

# Business lines

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# Environment

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

FCC Medio Ambiente 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 2018, **FCC Medio Ambiente turnover grew 3.2%** to reach 2,822 million euro and the **Earnings before Tax rose to 164 million euro**, representing a 23.72% increase compared to 2017, and in terms of turnover, the increase went from 4.8% to 5.8%. **Contracting rose 2.9%** to 2,157 million euro, leaving the order book at 9,804 million euro.

**FCC Medio Ambiente's** turnover **grew 3.2%**, to reach 2,822 million euro, and the **pre-tax profit rose to 164.1 million euro**, representing an increase of 23.7% compared to 2017, and in terms of turnover, the increase went from 4.8% to 5.8%

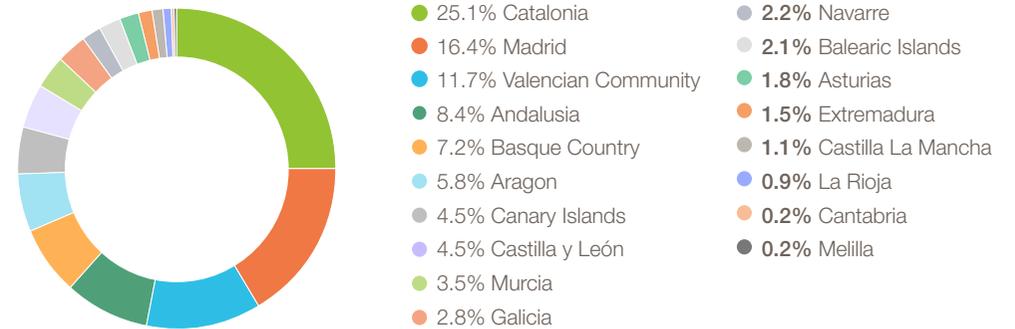
FCC Medio Ambiente manages 24.5 million tonnes of waste annually and produces more than 2.8 million tonnes of recyclables and nearly 600,000 tonnes of refuse-derived fuel (RDF). It has more than 700 waste management facilities in operation, of which nearly 200 are environmental complex facilities used 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

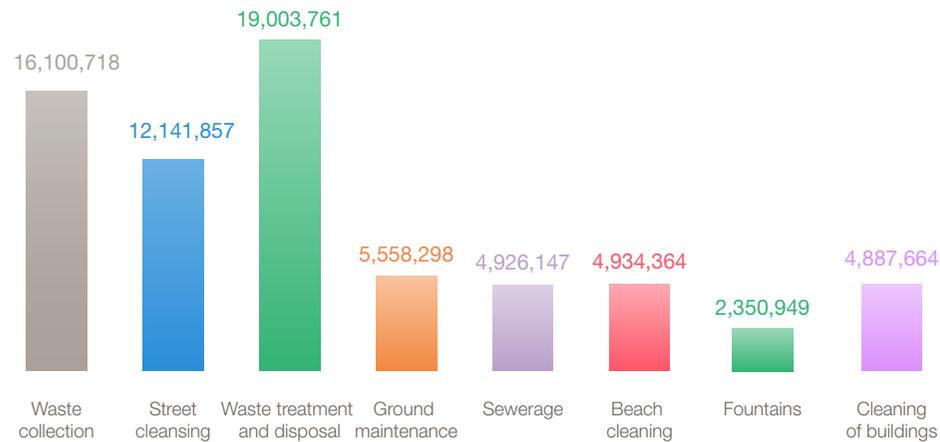
## Environment in Spain

FCC provides environmental services in 3,434 municipalities throughout Spain, serving a population of more than 29 million inhabitants, for street cleansing, the collection and transport, treatment and disposal of waste, ground maintenance, maintenance of sewage systems, beach cleaning, and energy efficiency services, among others. During 2018, FCC Medio Ambiente collected 5.4 million tonnes of urban solid waste and treated close to nine million tonnes.

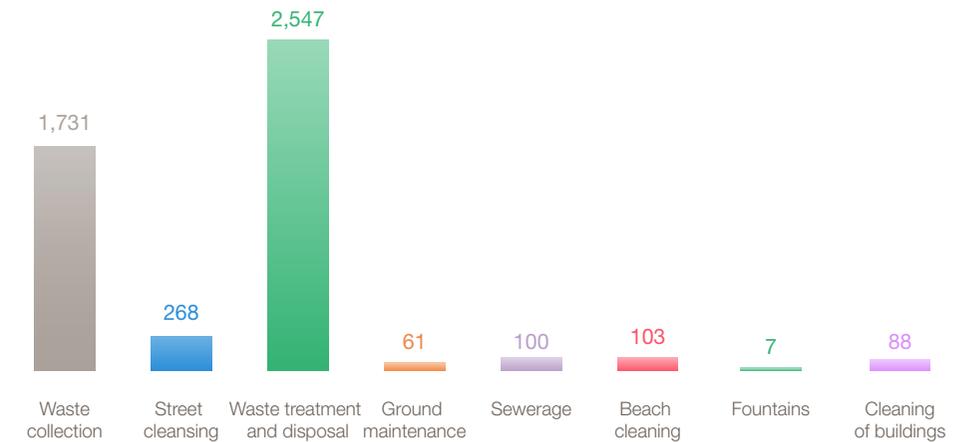
Environment in Spain. Revenue 2018. Geographic location



Environment in Spain. Inhabitants served 2018



Environment in Spain. Municipalities served 2018





Street Cleansing in Jaen, Spain.

This year saw a **slight upward trend** in municipal budgets for the services offered by FCC Medio Ambiente, as well as an **improvement** in the **weight** of the **technical** and **quality criteria** in the call for tenders. The **remodelling** of **waste management master plans** in several autonomous **communities** and large **municipalities** has been a source of **business opportunities**. Of note is the City of Madrid's Waste Management Master Plan and the development of the North and South Environmental Complexes of the Community of Madrid.

In this setting, **annual turnover reached 1,504 million euro**, which is an **increase of 2.6%** compared to 2017; and **EBITDA also increased to 242 million euro**, which is equivalent to **16% of the turnover**. The services **order book** stands at **5,530.04 million euro** for the activities of street cleansing, the collection, transport, treatment and disposal of waste, ground maintenance, the maintenance of sewage networks, beach cleaning, cleaning and maintenance of buildings and energy efficiency services, among others.

The strategy of FCC Medio Ambiente in Spain to maintain its competitiveness focuses on **combining Know-how**, developed over its more than **100 years of activity**, with the development of **innovative technologies** which allow **Smart Human Environmental Services** to be offered to customers, i.e., **more effective services** which cause the least inconvenience to citizens (the concept of **'friendly'** service), more **respectful** in the consumption of **resources**, and which contribute to making **more sustainable and inclusive cities** a reality. Special relevance is given to **policies of equality** and the **labour integration** of disadvantaged groups and all those **actions** which **reinforce the commitment** in the **fight** against **climate change** and in decreasing the carbon footprint will be promoted, especially those related to the **reduction of Greenhouse Gasses (GHG)**. The usage of **alternative energies** and the efficiency in their use for the provision of urban and environmental services, both in the **facilities** and the **service vehicles**, constitute **two strategic pillars** in which important steps have been taken, especially in the **development of electric vehicle technology for the fleet**. In this strategic action line, under the framework of Smart City Expo World Congress in Barcelona in **November, FCC Medio Ambiente presented the first industrial e-mobility platform for Urban Service vehicles**.

