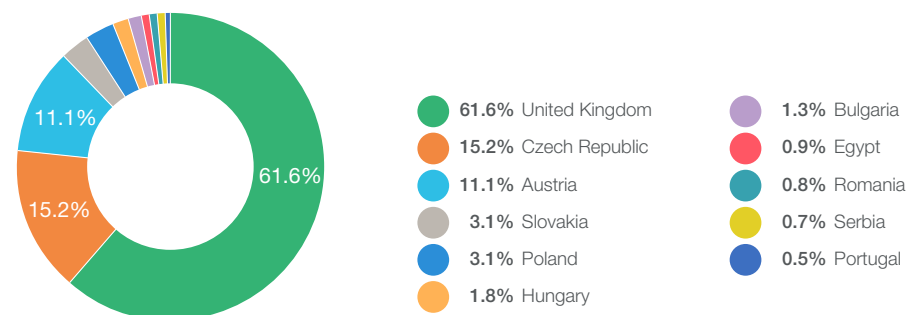
The awarding by the city council Las Palmas de Gran Canaria of the contract for Lots I and II regarding maintenance and conservation of green spaces and urban trees as well as the maintenance, conservation and renovation service for playgrounds

These services will be managed for four years, representing a combined order book of 45.1 million euros, with the possibility of an extension of up to two years. FCC had tended the green spaces in Las Palmas since 2004 with a workforce of more than 300 people.

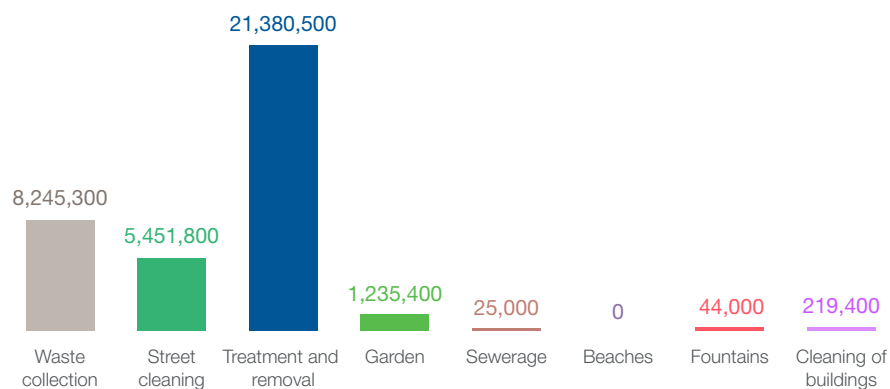
International Environment

FCC is one of the leading worldwide groups in the integrated management of urban solid waste and recovery of energy from waste. It applies innovative systems and the cleanest, most-advanced technologies in the provision of quality services that are sustainable over the medium and short-term and adapted to customers' needs. The International Environment division is present in Europe and North Africa and currently provides services in 11 countries: United Kingdom, Austria, Czech Republic, Slovakia, Hungary, Poland, Romania, Bulgaria, Serbia, Portugal and Egypt. Across these countries, almost 26 million inhabitants in 1,415 municipalities are served, and in 2017 more than 11 million tonnes of waste and 2.3 million tonnes of recovered material and Waste Derived Fuel (WDF) was managed.

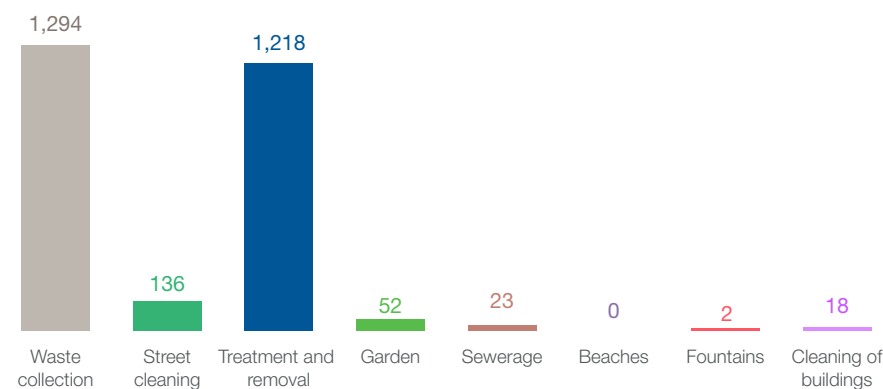
Revenue 2017 Geographic location



Inhabitants served. International Environment 2017



Municipalities served. International Environment 2017



Most relevant events in 2017 in the United Kingdom (FCC Environment UK)



Start-up of the EnviRecover incinerator in Hereford & Worcester (United Kingdom)

The start-up of the Hereford & Worcester incinerator took place in March 2017. The plant has a processing capacity of 200,000 tpa, will service more than 700,000 inhabitants and generate more than 160,000 MWh per year, the equivalent to that used by 31,000 homes. The plant was formally opened by His Royal Highness the Duke of Gloucester in June 2017.



