Geographical divisions and sector analysis. Strategy | 71
Activity in the Medio Ambiente area | 81
Highlights 2019 | 82
Excellence and sustainability | 96
Innovation and technology | 101

Environment

The area's turnover reached **€2.92 billion**, an **increase of 3.29%** on the previous year and the **pre-tax profit increased to €201 million.**

Geographical divisions and sector analysis. Strategy

For over 100 years, the Environmental Services area of the FCC Group has provided municipal services and end-to-end waste management, **serving almost 60 million people** in around 5,000 municipalities. The company operates in a total of 12 countries, providing a range of services, which demonstrates its varied experience in the sector: collection, treatment, recycling, energy recovery and disposal of urban solid waste, public street cleaning, maintenance of sewage systems, ground maintenance, treatment and disposal of industrial waste, and the recovery of contaminated soil.

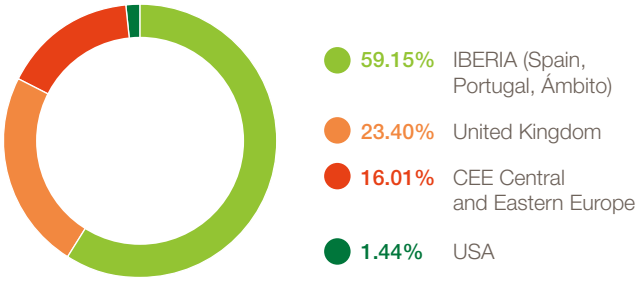
FCC Servicios Medio Ambiente Holding S.A.U, which is the backbone of the Environmental Services activities, is **structured into four geographical divisions**:

- Iberia: FCC Medio Ambiente (Spain), FCC Environment Portugal, FCC Ámbito (Industrial Waste)
- United Kingdom: FCC Environment UK
- Central and Eastern Europe: FCC Environment CEE
- USA: FCC Environmental Services

FCC Servicios Medio Ambiente successfully **issued Green Bonds worth €1.1 billion.**

Turnover 2019. By divisions

FCC Servicios Medio Ambiente



In 2019, the area's **turnover grew 3.29%** on the previous year to reach **€2.92 billion** and the **pre-tax profit rose to €201 million**, representing a 22.47% increase compared to 2018, increasing from 5.8% to 6.9% of turnover. **Contracting rose 40.6%** on the previous year to €3.03 billion, leaving the **order book volume at €10,37 billion**.

This year, as a fundamental milestone, FCC Servicios Medio Ambiente successfully **issued Green Bonds** worth **€1.1 billion**.

FCC Servicios Medio Ambiente manages about **25 million tonnes of waste** and **produces** close to **3.5 million tonnes** of **secondary raw materials** and refuse-derived fuel (RDF) every year. The company has more than **700 waste management facilities in operation**, of which more than **200** are **environmental compounds** used for **treating** and **recycling** waste, including **11 waste-to-energy projects**, with an annual capacity of **3.2 million tonnes** and **360 MW of non-fossil electricity**.

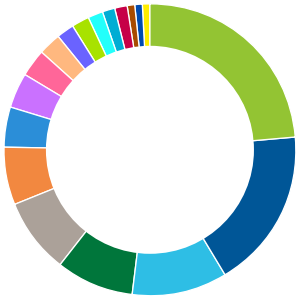
FCC Medio Ambiente Iberia (Spain, Portugal and Ámbito)

FCC Medio Ambiente provides environmental services in over **3,400 municipalities** throughout **Spain** and **Portugal** (FCC Environment), **serving** a **population** of about **30 million inhabitants** with activities including 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 2019, FCC Medio Ambiente Iberia **managed** almost **12 million tonnes** of urban solid **waste**.

Turnover 2019. Geographic location

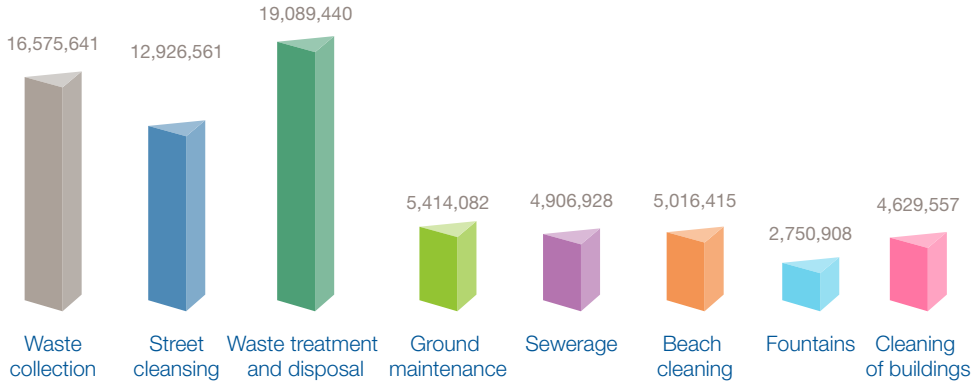
FCC Medio Ambiente. Iberia



23.9%	Catalonia	2.6%	Galicia
17.7%	Madrid	2.0%	Navarre
10.6%	Valencian Community	2.0%	Asturias
8.7%	Andalusia	1.6%	Balearic Islands
8.3%	Basque Country	1.4%	Extremadura
6.4%	Aragon	1.3%	Portugal
4.4%	Canary Islands	0.9%	Castilla-La Mancha
4.0%	Castilla y León	0.8%	La Rioja
2.9%	Murcia	0.7%	Cantabria