Annual turnover reached **1,504 million euro**, which is an **increase of 2.6%** compared to 2017

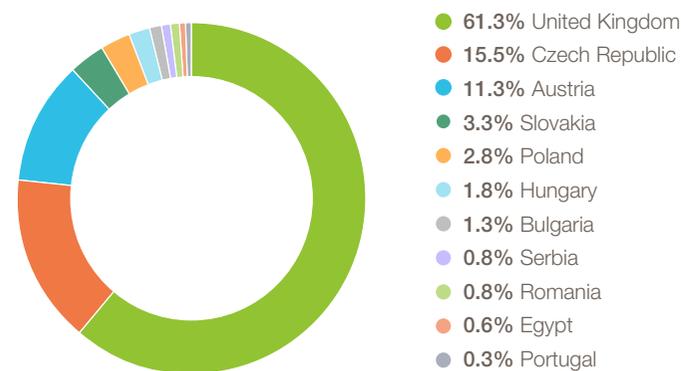


Waste collection in the historic centre of Madrid, Spain.

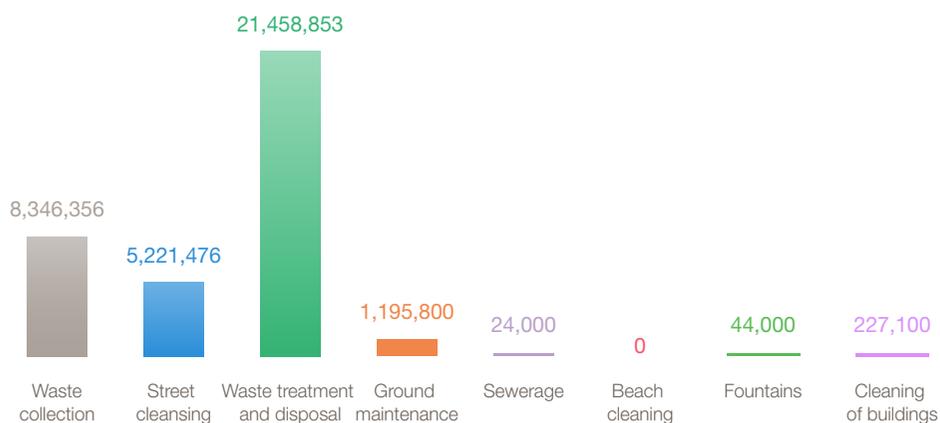
## International Environment

FCC is one of the leading worldwide groups in the integrated management of urban solid waste and recovery of renewable 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 long-term and adapted to customers' needs. **FCC Medio Ambiente's International** division is present in **Europe and Northern 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, more than 26 million inhabitants in 1,470 municipalities are served, and in 2018 more than 11.7 million tonnes of waste and 2.2 million tonnes of recovered material and Refuse-Derived Fuel (RDF) was managed.

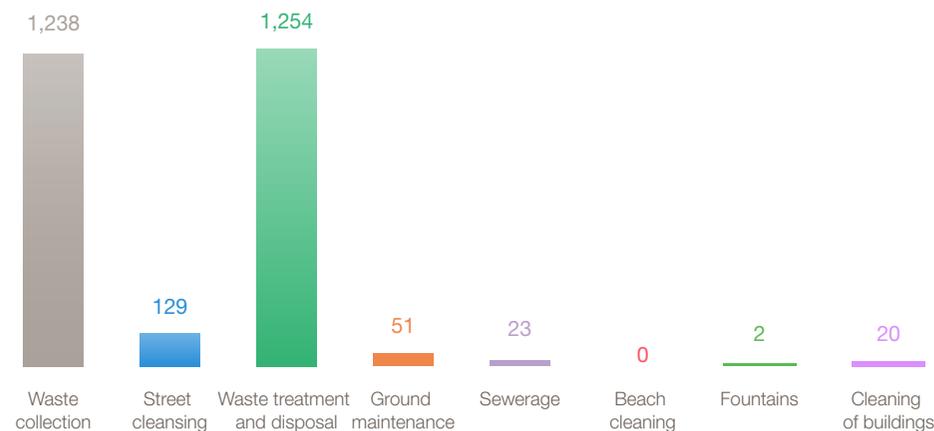
### International Environment. Revenue 2018 Geographic location



### International Environment. Inhabitants served 2018



### International Environment. Municipalities served 2018



The **main areas** of presence and development of **FCC Environment internationally** are centred on the **United Kingdom, Central and Eastern Europe** and to a lesser extent in other countries. The most relevant market drivers within the European Union have been the **European Directives on landfills, recycling** and generation of **renewable energy** and the new **legislation on waste**, approved by the European Union in 2018, aimed at satisfying the policies on the **Circular Economy**, to promote **sustainable development** and avoid negative impacts on the environment and to the health and well-being of citizens. The most significant proposed objectives include reducing municipal waste sent to landfill to a maximum of 10% by 2035, recycling 65% of municipal waste by 2035 and 70% of packaging by 2030. On the other hand, the **waste management market** has been subject to a **consolidation process** with an increase in **concentration** and the entry of **new players**, mainly **Chinese companies**.

Annual turnover reached  
1,172 million euro;  
an increase of 3.4%  
compared to 2017



*Energy Recovery Centre of Mercia Envirecover, United Kingdom.*

In this context, **annual turnover stands 1,172 million euro, 3.4% greater** than 2017, and the **EBITDA reached 178 million euro and represents an increase of 7.3%** on the previous year and **15.2% on turnover**. **Contracting reached 899 million euro with an order book of 3,629 million euro**.

The situation created by **Brexit** in the United Kingdom causes a **degree of uncertainty** to the **possible evolution of the sector** and will depend on the final result. However, a **slow-down 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.

In terms of the **International division**, the strategic priorities for 2019 focus on continuing to **improve efficiency, reduce operating costs** and structural costs, **renew existing contracts** and **develop large waste treatment and energy recovery, and renewable energy projects**.



*Waste collection in Ceské Budejovice, Czech Republic.*

## Industrial Waste (Ámbito) and USA

Ámbito 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 a strategic partner of industries and businesses that, in line with the circular economy, carry out their business activities ensuring environmental, social and economic sustainability.

Internationally, Ámbito has a noteworthy presence in the USA, where it engages in the collection and management of urban solid waste and industrial waste, and in Portugal, where it operates through its subsidiary ECODEAL.

### % Revenue of Ámbito by country. In 2018



Within the **national market**, the **production** of **industrial and commercial waste** witnessed an **increase throughout 2018**. This aspect has been noted in **Ámbito's** own activity, with a noteworthy **increase of 9% in the tonnage** managed. This increase, however, occurred in a **context** 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 treatment of waste**. 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.

**Portugal** has also witnessed a **significant increase** in the **tonnage** managed on all processing lines; **more than 20% above the previous year**.

In these circumstances, **annual revenues reached 147 million euro**, an **increase of 7.4%** on 2017, and the **EBITDA of 22 million euro** represented an **increase of 6.4%** on the previous year. **Contracting reached a record level of 312 million euro**, placing the **order book at 644 million euro**, which represents a **growth of 37.6%** over 2017.