Construction and development works for the Edinburgh and Midlothian incinerator (United Kingdom)

The development works for the Edinburgh and Midlothian incinerator, whose construction began at the end of 2016, have advanced in both time and term during 2017 and meeting the planned schedule of start-up at the end of 2018. The Edinburgh incinerator has a processing capacity of 155,000 tpa, will service a population of more than 600,000 inhabitants and generate more than 100,000 MWh per year, the equivalent to that used by 22,000 homes.

Most relevant events in 2017 in the CEE (FCC Environment CEE)



Start-up of the processing, transfer and materials recovery plant in Malesice, Prague (Czech Republic)

The plant has a processing capacity of 70,000 tpa and began operations in October 2017. The plant is in a strategic location to service the city of Prague, for municipal, commercial and industrial customers. The facilities allow the recovery of recyclable materials for subsequent sale and the transfer of waste to the FCC landfill sites of Uhy and Uholicky in the Czech Republic.



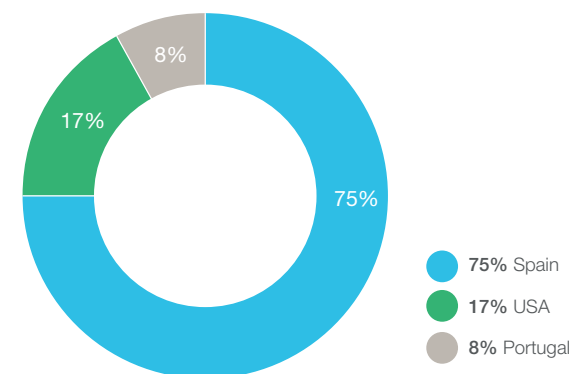
Extension of the biological mechanical processing plant in Zabrze (Poland)

The Zabrze biological mechanical processing plant, with a capacity of 60,000 tpa, has the status of a regional processing plant, and is in the development phase to process and generate 50,000 tpa of fuel derived from waste for later use in cement plants and renewable energy generation plants.



TRISA. Physical and chemical industrial waste processing plant (Tarragona).

Revenue of FCC Industrial Waste by country in 2017



Industrial Waste (Ámbito) and USA

FCC Industrial Waste specialises in industrial and commercial waste management, the recovery of by-products and decontamination of soil. Through innovative solutions for exploiting the resources contained in the various wastes, FCC has become an important partner of industries and businesses that, in line with the circular economy, carry out their business activities ensuring environmental, social and economic sustainability.

Internationally, FCC Industrial Waste has an outstanding presence in Portugal, through its subsidiary ECODEAL, and in the USA, where it carries out the collection and management of urban solid waste and industrial waste.

Most relevant events in 2017



Expansion of the ECOACTIVA secure deposit for hazardous waste from Aragón, in Zaragoza (Spain)

In 2017, the expansion of the ECOACTIVA secure deposit for hazardous waste from Aragón, located in Zaragoza, was completed, extending its useful life by an estimated eight years. In terms of glass recycling, works have been undertaken this year to technologically update the glass recycling facilities of Cadrete (Zaragoza). Specifically, a complementary line has been installed to the existing process for the processing of the glass container waste flow, with the aim of optimising the recovery of the smallest parts of the existing glass in said waste, minimising waste.



Inauguration of the recycling plant in Dallas (Texas)

In January 2017, the recycling plant in Dallas (Texas) was inaugurated. The state-of-the-art plant, built and financed by FCC Environmental Services, the US subsidiary of FCC Group, specialising in environmental services, will also be managed by the company for a period of 15 years, with a possible extension of 10 years. The Dallas recycling centre will process and return all recyclable materials in the city to the market, as well as that of other nearby cities in the state of Texas such as Garland, Mesquite and University Park. This plant has been selected by the National Waste & Recycling Association (NWRA) as the "Best Recycling Facility of the Year 2017 in North America". This award is acknowledgement that the recycling centre has demonstrated its leadership position in key indicators such as innovation, the amount of materials collected and/or processed, the types of materials recovered, the improvements to the site or the sustainability measures adopted.



Collection of urban solid waste from the western part of Polk County (Florida)

In 2017, FCC Environmental Services launched the collection of urban solid waste from the western part of Polk County, in the state of Florida. The maximum duration of the service is ten years and represents an approximate business volume of 96.4 million euros. Polk County is located in central Florida and has an approximate population of 650,000, 375,000 in the West zone awarded to FCC, and is bordered by Orange County, where FCC also collects urban waste over a ten-year period.