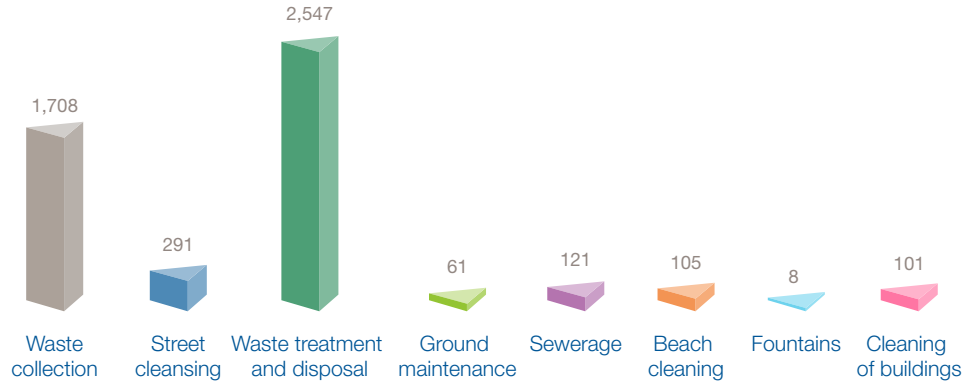
Inhabitants served in 2019

FCC Medio Ambiente. Iberia



Municipalities served in 2019

FCC Medio Ambiente. Iberia



The **turnover** of FCC Medio Ambiente Iberia reached **€1.72 billion**, representing an increase of **6.13%** on 2018, and the gross operating profit also rose to **€279.5 million**.

This year, the **remodelling** of the **waste management master plans** in different autonomous **regions** and large **municipalities**, in order to adapt them to the European Union's recycling and landfill redirection objectives for 2030-35 and to the implementation of the **circular economy social model**, continues to be 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.

FCC Medio Ambiente's **business strategy** demonstrates its **commitment to the fight against climate change** and **compliance** with the **Sustainable Development Goals** (SDG) of the United Nations' (UN) 2030 Agenda, with the achievements listed in its **2017-18 Sustainability Report**, under the slogan **"From commitments to action"**. FCC promotes a comprehensive **management model** of **services** to **encourage economically, socially** and **environmentally sustainable cities** in which the fundamental pillars are **policies** of **equality** and social and occupational **integration** of **disadvantaged groups**, in addition to **innovation** applied to **clean energy** and **waste recycling** technologies.

As a result of the **efforts** of its **R&D** teams, FCC Medio Ambiente has launched the **first 100% electric industrial chassis-platform for urban service vehicles**, which was the **winner** of the **World Smart City Awards** in the **Innovative Idea** category at the Smart City Expo World Congress 2019, the global event of reference for smart cities. The **industrial production** of this **Zero Emission Vehicle** (ZEV) **chassis**, which drastically **reduces** noise, pollutant and CO_2 **emissions** and **energy consumption** by **50%**, will make it possible to **implement affordable e-mobility** for **heavy vehicles** in **cities** with the following **environmental benefits**.

In this framework, **annual turnover** of FCC Medio Ambiente reached **€1.72 billion**, an **increase of 6.13%** compared to 2018; **and gross operating profit also increased to €279.5 million**, which is equivalent to **16.21% of the turnover**. **Contracting** in the year reached **€1.25 billion**, an increase of **18.58%**, with the **order book** standing at **€5.44 billion** for activities including 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.

FCC Ámbito (Industrial Waste)

FCC 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 different waste, **Ámbito** has become a **strategic partner** of **industries** and **businesses** which, in line with the **circular economy**, carry out their business activities ensuring environmental, social and economic **sustainability**.

It has a total of **40 treatment centres** across **Spain** and **Portugal**, which represents over 67 treatment lines and guarantees the functionality of the facilities. Internationally, FCC Ámbito has notable **presence** in **Portugal**, where it operates through its **ECODEAL** subsidiary.

In the **Spanish market**, it has continued to record an **increase** of industrial and commercial **waste volume** throughout 2019, with a **5.5% increase of tonnes managed**. However, this increase arose within a context characterised by the **intense competition** established by waste producers themselves and facilitated by the lack of subsequent producer responsibility when the waste is delivered to an authorised waste manager. **Legislative changes** coming into force tend to lean towards **greater** control of waste **traceability** by the regional governments. These changes will undoubtedly **favour** management **companies** with **end treatment facilities**, such as FCC Ámbito.

In **Portugal**, there has also been an **increase** of **activity** with the main recurring customers and a recovery of prices. This meant the year closed with a **7% increase** of tonnes.