This year, the **Industrial Waste** division will continue to **focus** on the **efficiency of operations** and **growing** the activity. The inclusion of **new technologies** will allow **Ámbito to consolidate** its position in the **recycling** and waste **recovery** markets, as that of a **key player** in the **circular economy**.

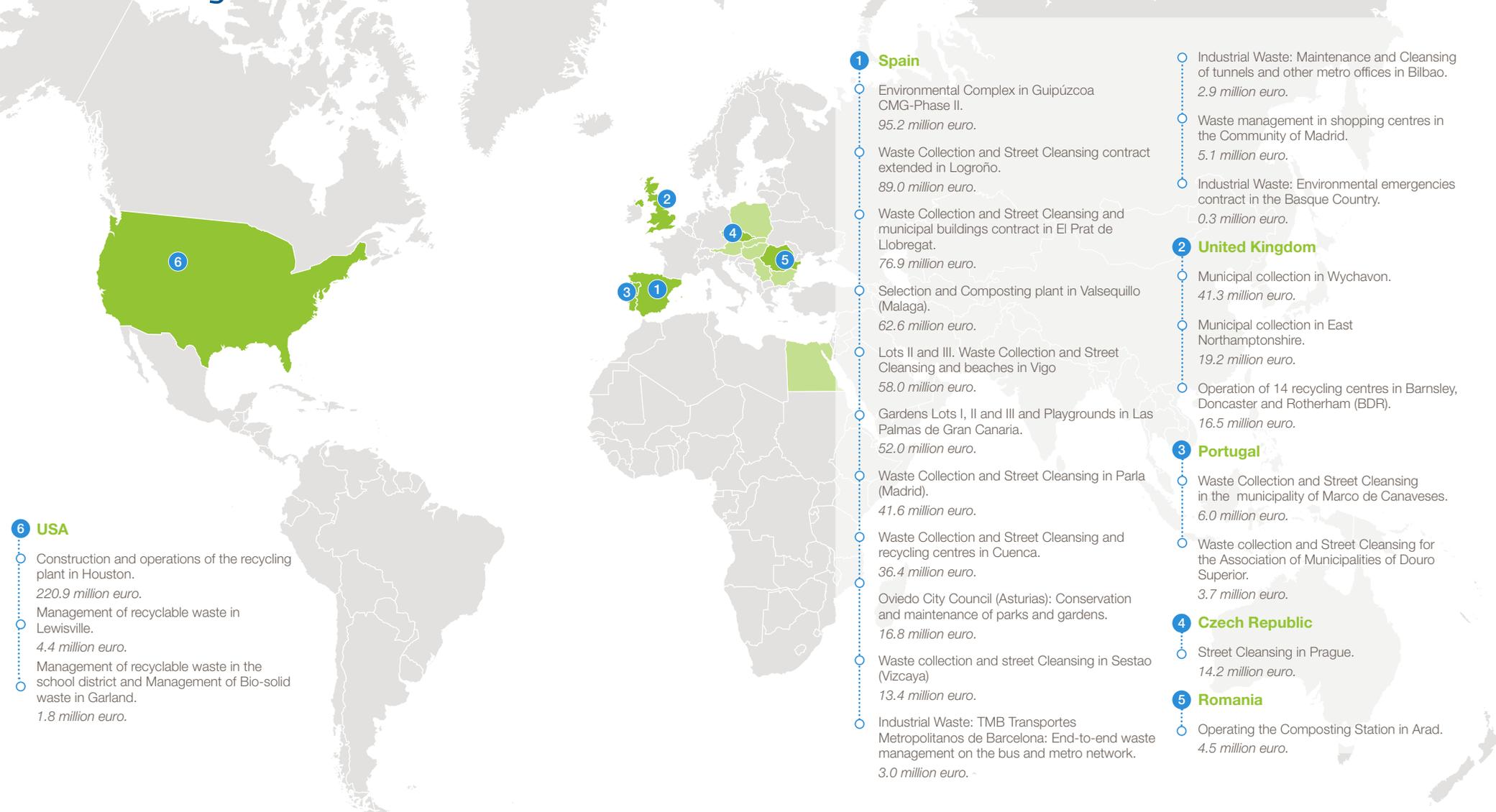
The **US** market continues its **good expectations** for the **development** of our **Municipal and Industrial Environmental Services** activity.



Sewage sludge transport fleet in Garland, Texas.

Annual **turnover** reached **147 million euro**, which is an **increase of 7.4%** on 2017

# Activity in the Environment area





## Other noteworthy contracts awarded in 2018

### Environment in Spain

During 2018, FCC Medio Ambiente in Spain was **awarded 123 bids** in the urban services arena, more diverse extensions and increases with an **overall contract volume of 946.2 million euro**.

**FCC Medio Ambiente in Spain was awarded 123 bids and the international division won 92 contracts to provide various types of services**

### International Environment

During 2018, the International division of FCC Medio Ambiente **won 92 contracts** to provide various types of services. Among them, services related to urban solid waste (USW) collection, selective collection, transport, treatment, disposal,

street cleansing, maintenance of parks and gardens, recovery of polluted soils, and other service contracts for the collection and treatment of commercial and industrial waste, which all represent a **contracting figure of 898.8 million euro**.

### Other noteworthy contracts awarded in 2018

#### United Kingdom (FCC Environment UK)

- New municipal contracts and firm renewals:
  - Contracts awarded: 13.
  - Annual turnover: 24 million euro.
  - Order book: 105.4 million euro.
  - New contracts, contract renewals and short-term contracts for C&I waste: 419.2 million euro.
- Temporary awards of municipal contracts:
  - Contracts awarded: 6.
  - Annual turnover: 17.6 million euro.
  - Order book: 119.4 million euro.

#### Central and Eastern Europe (FCC Environment CEE)

- New municipal contracts and firm renewals:
  - Contracts awarded: 70.
  - Annual turnover: 44.3 million euro.
  - Orderbook: 93.3 million euro.
  - New contracts, contract renewals and short-term contracts for C&I waste: 270.3 million euro.
- Provisional awards:
  - Contracts awarded: 8.
  - Annual turnover: 5 million euro.
  - Order book: 10.5 million euro.

#### Portugal (FCC Environment Portugal)

- New municipal contracts and firm renewals:
  - Contracts awarded: 9.
  - Annual turnover: 2.5 million euro.
  - Order book: 10.5 million euro.
- Temporary awards of municipal contracts:
  - Contracts awarded: 2.
  - Annual turnover: 0.9 million euro.
  - Order book: 3.8 million euro.

# Highlights 2018 Environmental Services

## January

FCC Environmental Services consolidates its position in the USA by winning the recyclable management contract in Houston.



## March

The City Council of Logroño renewed its confidence in FCC Medio Ambiente in March and extended the Street Cleansing and Waste Collection contract for another eight years.



## May

FCC Medio Ambiente and FCC Industrial work successfully on energy efficiency contracts for various Spanish municipalities.



## July

Cuenca City Council awards FCC Medio Ambiente the waste collection and street cleansing contract.



## September

FCC Medio Ambiente signs the contract for the construction of the second phase of the Environmental Complex of Guipúzcoa (CMG-2).



## November

FCC Medio Ambiente makes the global presentation of the affordable e-mobility platform for urban service vehicles.



FCC Medio Ambiente presents its LIFE4FILM project on the circular economy and plastics strategy to the European Commission in Brussels.