Excavation, removal and waste management of an environmental liability in the Barreiro Business Park (Portugal)

ECODEAL, a subsidiary of FCC Industrial Waste in Portugal, executed the removal and management of 17,300 tonnes of waste from an environmental liability deposited in the Barreiro Business Park, located on the left bank of the Tajo estuary, and its subsequent processing. The management of this environmental liability was carried out in the first half of 2017 and generated revenues of three million euros.

Contracting

Spain Environment

During 2017, FCC Environment was awarded 111 contracts in the urban services arena, with an overall contract volume of close to 1,000 million euros.

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Other noteworthy contracts awarded in 2017

- Urban waste collection, street cleaning, gardens and beaches of Sant Antoni de Portmany (Ibiza), Balearic Islands. 47,984,859.46 euros.
- Conservation and maintenance of gardens, Malaga. 16,842,483.80 euros.
- Urban waste collection, Chipiona (Cadiz). 14,362,979.30 euros.
- Urban waste collection north of the province of Cordoba. 12,364,048 euros.
- Urban waste collection from Inca (Mallorca) Balearic Islands. 12,208,316.56 euros.
- Pinto packaging plant operation, Madrid. 10,950,000 euros.
- Selective collection in Urola Kosta, Guipúzcoa. 10,171,826.76 euros.
- Urban waste collection, street cleaning and recycling centre, Salt (Girona). 9,675,169.96 euros.
- Cleaning of Metro Valencia stations. 8,790,083.57 euros.
- School cleaning, Albacete. 7,532,172 euros.
- Conservation and Maintenance of Gardens, Santa Coloma de Gramenet (Barcelona). 7,412,634.08 euros.
- Urban waste collection and landfill in the region of La Noguera (Lleida). 5,835,804 euros.
- Urban waste collection and transport of municipal waste in 16 municipalities in the L'Anoia region, Catalonia. 5,563,311.08 euros.
- Urban waste collection and street cleaning of Cassá de la Selva, Gerona. 5,495,235.92 euros.
- End-to-end, Preventive and Corrective Maintenance of CAP of the Catalan Institute of Health, Barcelona and the Balearic Islands. 5,186,644.84 euros.
- Urban waste collection and street cleaning of Fuente Álamo, Murcia. 5,124,494.08 euros.
- Collection of urban waste from the association of municipalities Lea Artibai, Vizcaya. 4,912,872.73 euros.
- Cleaning of Buildings at Universidad Rovira I Virgili, Tarragona. 4,801,875 euros.
- Selective collection in the province of Cordoba. 4,681,372 euros.
- Street cleaning in Etxebarri, Vizcaya. 4,518,828 euros.
- Industrial cleaning of the Repsol plant, Puertollano (Ciudad Real). 4,500,000 euros.



Waste collection with side-loading vehicle. Bilbao (Spain).

- Cleaning buildings in Donostia-San Sebastián, Guipúzcoa-Navarra. 4,379,009.20 euros.
- Cleaning municipal buildings in Crevillente, Alicante. 4,219,005.60 euros.
- Cleaning of schools and municipal units in Alicante. 3,514,544.58 euros.
- Urban waste collection of the association of municipalities Cuenca de Cidacos, La Rioja. 3,513,657.47 euros.
- Street cleaning and gardens of Berango, Vizcaya. 3,187,283.76 euros.

International Environment

In 2017, the International Environmental Services division was awarded contracts from over 110 tenders for USW collection services, selective collection, transport, treatment, disposal, street cleaning, park and garden maintenance, recovery of contaminated soils and contracts for the collection and treatment of commercial and industrial waste which supposed a contract amount of 938.6 million euros.

Below offers information about the contracting and the most significant contracts awarded according to their geographical distribution:

During 2017, **International Environment** division was awarded more than **110 tenders and contracts** giving contracting revenues of **938.6 million euros**

United Kingdom (FCC Environment UK)

Most relevant contract awards in 2017 in the United Kingdom

- **Operations contract for recycling centres in Wiltshire.** Contract awarded to FCC Environment for the management and operation of nine recycling centres in the country of Wiltshire. The population served totals 470,000 people who will generate 46,000 tonnes of waste annually. The contract has been awarded for a period of eight years, with the option to extend it for an additional eight years giving an order book of more than 39 million euros.
- **Contract for municipal waste collection and street cleaning, for Barrow-in-Furness City Council.** In March 2017, the City Council of Barrow-in-Furness awarded FCC Environment the contract for the collection of municipal and recyclable waste and cleaning for a period of seven years with the possibility of extending it by another seven. Barrow-in-Furness is in Cumbria in the North of England. The population served totals 70,000 inhabitants and represents an order book of over 13 million euros.
- **Contract for rail transport and waste processing in North London.** For a further three years, FCC Environment has renewed the rail transport and waste processing of 50,000 tpa contract with an order book of 26.3 million euros. FCC has provided these services since 2014.