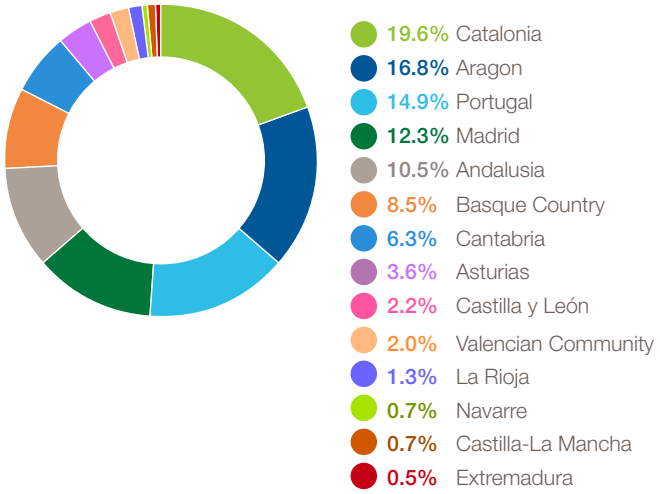
In this context, Ámbito's **annual turnover raised by 4.96%** on 2018, reaching **€122.7 million**. The **gross operating profit** also **increased** by **41.03%** to €26 million, equivalent to 21.22% of turnover.

In 2019, the **industrial waste** activity will continue to **focus** on the **efficiency** of **operations** and **growing** the activity. The incorporation of **new technologies** will allow **FCC Ámbito to consolidate** its position in the **recycling** and waste **recovery** markets, as that of a key player in the **circular economy**.

Ámbito's annual **turnover** increased by **4.96%** on 2018, reaching **€122.7 million**, and the **gross operating profit** also grew by **41.03%.**

Turnover 2019. Geographic location

Ámbito Industrial Waste. Spain and Portugal



United Kingdom
FCC Environment UK

FCC Environment is one of the **leading companies** in the **United Kingdom** for comprehensive **waste** management and **recycling**. It holds a unique position for providing services in an ever-changing waste sector. By building on a solid legacy of waste processing, it progresses towards a **greater** volume of **recycling** and the **generation** of **green energy**.

The company has a **wide range of waste management centres** that aim to **minimise** the **waste** disposed at **sanitary landfill sites** by processing the waste to ensure it reaches its full **potential** as a **valuable resource**. This is all carried out on the premise of being a thriving and successful company while also reducing the impact on the environment.

Across the whole country, FCC Environment **serves** over **18 million inhabitants**, and in **2019**, and in 2019 it has managed about **7 million tonnes of waste and 1.4 million tonnes of recovered material and Refuse-Derived Fuel (RDF).**

FCC Environment develops five key business areas: business waste solutions, municipal services, recycling and composting, green energy, and waste processing.

In 2019, the situation caused by Brexit in the United Kingdom led to uncertainty, which came to a head when the new Conservative government, with the support of an absolute majority, **executed Brexit** on **31 January 2020**. It includes a **transition period** until **December 2020**, during which greater clarity **will be sought** regarding the **trade agreement** with the **European Union (EU)**.

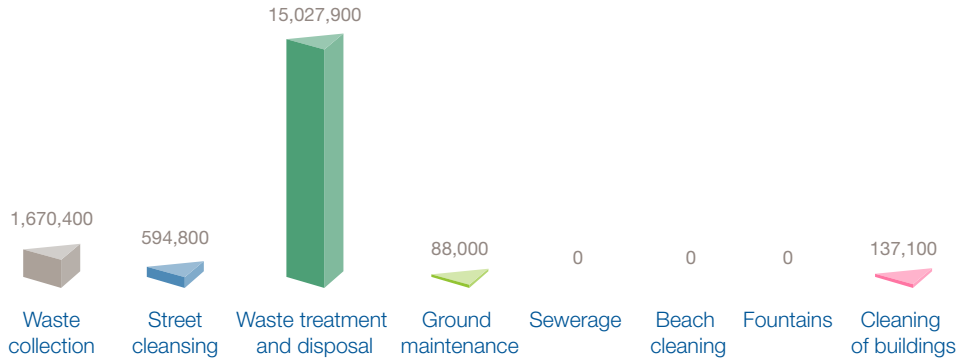
However, the **UK government** has **pledged** to go beyond the **commitments made** with the **EU** regarding **environmental** issues and aspects regarding the fight against **climate change** and **recycling** and waste **disposal objectives**. To this end, a **Resources** and **Waste Strategy** has been drawn up and the **Draft Environment Bill** has been presented in parliament. Once approved, this Bill will lead to significant changes in the management of waste and recycling in the United Kingdom in order to make **gradual progress** in achieving a **greater** level of **recycling** and **to end** the **export** of **waste** and **recyclable material** for their treatment abroad.

FCC Environment UK is working **closely** with the **British government** and with industry peers to help **shape** the **legislative framework** which will help the environmental services **activity** to **continue to thrive** during these times of change.

In this context, annual **turnover stands at €682.0 million, with a gross operating profit of €144.4 million, a 15.18% increase** on the previous year and **21.17% of revenue**. **Contracting reached €632.4 million** with an **order book of €3.40 billion**.

Inhabitants served in 2019

FCC Environment (UK)



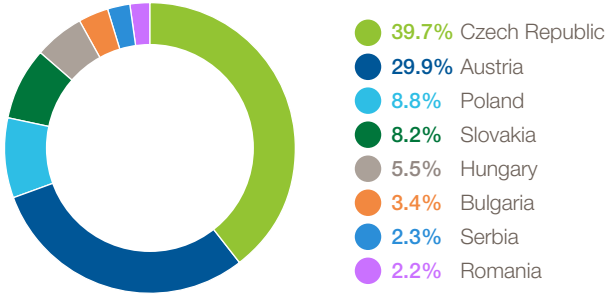
Central and Eastern Europe
FCC Environment CEE

FCC Environment is one of the **leading global** groups in **Central** and **Eastern Europe (CEE)** in the **comprehensive management** of urban solid **waste** and **recovery** of **renewable energy**. It applies innovative systems and the cleanest, most advanced technologies in the **provision** of **quality services** that are **sustainable** on the medium and long term and adapted to customers' needs.