Ámbito will take care of environmental emergencies in the Basque Country.



January

February

March

April

May

June

July

August

September

October

November

December

## February

FCC Medio Ambiente obtains the Reduzco seal from the Spanish Office for Climate Change.



## April

FCC Medio Ambiente is awarded the contract for the street cleansing, beach cleaning and collection and transport of waste services in Vigo.



## June

Parla City Council, in Madrid, awards FCC Medio Ambiente the street cleansing and waste collection service.



## August

FCC Medio Ambiente renews the maintenance and conservation contract for the parks, gardens and green spaces in the city of Oviedo.

## October

Together with the City Council of Jaén, FCC Medio Ambiente presents the new machinery for the waste collection and street cleansing service.



## December

FCC Medio Ambiente begins incinerating non-recyclable waste and exporting energy to the grid at the energy recovery and recycling centre of Edinburgh and Midlothian (United Kingdom).



## Other milestones of the year

### Environment in Spain



#### Awarding of the service to maintain and conserve green spaces and urban trees and maintenance service of playgrounds in the city of Las Palmas de Gran Canaria

The set of the four contracts awarded to FCC in the first months of the year represents a combined order book of close to 52 million euro for a period of four years, with the possibility of extending it for two more years. It involves managing 253 hectares of green spaces, 152 playgrounds, 17,800 palm trees and more than 41,000 trees. It will count on a workforce of 370 people and a fleet of 106 vehicles, of which about 60 will be electric or hybrid Zero Emission.



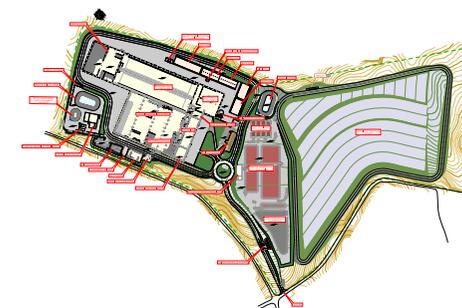
#### FCC Medio Ambiente wins the contract for urban sanitation in the municipality of Sestao, in Vizcaya

In April, FCC Medio Ambiente was leading the joint venture that was awarded the contract for waste collection and street cleansing, as well as the rat extermination, fumigation and disinfection service, for a period of four years, with the possibility of a two-year extension. It will count on a workforce of 55 people and a newly acquired fleet of eight vehicles for the waste collection service, one jet-vac tanker for gully and drain cleaning and 16 vehicles and machines and various auxiliary material for the street cleansing service, including various electrical equipment. The total amount of the contract is 13.42 million euro.



#### Awarding of the public space cleaning service and waste collection, and the renewal of the contract for cleaning municipal offices and buildings in El Prat de Llobregat, in Barcelona

In May, the City Council of El Prat de Llobregat and FCC Medio Ambiente signed a new contract for the public space cleaning service and waste collection for eight years and, in September, another for cleaning municipal offices and buildings for two years through the subsidiary SELSA. The combined amount is over 75 million euro. It will count on a workforce of 250 workers and will invest more than 10 million euro in collection and cleansing vehicles and office and building cleaning machinery. It also gives consideration to active measures on gender equality and fighting social exclusion.



#### Construction of the new Environmental Recycling Complex for the Mancomunidad del Este Association in Madrid

It will be the first of its type built in the Madrid Region for the end-to-end management of waste. The Community will allocate almost 58 million euro to finance the works that began in October 2018. The facility will commence operations in 2020. The Complex will be located on lands of approximately 60 hectares north of the municipality of Loeches and will process the waste from the 31 municipalities of the Mancomunidad del Este Association that, until now, was sent to the current landfill of Alcalá de Henares. It will be designed to operate with five processing lines, differentiating between residual, packaging, commercial, bulky and vegetable waste, with a total of 254,000 tonnes/year.

## Other milestones of the year

### Environment in Spain



#### FCC Medio Ambiente is awarded the contract for the street cleansing , beach cleaning and collection and transport of waste services in Vigo

In April, the City Council of Vigo, a city in which FCC Medio Ambiente has been providing services since 1989, awarded lots 2 and 3 of the street and beach cleaning services, collection and transport of various waste fractions and other special services for two years with the possible extension of another two. The contract amount is almost 58 million euro. The aim is to reinforce and consolidate the sense of citizen participation, promote the vision of waste as a resource, increase reuse from the perspective of a circular economy, to make Vigo the first 100% selective Spanish city .



#### Awarding of the contract for waste collection and street cleansing in Cuenca

In July, Cuenca City Council and FCC Medio Ambiente signed the contract for the collection and transport of solid urban waste, street cleansing and management of the municipality's recycling centre for 10 years; an order book of nearly 37 million euro. FCC has been providing services in Cuenca for 22 years. FCC will have a workforce of over 100 people, of which at least seven will come from a special employment centre for disabled staff.



#### Renewal of maintenance and conservation contract for the parks, gardens and green spaces of Oviedo

In August, the City Council of Oviedo awarded a joint venture led by FCC Medio Ambiente the contract to maintain and conserve parks, gardens and green areas, for four years with a possible extension of two. The total value, excluding extensions, is almost 17 million euro. The service will have a workforce of 115 and a fleet of 64 vehicles. It is noteworthy that 30% will be electric and 46% Compressed Natural Gas.



#### Signing of the contract for the construction of the second phase of the Environmental Complex of Guipúzcoa (CMG-2)

Construction, implementation and operation of the CMG-2 for 20 years, with an investment of 32.2 million euro and an order book estimated at 95 million euro. The new facility will have two plant types; one for biomethanisation and another to recycle slag from the waste-to-energy plant of phase 1 (CMG-1). Operations are expected to commence in the summer of 2019. The new infrastructure will allow the current tariffs to be maintained and will improve recycling, reuse and recovery of waste rates between 7 and 8 percentage points in Guipúzcoa to reach 60%, in line with the most advanced countries in Europe and will exceed the goal of 50% set by Europe 2020.

## Other milestones of the year

## International Environment

## United Kingdom (FCC Environment UK)


**The incineration of non-recyclable waste and the export of energy in the energy recovery and recycling centre of Edinburgh and Midlothian begins**

In November, FCC Environment UK began to incinerate non-recyclable waste at the Millerhill energy recovery and recycling centre. The plant will process 155,000 tonnes of waste per year, serving more than 600,000 people and generating more than 100,000 MWh of electricity. This is FCC's sixth plant in the United Kingdom, which will mean a total annual processing capacity of approximately 1,500,000 tonnes and the capability of exporting more than 700 GWh of non-fossil electricity per annum to the grid.


**Contract for municipal collection, street and public toilets cleaning in West Devon and South Hams**

The contract has been awarded for a period of eight years, that can be extended up to a maximum of 20 years. The current order book is over 58 million euro. The population served totals 138,770 people who will generate 110,000 tonnes of waste annually.


**Municipal collection contract in Wychavon**

The contract, which has been renewed since 1991, has been awarded for a period of 10 years, with an order book of 41 million euro and the possibility of extension for an additional 10 years. The population served totals 122,500 people who will generate more than 160,000 tonnes of waste annually.