Operation of Recycling Centres in Wiltshire (United Kingdom).

United Kingdom (FCC Environment UK)

New municipal contracts and firm renewals

Contracts awarded: 13.

Annual billings: 23.1 million euros.

Order book: 116.2 million euros.

New contracts, C&I waste contract renewals and short-term contracts: 303.8 million euros.

Temporary awards of municipal contracts:

Contracts awarded: 2.

Annual billings: 4.8 million euros.

Order book: 49.1 million euros.



Central and Eastern Europe (FCC Environment CEE)

Most significant contracts awarded in Central and Eastern Europe in 2017

- **Renewal of contracts for the collection and processing of municipal waste with the District of Graz-Umgebung (Austria).** FCC CEE has signed two contracts for the collection and processing with the District of Graz-Umgebung:
 - The municipal waste collection contract in Graz-Umgebung was renewed in 2017 for a period of five years, with an order book of three million euros. Services included in the contract are the collection of municipal, paper and organic waste.
 - The contract for the processing of municipal waste from Graz in the incineration plant of Zistersdorf, owned by FCC, has been renewed for another five years. The contract is for the processing of 29,000 tpa with an order book of over 9.5 million euros.
- **Renewal of eight contracts with ARA and the awarding of a new one in region of Schwechat (Austria):** FCC Austria Abfall Service AG has renewed selective collection contracts with ARA, the entity which manages recycling in Austria, which has been providing services in eight regions since 1993, for a period of five years. It has also been awarded another contract for the region of Schwechat, for the selective collection of 13,000 tpa of plastics and metals. The total order book is 17.5 million euros and the population served by FCC in Austria for this type of service is 685,000 inhabitants.
- **Renewal of the waste collection contract in Zabrze (Poland):** Zabrze is one of the main cities in Poland with a population of 180,000 inhabitants. La renewal of this contract means the leadership position is maintained in the region. In this region, FCC Poland also operates a mechanical and biological processing facility and a controlled landfill which allows it to consolidate itself in the region. The contract has been renewed for three years and the order book amounts to 16.2 million euros.
- **Renewal of the contract with Skoda Auto (Czech Republic):** FCC Czech Republic has renewed its contract with Skoda which includes the collection and transport of wastes, the collection of recyclables and the rental of machinery. The contract has been renewed for a period of three years with a total value of 10 million euros.
- **Contract for the recovery of contaminated soils in the Páramo Project (Czech Republic):** Awarding of the contract by the Ministry of Environment of the Czech Republic for the recovery of contaminated soils in the land where the Páramo plant (Pardubice) is located. The amount of contaminated waste is 50,000 tonnes and the contract has a five-year duration. The total order book of the contract is 9.8 million euros.
- **End-to-end management contract for the Hyundai group of companies (Czech Republic):** FCC Czech Republic was awarded the Hyundai waste management contract for the following companies: Mobis Automotive s.r.o in Novosice and Mobis Automotive s.r.o in Mosnov. Both companies are the main suppliers to Hyundai in the Czech Republic. The contract has a three-year term and the order book amounts to five million euros.



Collection of Recyclables for ARA in nine Austrian regions.

Central and Eastern Europe (FCC Environment CEE)

New municipal contracts and firm renewals

Contracts awarded: 77.

Annual billings: 29.4 million euros.

Order book: 62.7 million euros.

**New contracts, C&I waste contract renewals
and short-term contracts:** 408.2 million euros.

Portugal (FCC Environment Portugal)

Most relevant contract awards in 2017 in Portugal

- **Mechanical cleaning contract for the municipality of Oeiras:** The contract for mechanical cleaning for the City Council of Oeiras was awarded for a five-year term. The population served totals 40,000 inhabitants and represents an order book of 3.4 million euros.



MAREPA facilities in Alcorcón (Madrid).

Portugal (FCC Environment Portugal)

New municipal contracts and firm renewals

Contracts awarded: 11.

Annual billings: 1.5 million euros.

Order book: 1.5 million euros.

Temporary awards of municipal contracts:

Contracts awarded: 2.

Annual billings: 0.8 million euros.

Order book: 3.7 million euros.

Industrial Waste (Ámbito) and USA

In 2017, Industrial Waste-USA division signed contracts worth 169.4 million euros.

Nationally, one of the main milestones in our activity was the contract awarded to FCC Industrial Waste for the environmental management in all AIRBUS centres in Spain. The contract has a five-year term and will produce an order book amounting to 20.2 million euros. The scope of the service contracted involves development for each of the facilities in addition to the end-to-end management of the waste that they produce, and the support and maintenance of the environmental, energy and of environmental correction management systems.