This division is present in **eight countries**: **Austria, Czech Republic, Slovakia, Hungary, Poland, Romania, Bulgaria and Serbia**. Across these countries, about **5 million inhabitants** in **1,360 municipalities** are served, and in 2019, almost 6 **million tonnes** of waste and **660,000 tonnes of recovered material and Refuse-Derived Fuel (RDF) were managed**.

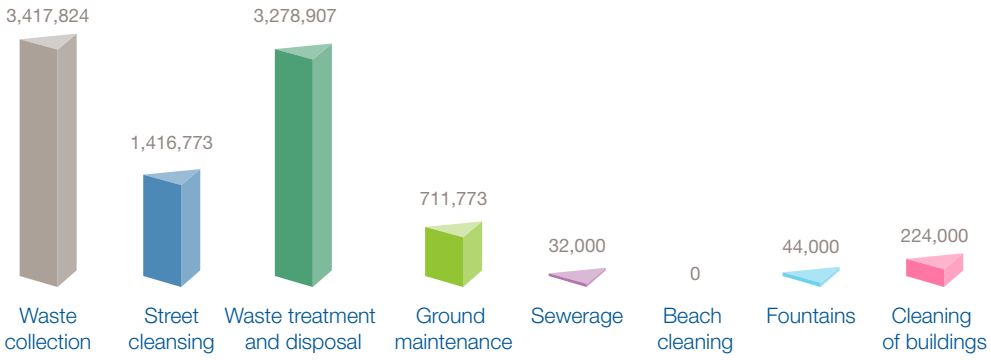
Turnover 2019. Geographic location

Central and Eastern Europe



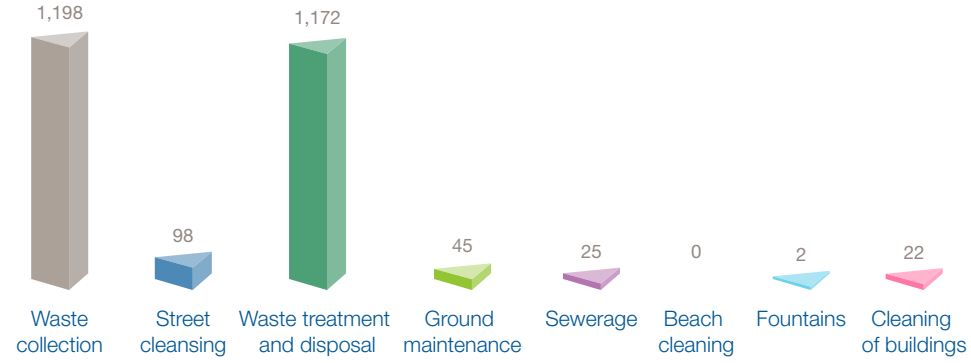
Inhabitants served in 2019

FCC Environment CEE



Municipalities served in 2019

FCC Environment CEE



Urban solid waste energy recovery plant, Zistersdorf (Austria).

The annual **turnover** is **€466.8 million**, an increase of **5.69%** on 2018, and the **gross operating profit** reached **€64.5 million**, an increase of **23.32%**.

The most relevant market drivers in the European Union were the recycling and landfill diversion objectives set for 2030/2035 in the **Circular Economy package**, in accordance with the **Sustainable Development Goals** of the **United Nation's 2030 Agenda**. The most significant objectives proposed 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**.

In the period between 2020 and 2021, the Central and Eastern European countries must transpose the ambitious objectives of the Circular Economy Package into their national legislation and set specific measures for reaching these objectives. In line with the legal requirements in the CEE countries, **FCC will further develop** existing **business models based** on **selective collection**, waste **treatment** and **recycling** (sorting and composting), and **waste-to-energy technology**.

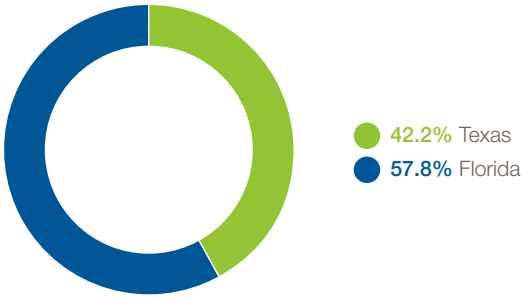
In this context, the **annual turnover is €466.8 million, an increase of 5.69%** on 2018, and the **gross operating profit reached €64.5 million, an increase of 23.32%. Contracting grew by 61.91%, reaching €588.8 million**.

The United States FCC Environmental Services USA

FCC Environmental Services is one of the **groups in the USA with the biggest development** in terms of **comprehensive management** and **recycling** of urban solid **waste.** The company **operates** in the **states** of **Texas** and **Florida**, and will **shortly start** providing waste collection services in Omaha, the most populated city in **Nebraska**. Across these states, more than **5 million inhabitants** are served, and in 2019, more than **500,000 tonnes** of **waste** and **140,000 tonnes of recyclable material were managed**.