**Renewal of the contract for operating the Civic Amenity Sites in Barnsdale, Doncaster and Rotherham (BDR)**

The contract, which has been renewed since 2008 and won the National Recycling Award in July 2018, recognising the work of FCC Environment in collaboration with the Barnsdale Metropolitan Council on recycling, has been awarded for a period of three years, with an order book of 16.5 million euro and the possibility of an extension of two further years. The population served totals 790,000 people and it will manage 75,000 tonnes of waste annually.

## Other milestones of the year

### International Environment

#### United Kingdom (FCC Environment UK)



#### Renewal of the municipal collection contract of Allerdale

The contract has been awarded for a period of eight years, with an order book of 37 million euro and with the possibility of extending it for another eight years. The population served amounts to more than 96,000 people, generating 78,000 tonnes of waste per year.



#### Modernisation and expansion of the Vratimov recycling plant (Czech Republic)

Located near FCC's offices in the region, the plant serves municipal as well as commercial and industrial customers, and allows recyclable materials to be recovered for their subsequent sale.

The expansion became necessary due to the increase in recyclable materials being generated in the region. The construction of the additional sorting line, together with storage space for incoming and outgoing materials, increases the processing capacity up to 48,000 tonnes per year and involved a total investment of 1.7 million euro.



#### Construction of a Refuse Derived Fuel (RDF) production plant in Zabrze (Poland)

It is located in FCC's facility in Zabrze and has a processing capacity of 60,000 tpa of MSW to generate 50,000 tpa of RDF for its subsequent use in cement plants and renewable energy generation plants. FCC has signed a contract to supply this amount of RDF to a cogeneration power plant at the same city for a minimum period of five years. The plant has involved an investment of 3.6 million euro.



#### Contract to operate the Arad composting plant (Romania)

The contract, which has been awarded for a period of five years and an order book of 4.5 million euro, includes the operation of the regional composting plant in Arad, with a capacity of 20,000 tonnes per year of bio-waste and vegetable waste.

#### Renewal of the street cleansing contract for lot 5 in the city of Prague (Czech Republic)

The services included in the contract, signed for a period of five years and with an order book of 14.2 million euro, are street cleansing during the summer months and maintenance works over winter.

## Other milestones of the year

## International Environment

## ..... Portugal (FCC Environment Portugal) .....

**Renewal of waste collection and street cleansing contract in Marco de Canaveses**

Renewal of the waste collection and street cleansing contract by the City Council of Marco de Canaveses for a period of five years. The population served totals 53,450 inhabitants with a surface area of 202 km<sup>2</sup> and represents an order book of 6 million euro.

**Renewal of waste collection and street cleansing contract in the municipalities of Douro Superior**

Renewal of the waste collection and street cleansing contract by the association of municipalities of Douro Superior for a period of five years. The population served totals 33,800 inhabitants with a surface area of 760 km<sup>2</sup> and represents an order book of 3.6 million euro.

## Industrial Waste (Ámbito) and USA

## ..... Industrial Waste (Ámbito) .....

**Completion of the works in the refrigerator treatment facility managed by Ámbito at Pont de Vilomara, in Barcelona**

The new facility, whose works allowed the latest technologies available in the market to be implemented and an 60% increase in its production capacity, has already processed more than 200,000 units, meeting and exceeding the strictest European environmental standards in terms of emissions, gas recovery and material recovery, which reinforces its important role in the fight against climate change and in favour of the circular economy. Thanks to the three million euro investment undertaken due to the renewal of the management contract over a period of 10 years with the possibility of four more, this facility is currently the most technologically advanced in its class, and the first in Spain suitable for processing electric water heaters containing refrigerant gases.

**The technology update processes of the Cadrete Glass Recycling facilities in Zaragoza continue**

A CSP (ceramics, stones and porcelains) glass treatment tower of our own design has been built, which will allow recovered glass or "calcin" (scrap glass) from the rejection flows coming from the Ámbito treatment plants for glass recycling located in Cadrete and Sagunto (Valencia) improving the treatment control and the quantity of the recovered glass.

## Other milestones of the year

## Industrial Waste (Ámbito) and USA

## Industrial Waste (Ámbito) .....

### Management of agricultural packaging waste generated in several Autonomous Communities

Awarding Ámbito the Contract offered by Sigfito Agroenvases SL, (SIGFITO) for the management of agricultural packaging waste generated in the Autonomous Communities of Castilla La Mancha, Murcia, Comunidad Valenciana, Madrid and the Balearic Islands, with an expected annual management of over 1,000 tonnes. This award is in addition to that obtained in Andalusia, and why FCC Group will now manage more than 60% of this type of packaging produced in Spain.

### Management of iron and steel industry zinc sludge in ECODEAL (Portugal)

Along 2018 ECODEAL carried out the removing and management of 16,000 tonnes of iron and steel industry zinc sludges from the Barreiro Business Park, located at the Tagus Stuary.



### FCC Environmental Services celebrates a Ground-breaking event at the Houston recycling plant location in the USA

At the beginning of July, FCC Environmental Services carried out a Ground-breaking event for the Material Recycling Facility (MRF) in Houston where it will separate and recover all recyclable materials in the city and subsequently market them. The event was attended by representatives of the City of Houston, among which were the mayor of the city, Sylvester Turner, and the deputy mayor and board member of district B, Jerry Davis. On behalf of FCC Environmental Services attended Iñigo Sanz, CEO of FCC Environmental Services, Tony Emilio, director of Municipal Services and Andrea Rodriguez, Technical Director.



Ground-breaking event at the Houston Recycling plant location, Texas.

# Service excellence

FCC Medio Ambiente has been helping municipal entities for more than 100 years with the management of services these entities offer their citizens. At FCC, we are aware of the importance of these services for the municipalities and have always taken great care of them.

This constant **concern** to **satisfy our customers** has led us to establish a **commitment to quality**, which has been recognised by entities outside our organisation, such as obtaining the ISO 9001 **quality certificate** in 1997, having been the first company certified by AENOR for these activities.

Additionally, we have always had the certainty that just satisfying our customers it is not enough; In today's society it is fundamental to consider all the interested parties, so **our commitment covers** other areas, such as **caring** for the **environment**, seeking **efficiency** in our services, the **health and safety** of our **workers**, **innovation** and, especially, **working** towards the **social and labour integration** of those disadvantaged **groups** that may be at **risk of exclusion**. This has led us to, over these more than 20 years, obtain **new certificates**. News this year, in terms of excellence and inclusion, include:

- [FCC Medio Ambiente and Obra Social from "la Caixa" join together to favour the social-labour inclusion of people at risk of exclusion.](#)
- [FCC Medio Ambiente obtains the Reduzco seal from the OECC \(Spanish Office for Climate Change\).](#)



- [FCC Medio Ambiente becomes the first Spanish entity to obtain the Q Tourist certification from ICTE \(Spanish Tourism Quality Institute\)](#) for the cleaning and conservation services of parks, gardens and green spaces and cleaning of beaches, coasts and coastal waters.
- **FCC Medio Ambiente obtained the rating of an Energy Services Company**, on 3 December 2018, in accordance with the UNE 216701 standard for the three possible activities: Energy auditing and consulting (Certificate PSE 2018/0001), Operations (Certificate PSE 2018/0002) and Investment (ESE) (Certificate PSE 2018/0003). Also note that in all three cases, we were rated in the highest category established by the standard (category 3).