In 2017, **Industrial Waste-USA**
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169.4 million euros



Recycling plant in Dallas (Texas, USA).

Another important achievement has been the awarding by SIGFITO of the management of agricultural containers in Andalusia for a period of one year, extendable to a total of three. Andalusia is the largest producer of phytosanitary containers in Spain, with an annual management forecast of around 1,300 tonnes. The contract includes the supply of bags for the conditioning of waste in the collection centres, their collection and transport, and finally their processing. The solution proposed by FCC Industrial Waste includes the recovery of 100% of the waste collected, mainly plastics, but also comprised of metals and paper/cardboard.

In terms of glass recycling, in 2017, FCC Industrial Waste won the auction by ECOVIDRIO for the management of glass packaging waste from selective collection in the provinces of Valencia, Castellón, Zaragoza, Huesca and Teruel. The period of the contract is three years (2018-2020), during which it is expected to manage around 185,000 tonnes of packaging. The sale of the produced glass cullet will generate an order book for FCC Industrial Waste of more than nine million euros.

Regarding the paper and cardboard recycling business, through its subsidiary MAREPA, FCC Industrial Waste has been

awarded the contract for the end-to-end waste management of MACROLIBROS, S.A., based in Valladolid, with a duration of three years and total estimated revenues of 1.8 million euros.

In 2017, FCC Industrial Waste began soil decontamination work in a former operations centre of the Municipal Transport Company of Madrid. The objective of the works is the processing of more than 16,000 m³ of land contaminated with hydrocarbons through bioremediation. In addition, the excavation work and processing of land with low and very low radioactivity contamination from the dismantling of the Zorita Nuclear Power Station continues

USA

In terms of the activity in the United States, the successful series of contracts awarded continues with two new contracts in 2017:

- Service for the processing and commercialisation of the recyclable residues of the Texan cities of Mesquite, Garland and University Park, for 7.5 million USD (6.25 million euros) and a duration of five years.
- Service for the collection and processing of all residential and commercial waste in the city of Rowlett (Texas), for an initial period of seven years with a possible extension of three more years. The budget of the award was 32.5 million dollars. The total volume of the contract would come to 70 million dollars (58.33 million euros) if all commercial services and the extension are included.

The total signed-up order book by FCC Group in the last three years in the United States is 630 million dollars.

Service excellence

Management of quality, the environment, innovation, occupational health and safety and energy

Historically, FCC has expressed constant concern for compliance with standards and requirements, not only those which are legal or regulatory, or contractually established by our customers, but all those related to the care of the environment, the search for efficiency in our services and the health and safety of our workers.

This concern has led Environment area to develop important innovations in technology, operating procedures and human resources policies. Among them, 100% electric mobility technology (zero emissions vehicles, ZEV) in urban services, even for large-tonnage equipment; or human resources policies which promote equality and labour inclusion. All this has been carried out within the framework of our end-to-end management system, certified by external bodies, and based on the following standards: UNE-EN ISO 9001 (Quality Management), UNE-EN ISO 14001 and EMAS (Environmental Management), OHSAS 18001 (Management of Health and Safety of Workers), UNE-EN ISO 50001 (Energy Management), UNE 166002 (Management of R&D) and the Healthy Company Model.

Avanza Awards: Amongst the objectives of the management system are to promote the participation of all workers in the improvement of our services and the internal processes of the organisation. In order to recognise the work and effort made by the staff who contribute day-to-day to improve the company's competitiveness, the social integration within it, the improvement of the quality in our processes, respect for the environment and the development and application of innovative solutions or practices, in 2017 the Avanza Awards were created which are classified in four categories: Social Initiatives, Quality, Environment, and Innovation, and have resulted in numerous ideas and the transfer of good practices thanks to the good reception and the number of applications submitted. Durante 2017, FCC Environment held the UNE-EN ISO 9001, UNE-EN ISO 14001, EMAS, UNE-EN ISO 50001 and OHSAS 18001 certifications for one more year. Other noteworthy milestones in regard to certification were:

- **Healthy Company Certification:** Started in 2013, this process concluded in 2017 with the roll-out and certification (effective from February 2018) of all FCC Environment Offices in Spain.
- **Certification of the R&D Management System.** The scope of this system was extended in 2017 to the projects being carried out by the Information Systems and Technologies and Coordination and Development departments. The projects of the Machinery and Waste Disposal and Processing departments which were certified last year have continued to be developed.



- During 2017, and completed in February 2018, the '**Re-duzco**' stamp granted by the Spanish Office of Climate Change (OECC) was achieved within the process of carbon footprint registration, compensation and CO₂ absorption projects of the Ministry of Agriculture and Fisheries, Food and Environment (MAPAMA), thanks to our commitments to reduce GHG emissions being met.