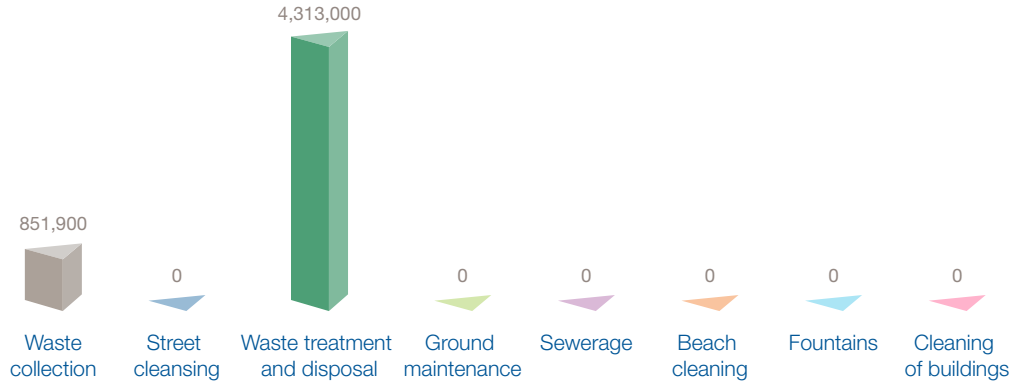
Turnover 2019. Geographic location

FCC Environmental Services USA



Inhabitants served in 2019

FCC Environmental Services USA



Five years after starting environmental activity in the **USA**, the **market** continues **offering** significant **opportunities** in the field of urban solid waste management, for collection, recycling and treatment.

In addition to the collection **contract** in Omaha, are also very valuable the contracts **won** in some of the largest towns in **Florida**, such as **Palm Beach** and **Volusia**.

In terms of waste treatment, FCC Environmental Services has **opened** the **Houston recycling facility (Texas)**. The **contract** with the city of Houston is for **20 years**, with a treatment capacity of **145,000 tonnes per year**.

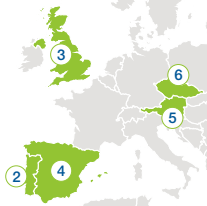
In these circumstances, the **annual turnover** was **€41.9 million** in 2019, an **increase of 37.18% over 2018**, and this will double in the short term once the contracts awarded have been implemented. **Contracting** grew 163.31% on 2018, reaching a **new record** of **€557.9 million**, placing the **order book** at **$1.00 billion**, and this figure would reach $1.80 billion if the potential contract extensions are added.

Annual **turnover** was **€41.9 million** in 2019, an increase of **37.18%** over 2018.

FCC Environmental Services Activity 2019

- Opening of the recycling facility in Houston.
- Waste collection contract in Palm Beach County (Florida) for 7 years.
- Commercial waste collection contract in Polk County (Florida) for 4 years.
- Waste collection contract in Volusia County (Florida) for 7.5 years.
- Waste collection contract in the city of Omaha (Nebraska) for 10 years.
- Contract for the management of biosolid waste from water plants in the city of Houston (Texas) for 5 years.
- Recyclable material processing contract in the city of Huntsville (Texas) for 3 years.
- Recycling centre management contract in the city of Omaha (Nebraska) for 5 years.
- Recyclable material processing contract in the city of Laporte (Texas) for 8 years.

Activity in the Environment area



1. USA

FCC Environmental Services

- **Omaha (Nebraska)**
  Waste collection.
  220.0 million euro.
- **Palm Beach (Florida)**
  Waste collection.
  196.0 million euro.
- **Volusia County (Florida)**
  Waste collection.
  75.0 million euro.
- **Houston (Texas)**
  Biosolid waste management.
  27.0 million euro.

2. Portugal

FCC Environment Portugal

- **Vila Real**
  Waste collection.
  1.6 million euro.

FCC Ámbito

- **Martinhal**
  Soil decontamination for ECODEAL.

3. United Kingdom

FCC Environment United Kingdom

- **Lostock (England)**
  Development of an energy-from-waste facility.
  570.0 million euro investment.
- **Bedfordshire (England)**
  Waste collection and street cleansing.
  92.0 million euro.
- **Suffolk (England)**
  Management and Operation of Recycling Centres.
  43.0 million euro.
- **Hertfordshire (England)**
  Management of transfer and transport operations and waste treatment.
  27.0 million euro.
- **East Lothian (Scotland)**
  USW thermal treatment.
  30.5 million euro.

4. Spain

FCC Medio Ambiente

- **Jerez de la Frontera (Cadiz)**
  Waste collection and street cleansing.
  186.9 million euro.
- **Almuñecar (Granada)**
  Waste collection, street cleansing and beach maintenance.
  46.4 million euro.
- **Txingudi (Guipúzcoa)**
  Waste collection and street cleansing.
  42.8 million euro.
- **Tarragonés (Tarragona)**
  Waste collection, street cleansing and recycling centre.
  42.7 million euro.
- **Gomecello (Salamanca)**
  Recycling and treatment plant.
  29.8 million euro.
- **Fuengirola (Málaga)**
  Waste collection and street cleansing.
  22.8 million euro.
- **Teruel (Aragón)**
  Domestic waste collection for the Association Agrupación Nº8 - Teruel.
  17.2 million euro.
- **South East Area - Leganés (Madrid)**
  Pneumatic collection network maintenance, street cleansing and pest control.
  17.1 million euro.
- **Las Palmas (Gran Canaria, Canary Islands)**
  Schools cleaning.
  17.0 million euro.
- **Madrid**
  Renovation of the La Gavia park.
  14.1 million euro.
- **Barberá del Vallés (Barcelona)**
  Waste collection and street cleansing.
  13.7 million euro.
- **San Sebastián (Guipúzcoa)**
  Cleaning of municipal buildings.
  13.1 million euro.