## Industrial Waste (Ámbito)

In its commitment to both customers and society in general, through compliance with the legal requirements that apply to it, **Ámbito** 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 **accreditation** from **ENAC** as an entity to inspect associated **soils and groundwater** (ISO 17020).

In **health and safety**, **Ámbito** is **accredited** according to **OHSAS 18001**.

All centres have annual internal audits within the framework of the standards implemented and special **relevance** is given to the **training of workers**. In the last year, the number of training hours given increased by 29.24% and the number of workers who received training has increased by 16%. In addition, the average number of training hours per employee increased from 9.85 hours to 10.93 hours.

# Innovation and technology

2018 has been a year of **spectacular growth** in terms of **innovation** in FCC Medio Ambiente as **five new projects** were approved that have meant an **increase** in the R&D **budget** for the company of about **4.2 million euro**. This determination confirms the commitment to innovation within our organisation; **innovation that is in the DNA of FCC Medio Ambiente** and which is one of our hallmarks.

One of the highlights was the **global presentation** in November at the [Smart City Expo World Congress](#) in Barcelona of the first affordable and versatile e-mobility industrial platform for Urban Service vehicles, created from the VEMTESU project and designed for electric-hybrid vehicles with permanent electric drive, without mechanical transmission, which can be plugged-in, with an increased range and a novel self-supporting and modular body design and structural composition with ultra-low and advanced cabin.

For another year, the **Environmental Services** area **maintained** the **certification** of its **R&D Management System**, in accordance with the **UNE 166.002** standard.

**Projects** are currently grouped into **five technological** or knowledge areas:

- **Vehicles, mobile machinery and facilities**
- **Management and recycling of waste**
- **Information and Communication Technologies**
- **Sustainable development**
- **Resilience**

Five new projects **were approved** that have meant an **increase in the R&D budget** for the company of about **4.2 million euro**



FCC Medio Ambiente's e-mobility platform.

## Most significant projects registered or being registered in the R&D system



Side-loading electric collection vehicle developed on the FCC e-mobility platform.

### VEHICLES, MOBILE MACHINERY AND FACILITIES

- VEMTESU (*Development of Highly-Efficient Electric Traction Vehicular, Modular and Self-supporting Platforms for Urban Services*):

The project was completed in 2018 and has resulted in the development of the first affordable and versatile e-mobility industrial platform for Urban Service vehicles, successfully achieving the objectives set at the beginning. At the **Smart City Expo World Congress** [the platform was presented and the first vehicle developed on it exhibited](#) which had a **significant impact in the media**.

#### Main characteristics:

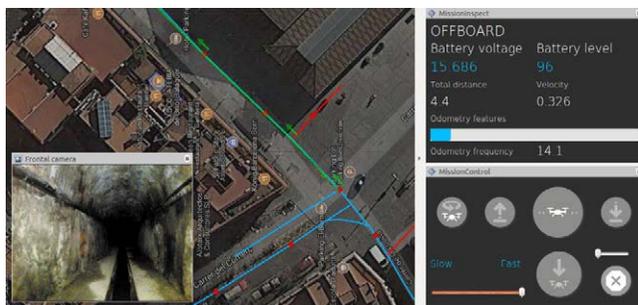
- **Zero emissions in the urban area** with the same service and performance as the current vehicles equipped with a heat engine.
- **Minimum emissions in transport** with power generation at the same time as movement, even with a gas heat engine and only for power generation.
- **Noise emissions at the lowest technically possible limit**, with special importance on starts, braking and in the use of bodywork.

- **Functionality equal to or better than the conventional vehicle** in any of its urban applications: greater acceleration, better braking, automatic control and electronic regulation.
- Through the **low cabin, facilitate and improve frequent access** to the cabin by operators. Currently, they must descend from a very high level and accidents are frequent.
- **Increase the driver's visibility** by increasing the glazing surface area.
- Full **integration** of the **body and cabin assembly** exterior shapes; important aesthetic and aerodynamic improvement.
- Very significant **improvement** in the **maintenance and accessibility of components** for maintenance activities in workshops due to the modular design of the components and their integration into the new vehicle. **Reduced maintenance costs**.
- **Durability** and **recyclability** of components: The **lifespan is extended** and the vehicles can be recycled, supporting the transformation to the **circular economy model**.
- **Integration** into the cabin of the **general control for the equipment and the bodywork**.
- **Maximising efficient energy use: the first vehicle developed with this platform uses 50% less energy** than a conventional vehicle with the same performance.
- Study, analysis and development of new technologies in electric and hybrid engines for the MSW collection lorry<sup>(1)</sup>
- Development of national, 100%-electric cleaning lorries, for multi-service use<sup>(1)</sup>

<sup>(1)</sup> Finished projects.

# ARSI

AERIAL ROBOT FOR SEWER INSPECTION



ARSI: Operator's View - Mapping and support applications.



ARSI in full flight in a gallery that can be visited.

## ● ARSI (Aerial Robot for Sewer Inspection)

Within the framework of the European project Echord++ (European Coordination Hub for Open Robotics Development), FCC Medio Ambiente, together with other companies, participates in the **ARSI consortium (Aerial Robot for Sewer Inspection)**, which develops an innovative automatic micro aerial vehicle (DRONE), equipped with multiple sensors, which will streamline, facilitate and improve the tasks of inspecting the sewers in Barcelona.

The **3rd phase of the ARSI project** was completed in 2018. Emphasis has been placed on the **processing of images** collected by the drone **flight** and the **automatic detection of structural defects** in the **pipes**, as well as on integrating GIS in programming inspection itineraries. FCC **will continue working** with the EURECAT Technology Centre in Barcelona **to reach a level of development of the platform compatible with industrial production** and to be able to **carry out inspection tasks** in the **production line** within the Barcelona sewer contract.

[Introduction to FCC's ARSI project](#)

[Latest news from the FCC ARSI project](#)

## MANAGEMENT AND RECYCLING OF WASTE

### ● SCALIBUR (Scalable Technologies for Bio-Urban Waste Recovery)

It is a [project from the Horizon 2020](#) call, led by ITENE (ES), in which, in addition to FCC Group (represented by **FCC Medio Ambiente** and **Aqualia**), entities from various European Union countries take part: AERIS (ES), ASA (GE), CENER (ES), CLUBE (GR), CSCP (GE), EXERGY (ND), GIE (ND), KOUR(IT), LAZIO REGION (IT), CITY COUNCIL OF LUND (SW), CITY COUNCIL OF MADRID (ES), SMVAK-AQUALIA (CZ), UNIVERSITY OF MODENA (IT), VISUM-IRIS(IR), WBD(ND), WETSUS (ND), ZEDATEC (ND).

**SCALIBUR**  
LEADING A REVOLUTION  
IN BIOWASTE RECYCLING





The project seeks to **take advantage of bio-waste, producing new by-products and bio-materials from them.** Within the SCALIBUR project, a complete study will be carried out of the quality, logistics and processing systems of urban solid waste and WWTP sewage sludge to obtain new high added value by-products. In short, breaking with the linear economy and creating new business models based on the circular economy, taking a sustainable approach.

In the cities where the processes and prototypes will be implemented, social awareness actions will be carried out, collecting and integrating the opinion of those interested in the project through strategies to stimulate social participation (through the creation of the Biowaste Clubs), selecting the communities that are most interested in it.