In its commitment to customers and society in general, through compliance with the legal requirements that apply to it, FCC Industrial Waste has implemented a Quality and Environmental Management System, based on the ISO 9001 and ISO 14001 standards. It also holds the following certifications: Regulation (EC) 1221/2009 Eco-management and Audit Scheme EMAS III, Secure destruction of confidential material (UNE 15713), Conformity with the end-of-waste condition (Regulation EU 1179/2012). It also has the ENAC accreditation as an entity to inspect associated soils and groundwater (ISO 17020). In health and safety, FCC Industrial Waste held the OHSAS 18001 certificate. All centres have annual internal audits under the framework of the implemented standards. In addition, training has increased by 20% in the last year and the number of workers who received training has increased by 38%.



Luton, United Kingdom, 2018 – FCC rechargeable 100% electric waste collection vehicle.



Rota, 2018 – FCC's 100% electric self-loading collector.



Barcelona, 1974 – FCC electric waste collection vehicle.

Innovation and technology

Innovation is in the DNA of **FCC Environment** and is one of our identity signs. **The Environmental Services Area** has been developing innovative technologies since it started to provide its services more than 100 years ago, to make them more sustainable and efficient. As an example, in 1974 the first waste collection vehicle with an electric motor was put into service in Barcelona. To regulate and coordinate the flow of information and to standardise the research processes in the environmental area, **an R&D+Innovation management system was implemented in 2016 that obtained UNE 166.002 standard certification.**

Currently, the projects are grouped into five areas of technologies or knowledge:

- Vehicles, mobile machinery and facilities.
- Waste management and recycling.
- Information and communication technologies.
- Sustainable development.
- Resilience.

Most relevant current projects, registered or in being registered in the R&D system



Vehicles, mobile machinery and facilities

ARSI (*Aerial Robot for Sewer Inspection*).

- Within the framework of the European Echord++ project (*European Coordination Hub for Open Robotics Development*), FCC Environment is participating, together with other companies, in the ARSI (*Aerial Robot for Sewer Inspection*) consortium, which is developing an innovative automatic aerial vehicle (drone) equipped with multiple sensors to speed up, facilitate and improve sewerage inspection in Barcelona. At this time the project is in the advanced prototype phase and for FCC this technological solution will provide safety and comfort in the work, very significant improvements in productivity ratios and reductions in costs and occupational accidents. In June 2017, during the Future Industry Congress, the Barcelona technology centre, Eurecat, awarded the ARSI project the "Relevant Project" prize.

Introduction to FCC's ARSI project

<https://www.youtube.com/watch?v=zRJ4P8vHpd8>

Latest news from FCC's ARSI project at the Smart City Expo World Congress 2017

<https://www.youtube.com/watch?v=GrKWEf61upQ&t=62s>

VENTESU (Development of modular and self-sustaining vehicle platforms with high-efficiency electric traction for urban services).

- The objective is the design and development of a hybrid electrical vehicle with permanent electric drive, without mechanical transmission, plug-in, with range extension and equipped with a system of batteries and ultra-capacitors that work together, complement each other and increasing efficiency. All of this with an innovative design and composition of self-supporting and modular bodywork with a low cab. Through this project, the following technical and environmental mileposts are also achieved:
 - Obtaining of minimal emissions of exhaust fumes and noise.
 - Electric traction with high torque motor and energy regeneration system.

Study, analysis and development of new technologies in electric and hybrid engines for the USW collection truck^(*).