FCC Ámbito

- **San Fernando, Cadiz, Puerto Real and Rota (Cadiz)**
  Management of hazardous and non-hazardous waste from Navantia.
  3.3 million euro.
- **La Muñoza (Madrid)**
  Operation of recycling centres and physical-chemical and biological treatment plants for IBERIA.
- **Arganda de Rey (Madrid)**
  Completion of extraction works of the pumpable phase at the acid tar lagoons for TRAGSA.

5. Austria

FCC Environment CEE

- **Vienna, Lower Austria, Carinthia, Styria**
  Waste management at railway stations for ÖBB/Austrian Railways.
  20.0 million euro.
- **Kitzbühel**
  Railway transport and waste incineration.
  6.0 million euro.

6. Czech Republic

FCC Environment CEE

- **České Budejovice**
  Classification, loading and transport of old landfill waste.
  14.7 million euro.
- **Ostrava**
  Decontamination and recovery of thixotropic sewage lagoon.
  9.9 million euro.
- **Nosovice**
  Waste collection, treatment and removal, and dangerous waste treatment.
  2.7 million euro.

Highlights_Environment Services

2019

January

- FCC Medio Ambiente is awarded extensions to several of its most relevant contracts worth €27 million (Spain).

February

- Suffolk County (United Kingdom) awards FCC Environment the contract for operating eleven recycling centres.

March

- FCC Environmental Services is awarded a contract worth $215 million in Palm Beach (Florida, USA).
- FCC Environment will develop one of Europe´s largest energy-from-waste facilities in Lostock (UK), in partnership with the Danish fund Copenhagen Infrastructure Partners (CIP).

April

- FCC Environmental Services holds the grand opening of the new state-of-the-art Material Recycling Facility in Houston (Texas, USA).
- Tenth anniversary of the FCC Environment´s waste-to-energy facility in Zistersdorf (Austria).

May

- FCC Medio Ambiente manages the service of seven of the ten cleanest cities in Spain, according to the 2019 report from the OCU (Organization of Consumers and Users).

June

- FCC Medio Ambiente is awarded the waste management, street cleansing and beach maintenance contract in Almuñécar (Granada, Spain).

July

- FCC Environmental Services is awarded the urban solid waste collection contract for Volusia County (Florida, USA).

August

- FCC Medio Ambiente is awarded the waste management and street cleansing contract in Jerez (Cadiz, Spain).
- FCC Environmental Services wins the urban solid waste collection contract in Omaha (Nebraska, USA).

September

- FCC Environment officially opens the Millerhill energy-recovery and recycling centre for Edinburgh and Midlothian (Scotland, United Kingdom).

October

- FCC Medio Ambiente renews the domestic waste treatment and transfer service contract for the province of Salamanca (Spain).
- FCC Environmental Services renewed the contract for the management of the biosolid waste from water plants in Houston (Texas, USA).

November

- FCC Medio Ambiente wins, with its 100% electric modular chassis-platform, the World Smart City Awards 2019 in the category of Innovative Idea (Barcelona, Spain).
- FCC Medio Ambiente carries out the issuance of a green bond worth €1.10 billion.

December

- Active participation of FCC Medio Ambiente within the framework of the Climate Change Summit COP25 in Madrid (Spain).
- FCC Medio Ambiente publishes its 7th sustainability report under the slogan "From commitments to action".

Other highlights

Issuance of Green Bonds

In November this year, as a fundamental milestone, FCC Servicios Medio Ambiente Holding, S.A.U successfully issued Green Bonds worth €1.1 billion. To this end, the company developed a Green Bond Framework, which is aligned with the International Capital Market Association (ICMA) 2018 Green Bond Principles, and has been validated by an independent external body (Green Bond Second Opinion) to ensure that this framework is in fact aligned with the Green Bond Principles. The Green Bond funds will be used to finance projects that will reduce emissions, reduce waste disposal at landfills and promote circular economy actions.

FCC Medio Ambiente Spain

Awarding of the waste management and street cleansing contract in Jerez (Cadiz)

The Jerez city council awarded a joint venture led by FCC Medio Ambiente, and with the concourse of the special employment centre FCC Equal, the urban solid waste management and street cleansing contract for nine years, with a possible one-year extension. The total value of the contract amounts to more than €186 million. There will be more machinery with more sustainable vehicles classified as “Zero Emissions” or “Eco” classifications, such as nine electric vans, six hybrid cars and seven tricycles with auxiliary electric engines, which will contribute to reducing environmental gas and noise pollution. The service will also benefit from advanced geolocation technology. In order to perform the services, FCC will have a staff of 335 employees and it has been forecast that 90 people with disabilities will be employed.