The organic fraction of the municipal waste will be used by FCC Environment and the CENER centre to produce biopesticides and bio-plastics through enzymatic hydrolysis followed by fermentation. In addition, FCC will apply a bio-chemical process to biomethanisation biogas to produce high added value alcohols for the chemical industry.

Last November, **FCC Medio Ambiente took part in presenting the SCALIBUR project to the representative of the European Commission, Isabelle Van Vorm, during the project's Kick Off at the facilities of ITENE (Packaging, Transport & Logistics Research Centre) in Valencia.**

- **INSECTUM: (Recovery of urban by-products and bio-waste through bio-conversion with insects to generate innovative products in strategic sectors)**

It is a project from CDTI's CIEN programme, led by FCC Medio Ambiente with the following also taking part: FERTINAGRO NUTRIENTES, BIOENTO FARM, DIBAQ DIPROTEG, POLYSISTEC and TRADICHEM as partners, as well as TECNALIA Research and Innovation, LEITAT Technological Center, CTAQUA (Aquaculture Technology Center), CETIM (Multisectorial Research Technological Centre), VISAVET (Health Surveillance Centre) and the University of Zaragoza. It involves **implementing an innovative urban bio-remediation recovery system based on its bio-conversion through insects in products with a high added value for the industry** (the human food sector, nutraceuticals/pharma, animal feed, fertilisers and chemicals). It proposes feeding insects with organic matter from selective collection, organic matter recovered from MSW and digestate from bio-methanisation.



- **B-FERST (Bio-based fertilising products as the best practice for agricultural management sustainability).**

It is a project financed by the Public-Private Association Bio-Based Industries (BBI JV), led by FERTIBERIA S.A. and which, in addition to FCC Medio Ambiente, the following also partake: FCC Aqualia, S.A., University of León, Novamont Spa, Drage & Mate International SI, Fkur Kunststoff GmbH, Agrisat Iberia SI, Vlaamse Instelling Voor Technologisch, Ag Futura Technologies, Arcadia International, Reg&Env Center Central& Eastern Europe y Instytut Uprawy Nawozenia Gleboznawstwa.

The main goal of B-FERST is to **integrate the recovery of bio-waste into agriculture by creating new bio-based circular economy value chains coming from municipal solid waste and the agricultural industrial sector** and aimed at producing mineral and organomineral fertilisers and developing the nutrient mixture suitable for its use. The objective is to change the traditional value chain of fertiliser production. To achieve this, the sector must **evolve from a linear manufacturing system to a lean manufacturing system based on the circular economy that will be developed in B-FERST.** The new fertilisers will be produced in a 1t / h capacity demonstration plant through nutrient (N and P) recovery processes and granulation and addition of bio-stimulants. Ash streams, sewage sludge, struvite and municipal waste compost will be used.

LIFE4FILM (LIFE17 ENV/ES/000229 Post-consumption film plastic recycling from municipal solid waste)

In November, FCC Medio Ambiente presented the LIFE 4FILM project on recycling plastic film from urban waste to the European Commission in Brussels during the launch event of the 2017 edition of the LIFE programme (Environment projects-Resource Efficiency/Waste).

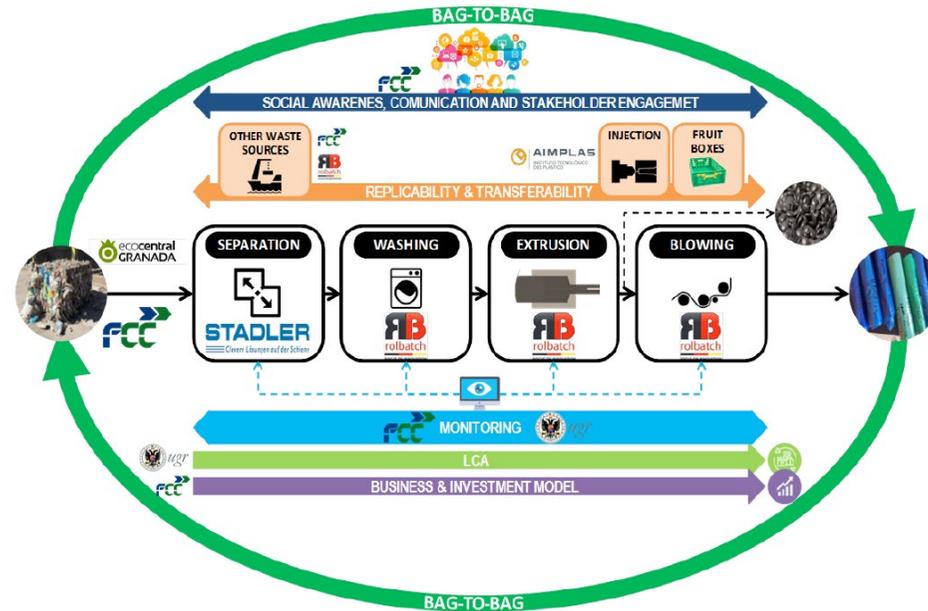
LIFE 4FILM is the first LIFE project in which FCC Medio Ambiente has been the coordinator, and its main objective is to avoid landfill or energy recovery of plastic film (LDPE) present in solid urban waste by implementing an innovative recycling process on a semi-industrial scale through a 10,000t/year capacity recovery line in Granada

(Spain), which will be operated by FCC with the aim of demonstrating its profitability and its ability to be replicated at a European level.

The LIFE4FILM project was approved around mid year by the European Executive Agency for Small and Medium-sized Enterprises (EASME), which is responsible for managing the LIFE programme, and the grant agreement signed with EASME will involve the contribution of almost 44% of the total 4.54 million euro budget. It is expected that the project will begin imminently and last for two years.



Presentation of the LIFE4FILM project to the European Commission in Brussels.



● **DEEP PURPLE** (*Domestic extraction of emerging products with purple phototrophic bacteria*)

A project financed by the Public-Private Association Bio-Based Industries (BBI JV), led by FCC Medio Ambiente, in which the following also partake: Technical University of Delft, Universidad Rey Juan Carlos, FCC Aqualia, S.A. University of Valladolid, Bioeconomy Cluster Management, Exergy, IRIS, Materia Nova, Avecom, Asegre, University of Bologna, Confagricoltura, National University of Ireland, Galway. This is a pilot research project on **applying the most innovative techniques across the board in managing the different effluents generated in the organic waste treatment facility (digestate, leachate and biogas), based on the Circular Economy principles** promoted by the European Union. It uses purple phototrophic bacteria to recover by-products in wastewater, such as polyhydroxyalkanoates and hydrogen, single cells, or nitrogen and phosphorus for their use as fertilisers.



Ecoparque 2 (Barcelona). Prototype UMBRELLA in operation. METHAmorphosis.



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

LIFE-Methamorphosis - LIFE14 CCM/ES/000865

● **METHAmorphosis** (LIFE 14/CCM/ES/000865: *Waste streams treatment for obtaining safe reclaimed water and biomethane for transport sector to mitigate GHG emissions*)

A [project](#) developed by a consortium made up of six entities (Metropolitan Area of Barcelona, Aqualia -project leader-, FCC Medio Ambiente, Gas Natural, Icaen and SEAT) and co-financed by the European LIFE programme which is finalising the construction of a demonstration plant in the Ecoparque de Besós, managed by FCC Medio Ambiente.