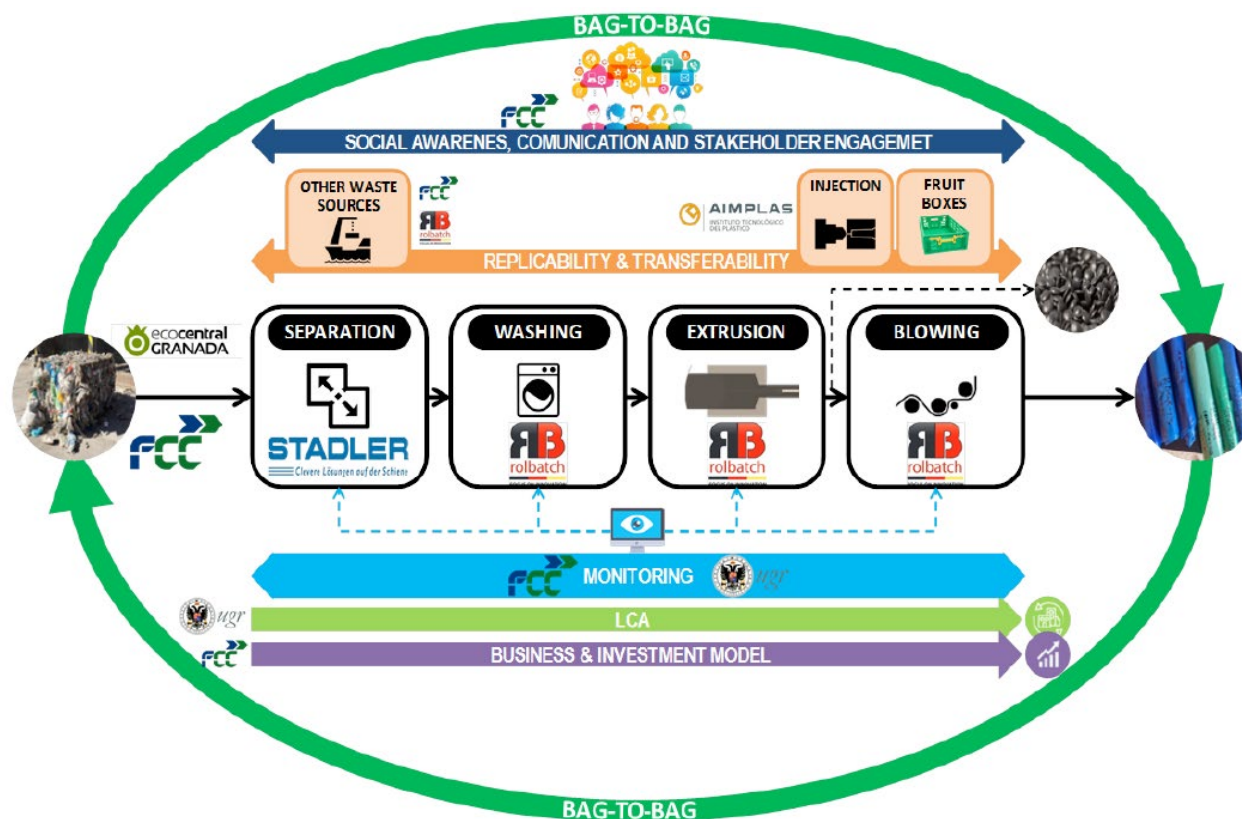
Development of national, 100%-electric cleaning trucks, for multi-service use^(*).

^(*) Completed projects.

Management and recycling of waste

LIFE4FILM (LIFE17 ENV/ES/000229):

- Part of the LIFE European Environment and Resource Efficiency program, project LIFE4FILM is led by FCC Environment and developed in partnership with AIMPLAS (Asociación de Investigación de materiales plásticos y Conexas) (ES), Rolbatch GmbH (DE), Stadler Selecciona, SLU (DE) and the University of Granada (ES). The main objective of LIFE4FILM is to avoid sending plastic film (LDPE) in solid urban wastes to the landfill or to energy recovery through the implementation by FCC of an innovative recycling process on a semi-industrial scale with a recycling line with a capacity of 10,000 tonnes/year in the Ecocentral plant in Granada (Spain) which will include equipment from Rolbatch and Stadler and that will also be operated by FCC to demonstrate the profitability and replicability of the recycling process at European level. The LIFE4FILM Consortium has the capacity to develop a new integrated technology for recycling plastic film based on low carbon economy and more sustainable waste management. This project is currently at the Grant Agreement signing phase with the European Commission.



METHAmorphosis LIFE 14/CCM/ES/000865:



Ecoparque 2 (Barcelona) – Processing facilities for METHAmorphosis.

- Project developed by a consortium of six entities (AMB -Metropolitan Area of Barcelona, FCC Aqualia – project leader – FCC Environment, Gas Natural, Icaen and SEAT) and co-financed by the European LIFE programme, that is finalising the construction of a demonstration plant in Ecoparque (environmental complex facility) in Besós, managed by FCC Medio Ambiente. The process integrates three technologies developed recently by Aqualia (AnMBR, ELAN – autotrophic elimination of nitrogen – and washing of biogas) to improve the efficiency of bio methane production in the treatment of leachate in installations for the anaerobic digestion of organic matter from urban waste. This bio methane will be used as a fuel in natural gas vehicles, among them those for waste collection in normal operational conditions, provided by FCC Environment; and will also be tested for injection into the natural gas grid. The reduction of green-



Waste streams treatment for obtaining safe reclaimed water and biomethane for transport sector to mitigate CHC emissions

LIFE-Methamorphosis – LIFE14 CCM/ES/000865



Ecoparque 2 (Barcelona) – Gas-powered collector and vehicle for the METHAmorphosis project.

house gases in the project is achieved with two actions, the process implemented in the treatment of leachate allowing an energy saving of around 70% compared to conventional process, and the use of bio methane as a vehicle fuel with a carbon footprint around 80% lower than that of Diesel or petrol vehicles. METHAmorphosis represents an advance in the energy re-use of wastes and a great proposal for circular economy since it converts the waste treatment plant into a fuel producer with the capacity to power vehicles. The European Commission has made METHAmorphosis an example of the LIFE programme in its November 2017 report **“Two years after Paris. Progress towards meeting the EU’s climate commitments”**.