Awarding of the waste management, street cleansing and beach maintenance contract in Almuñécar (Granada)

Almuñécar City Council and FCC Medio Ambiente signed the contract for the collection and transport of solid urban waste, street cleansing, cleaning of beaches and coastlines and management of containers and the recycling centre for 10 years, with an order book value of over €50 million. FCC has provided services in the city since 2008. Up to 89 workers will be employed and 22,000 tonnes of various waste fractions are expected to be collected. Nearly nine kilometres of beaches and 22.17 linear kilometres of coastline will be served with beach conservation and cleaning services and cleaning of floating debris. The selective collection service will be improved, a container placement-and-removal system will be installed in the old towns of Almuñécar and La Herradura, and a municipal recycling centre will be incorporated in the future.

FCC Medio Ambiente wins the World Smart City Awards in the Innovative Idea category for its 100% electric modular chassis-platform

Within the framework of the Smart City Expo World Congress 2019, FCC Medio Ambiente won the World Smart City Award in the Innovative Idea category for its affordable, versatile and highly energy-efficient e-mobility industrial platform for urban service vehicles. It was developed by a consortium led by FCC Medio Ambiente and subsidised by European funds as part of the CDTI’s (Centre for the Development of Industrial Technology) CIEN strategic project from the Ministry of Finance, Industry and Competitiveness. The strategic objective of this platform is to facilitate the implementation of affordable electric mobility in urban services with huge environmental benefits. This award is a great recognition of the team effort that allowed to create this technology.

FCC Medio Ambiente Spain

Renewal of the street cleansing and collection contract in Txingudi (Guipúzcoa)

FCC Medio Ambiente renewed the contract of waste collection and street cleansing for the municipal association of Txingudi (Guipúzcoa), made up of Hondarribia and Irún. The contract has a five-year term and amounts to over €42 million. It will have a fleet of 51 vehicles, with some of them being low-emission vehicles with liquefied petroleum gas (LPG) engines. The contract means organic waste, plastic and paper will be collected more frequently, with residual waste being collected less frequently. People in long-term unemployment and with disability greater than 33% are expected to be employed through the Special Employment Centre, FCC Equal. On the other hand, at least 10% of the new employees will be female.

Operation of the transfer and treatment of domestic waste service in the province of Salamanca

FCC Medio Ambiente renewed the contract for the operation of the transfer and treatment of domestic waste service in the province of Salamanca, promoted by the Consortium for the Management of urban solid waste of Salamanca (GIRSA). The contract has a five-year term and represents an order book value of almost €30 million. The services also include the operation and maintenance of the Waste Treatment Centre (WTC) in Gomecello, in which €5 million will be invested for renovation, and which has a urban solid waste pre-treatment area (140,000 tonnes/year), an anaerobic digestion line (20,000 tonnes/year), composting area (50,000 tonnes/year), a landfill for the disposal of non-recyclable waste and a leachate treatment system.

FCC Medio Ambiente wins the contract for urban solid waste collection and street cleansing in Fuengirola (Málaga)

Fuengirola City Council (Málaga) and FCC Medio Ambiente have signed the contract for urban solid waste collection and street cleansing for four years, worth over €22 million, with two possible extensions of one year each. The fleet for this collection service will include three 25m^3 side-loading collectors, three 18 m^3 rear-loading collectors and three open-box vehicles. For the street cleansing service, which covers about 210 kilometres of streets across 25 sectors, the company will have specialised machinery and vehicles such as 20 electric tricycles, 8 open back tipping ancillary vehicles, 3 vacuum mechanical sweepers, 6 wash-down vehicles, a scrubber, one self-propelled washing machine and one high-pressure hydro-cleaning van. FCC Medio Ambiente will have a workforce of 148 employees to cover this contract.

FCC Medio Ambiente Spain

Investment of about €12 million in the renovation of machinery at the El Campello (Alicante) plant to increase the amount of recovered waste

FCC Medio Ambiente will invest close to €12 million for renovating the machinery at the El Campello waste treatment plant in Alicante. The aim is to provide the facility with state-of-the-art equipment, in order to increase the volume of waste recycled. FCC has managed this facility since April 2009 which serves the 52 municipalities of Marina Alta, Marina Baixa and El Campello. The renovation affects the plant's mobile equipment and part of the fixed equipment, and is complementary to the investment approved by Consorci Mare in December 2018 as part of the modification of the management project that will fully optimise the operation of the plant and reduce rejection to landfill. Container-carrying lorries, loader shovels, bulky and vegetable waste shredders, a biostabilised product turning machine and several 10 m^3 containers will all be renovated.

Awarding of the urban waste collection, street cleansing and recycling centre contract in El Tarragonés (Tarragona)

FCC Medio Ambiente signed the urban waste collection, street cleansing and recycling centre contract in El Tarragonés (Tarragona) for 10 years, which is worth over €42 million. All the collection vehicles will be newly purchased and many will use alternative energy. The workforce will consist of 17 workers, who will service the 42,405 inhabitants within a street cleansing length of almost 120 kilometres. The services will be organised and supervised through the comprehensive digital management platform, VISION, which was developed exclusively by FCC Medio Ambiente, while a vehicle geolocation system and digital tools will be used to monitor any incidents.