**The process integrates three technologies recently developed by Aqualia (the AnMBR, the ELAN -autotrophic nitrogen removal- and the washing of biogas), to improve efficiency in the production of biomethane in the treatment of leachates from MSW bioresidues treated at anaerobic digestion plants.** This biomethane will be used as fuel in natural gas vehicles; among them, waste collection vehicles under normal operating conditions, provided by FCC Medio Ambiente. The reduction of greenhouse gas emissions in the project is achieved through two actions: on one hand, the process implemented in the treatment of leachates **allows energy savings of around 70% compared to the conventional process** and; on the other hand, the use of biomethane as a fuel for vehicles has a **carbon footprint some 80% less** than that of petrol or diesel vehicles. METHAmorphosis represents an advance in the energy recovery of waste and



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

a great circular economy proposal as it converts the waste processing centre into a fuel producer with the capacity to power vehicles.

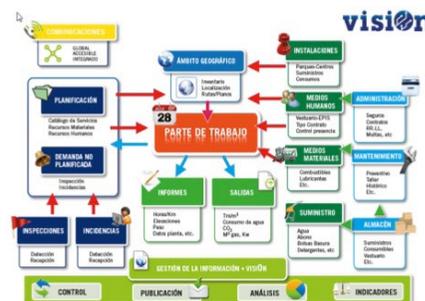
Currently, the AnMBR anaerobic effluent treatment line is in operation, the ELAN nitrogen autotrophic elimination line is in the process of commissioning after its inoculation with the bacterium annamox and the biogas upgrading line has started production of biomethane for tests in SEAT passenger cars and FCC Medio Ambiente's lorries.

The [European Commission has used METHAmorphosis as an example of the LIFE](#) programme in the November 2017 report **“Two years after Paris. Progress towards meeting the EU's climate commitments”**.



## INFORMATION AND COMMUNICATION TECHNOLOGIES

**vision**  
smart environmental services



### ● VISION

Within the [VISION](#) project, 100% developed by FCC Medio Ambiente, the process to integrate all aspects of managing our services in a unified and technologically up-to-date manner continued throughout 2018. In this sense, It is noteworthy that in 2018 the **tool was implemented for all FCC Medio Ambiente contracts** in Spain, **integrating the Quality Management, Warehouse Management and Contracting systems**.

At the same time, deployment of the platform to all contracts and activities in our area has continued. Some of the most relevant functional aspects implemented in this year are:

- **Automatic controls on legal compliance**

System to define legal requirements needed for different activities, automatic discovery procedures based on service information and verification of compliance providing documentary justification.

- **Management of environmental aspects**

By analysing data on consumption, waste, inventories of elements, signed contracts, etc. a map is drawn up of current and potential environmental aspects to allow the impact of our activities to be measured and actions to mitigate it taken.

- **Integration of Service Management with administration and human resources systems**

In order to move forwards with having a fully integrated ERP (Enterprise Resource Planner), the connection systems between the administrative and financial management and human resources platforms have been created. Systems for information structures, procurement with warehouses and updating of personnel data have been integrated.

- **Sensors on our vehicles**

In partnership with the main suppliers of specialised vehicles, the control systems of the collection vehicles has been integrated with FCC Medio Ambiente's on-board control system. With this step, there is an integrated system that allows operations, alarm management, preventive maintenance, etc. to be controlled.

- **Service compliance control system**

Based on the existing inventory information, service scheduling, job execution, location and sensor systems, controls are developed to verify the provision of scheduled services and compliance with planned routes.

- **Personnel: Production support system**

In the management of personnel, production support systems have been integrated in aspects of attendance records, activity shifts, management of PPEs and clothing, training records, etc. These systems have been related to the programming of services, legal compliance, etc.

## SUSTAINABLE DEVELOPMENT

### ● SEEUEUS (© System for Environmental Efficiency Evaluation of Urban Services)

During 2018 and at the conclusion of Phase 2, the computer application based on innovative and inclusive ICTs to monitor, calculate and communicate environmental information has been successfully developed, which allows relevant indicators (KPIs) to be produced to evaluate and improve efficiency in the environmental management of services: responsible use of energy and water resources; reduction of GHG emissions and the production of waste.

The development of a third phase of the project is planned in 2019 to integrate the achievements made in the previous phases, within the VISION platform, as mentioned in previous sections.

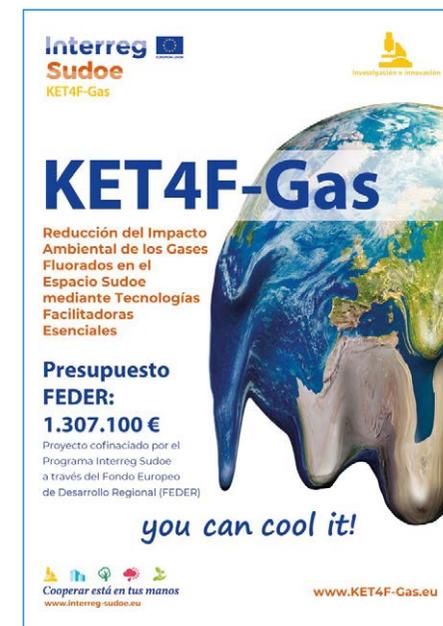
### ● KET4F-Gas Project

Ámbito, the Industrial Services division, continues to develop the "[KET4F-Gas project](#), - Reduction of the Environmental Impact of Fluorinated Gases in the Sudoe Space using Key Enabling Technologies". The project **is financed by the European Regional Development Fund through the European programme Interreg Sudoe**, and aims to respond to the challenges of climate change in the Sudoe space. The project goal is to investigate alternatives that contribute to the reduction of greenhouse gas emissions by developing and improving technologies to recover and replace fluorinated gases.

Fluorinated gases, extensively used in the refrigeration industry, have a high impact on global warming, can be up to 23,000 times more harmful in terms of the greenhouse effect than CO<sub>2</sub>, and remain trapped in the atmosphere for thousands of years. Their use has increased dramatically in recent years as a result of the need to replace the chlorofluorocarbons (CFCs) that are responsible for destroying the ozone layer. In the short and medium term, in addition to developing substitute compounds, it is necessary to develop technologies that allow emissions of these gases to be processed.

The 'KET4F-Gas' project is therefore fully aligned with the requirements of **EU 517/2014**, which aims to **reduce fluorinated gases** thanks to the **recovery and reuse of these compounds** from waste generated at industrial and domestic levels, the **elimination of emissions** from maintaining the equipment, and **the recovery of the gases at the end of the useful life of equipment** and products containing them.

KET4F-Gas will last for three years and receive total funding of 1.7 million euro. The project is made up of 14 partners and six associates, from Spain, France, Portugal and the United Arab Emirates, among which are universities, companies, waste and environmental agencies and other public and private entities with the common interest of dealing the Kigali Amendment. The overall coordinator is Lisbon's Universidade Nova.



Ámbito's participation in this project is in response to its firm commitment to sustainable development and the fight against climate change through innovation, and contributes to it by offering its extensive experience in refrigerant gas wastes acquired over 22 years in refrigerator waste management at its plant in Pont de Vilomara (Barcelona). In this time about 1,800,000 refrigerators have been dealt with; a total weight of around 100,000 tonnes. Ámbito also has an exclusive facility to receive and process waste containing gases located in Fustiñana (Navarra), reconditioning them to be sent for final management.