Recovery of glass in refining (Alhendín - Ecocentral Granada):

- Installation of a system of optical sorters to retrieve glass in the refining line. After the implementation, in seven shifts per week, 10.5 tonnes of glass per shift are being recovered what makes a total of 3,822 tonnes of glass/year, an increase in recovery of 1.04%.

Improvements in composting and reduction of odours in the El Campello (Alicante) plant:

- Application of products with cultivations of micro-organisms to improve aeration and prevent bad odours in the composting process.

Modification of the biomass boiler to improve the energy efficiency in the Serra do Barbanza environmental complex:

- Modification of the control system to:
 - Optimise combustion: lambda sensor. Monitoring and control of biomass feed motors and air.
 - Reduce the temperature of the outlet gases (125 °C) from the chimney: differential pressure sensor. Control of aspiration motor speed.
 - Reduce the number of start-ups of the motors interlocked in group: installation of frequency shifters.
 - Increase the transfer of heat from the recirculation water to the evaporator: reduction of the circulation speed with frequency shifter.

These improvements have reduced the average start-ups per day by 50%, reducing electricity consumption by 40% and the consumption ratio per m³ of leaching treated by 35%, as well as reducing pellets consumption by 24%.

Information and Communication Technologies

Communication and monitoring of vehicles / Design of GCD17 device and implementation:

- Design and putting into operation of an integrated communications device in the vehicles to allow their monitoring, telemetry management, IoT connections, location and data entry, all integrated with the operations management system.

Systems for integrating data for Web services:

- Development of a data integration platform that allows the connection of numerous information systems coexisting in the operation of our services (clients, suppliers, government departments, back office, etc) without the need to make complex modifications to those systems.

Adapting of mobility utilities in APPVISION:

- Large part of our activity is undertaken in the urban space. The objective of the development of utilities in mobile applications for the VISION platform (digital platform for the integral management of municipal services, developed exclusively by FCC) is to provide a mobile extension of the platform for the prompt and efficient collection of information. This extension must be integrated in the various utilities and improvements currently offered by mobile devices (image capture, number plate reading, NFC readers, location systems, drawing tools, etc).

Geographical information: integration and display of data and maps:

- The management of the services that FCC Environment undertakes includes geographical positioning that is basic for knowing where their incidents occur. This need requires the management of various types of maps, cartographic backgrounds, geolocation data and various tools for their display. The intention is to integrate the handling of geographical information within the platform so that the daily work of our services can make use of this type of information without the need to transfer data or handle complex application.



vision
smart environmental services





Sustainable development

SEEEUS System for Environmental Efficiency Evaluation of Urban Services:

- Consisting of the in-house development, in an open digital environment, of a computer application based on innovative information and communication technologies to integrate the monitoring, calculation and communication of environmental information, allowing:
 - Support for the environmental advice service based on a verified method and coupled to the various phases of contract management.
 - Communication to our stakeholders of the relevant indicators in terms of energy efficiency, water saving, the mitigation of greenhouse gas emissions and the reduction of wastes.
 - Setting up of indicators to aid decisions (KPIs) that allow the manager and local organisations to share and have access to the relevant information.

Project KET4F-Gas:

- The Industrial Services Division, Ámbito, is developing the KET4F-Gas project, **co-financed by the European Regional Development Fund through the Interreg SUDOE programme.**
- Fluorinated gases (F-gases) are greenhouse gases used massively in the refrigeration sector that have a high global warming potential so that their emissions must be reduced, taking into account the international agreement signed in Kigali in 2016. The use of F-gases has increased dramatically in recent years as a consequence of the need to replace CFCs, which damage the ozone layer. The objective of this project is to design and implement essential facilitat-

ing technologies (EFTs) using alternative solvents designed according to green chemistry principles, benign and more efficient, to recover F-gases used in refrigeration and air conditioning equipment, preventing their emissions. This project will increase applied research and eco-innovation to protect the environment through the application of EFTs, allowing technology transfer to improve the competitiveness of companies.



FCC ENVIRONMENT'S SUSTAINABLE MANAGEMENT MODEL (2017/2020)

COMMITMENTS IN LINE WITH THE 5 DIMENSIONS OF THE SDGs



PRIORITISED SGD_s