Renovation of the La Gavia park (Madrid)

The contract of the second renovation phase of the La Gavia park in Madrid has a two-year term and represents an order book value of €14 million. It will include an estuary that will separate an urban area from a forest area with squares and hills designed for recreational, educational and sporting activities. Located in the district of Vallecas, the "Recycling Hill" will be a benchmark in Madrid as it will promote environmental values such as recycling and care of the environment. The total area of the La Gavia park is 39.5 hectares, of which 19.5 are currently designated as municipal green areas. The project will recover the lighting network, extend and improve the existing automatic irrigation and drainage network and more than 2,600 trees and 147,800 bushes will be planted.

FCC Medio Ambiente Spain

Awarding of the urban waste management and street cleansing contract in Barberá del Vallés (Barcelona)

FCC Medio Ambiente has signed the contract for urban waste management and street cleansing in Barberá del Vallés (Barcelona). It is worth €13.67 million and has a four-year term with an option for a one-year extension. The service will have 10 vehicles and a workforce of 44 workers to serve the town's almost 33,000 inhabitants. The services will be organised and monitored through the comprehensive digital management platform, VISION, developed exclusively by FCC Medio Ambiente. This platform enables the established targets and the customer's current and future requirements to be met, while also implementing an identification system on all the containers.

FCC Medio Ambiente is awarded the contract for the maintenance of pneumatic collection, street cleansing and pest control in the south east area of Leganés (Madrid)

FCC Medio Ambiente has signed the contract for the maintenance of the network of pneumatic urban waste collection, street cleansing and pest control in the south east area of Leganés (Madrid) for four years and worth over €17 million. The service will include two road and pedestrian-area sweepers, four water-cleaning vans, one rear- and side-loading collector, container washer lorry and one workshop van. In order to perform the different services, FCC Medio Ambiente will have 135 operators and is planning to hire 7 people with intellectual disabilities through the Special Employment Agency, FCC Equal.

FCC Medio Ambiente will be responsible for the collection and transport of domestic waste from the association Agrupación nº 8 in Teruel (Aragón)

FCC Medio Ambiente has signed the contract for the collection and transport of domestic waste from the municipal association Agrupación nº 8 in Teruel. It has a 12-year term and is worth over €17 million. The service will include 14 rear-loading vehicles and 2 side-loading vehicles, in addition to other vehicles such as container-washing lorries, skip loaders and a tractor unit. The park of containers will be completely renovated with 2,021 rear-loading units for residual waste, 998 for packaging and 1,159 for paper, as well as 175 side-loading containers for packaging and 138 for paper. The workforce will consist of 19 workers. The services will be organised and monitored through the comprehensive digital management platform, VISION, developed exclusively by FCC Medio Ambiente.

FCC Medio Ambiente Spain

Construction and commisioning completed in phase 2 of the Guipúzcoa Environmental Complex (CMG-2)

FCC Medio Ambiente has completed the construction and commisioning of phase 2 of the Guipúzcoa Environmental Complex (CMG-2), located in Zubieta. The contract was signed in September 2018 with an investment of €32.2 million and an estimated order book value of €92 million, and also included the operation of the CMG-2 for 20 years. The new facility has one biomethane plant and another for recycling slag from the energy recovery plant of phase 1 (CMG-1). Both the biomethane and slag plants, together with the CMG-1 facilities, form the comprehensive system for waste treatment in Guipúzcoa.

FCC Medio Ambiente manages the service of seven of the ten cleanest cities in Spain

The Organisation of Consumers and Users (OCU) published its quadrennial study on inhabitants' perception of cleanliness in Spanish cities. Seven out of the ten best-rated municipalities entrust their cleansing services to FCC Medio Ambiente. These cities are Oviedo, Bilbao, Vigo, Logroño, Pamplona, Segovia and San Sebastián. Most of them also received a better score than in the previous study. The OCU report shows that civic education and good management of resources are crucial for maintaining a high level of satisfaction. In this respect, FCC would like to thank all the people, institutions, workers and citizens who ensure the highest cleaning standards in Spain for these cities.

FCC Environment Portugal

Renewal of the urban waste collection contract in Vila Real

The contract for urban solid waste collection in Vila Real has been renewed for two years, representing an order book value of €1.6 million. The population served amounts to 51,850 inhabitants.

FCC Ámbito

Awarding of internal logistics management, and operation of recycling centres and treatment plants at the Iberia centre in La Muñoza (Madrid)

FCC Ámbito will be responsible for managing internal logistics and operating recycling centres and physical-chemical and biological treatment plants at the Iberia centre in La Muñoza, Madrid, where the fleet is maintained. The contract includes collection and management of waste generated at the 19 airports at which Iberia operates.

FCC Ámbito will be responsible for managing Navantia's waste at the Bay of Cadiz for the San Fernando, Cadiz, Puerto Real and Rota plants (Cadiz)

FCC Ámbito will be responsible for managing dangerous and non-dangerous waste generated by Navantia at the Bay of Cadiz for the San Fernando, Cadiz, Puerto Real and Rota plants. The contract has a two-year term, with a possible extension of two years, and the order book amounts to €3.32 million.

FCC Ámbito concludes the extraction work on the pumpable phase of the Arganda del Rey lagoon (Madrid)

In 2019, FCC Ámbito concluded the extraction works on the pumpable phase of the Arganda del Rey lagoon (Madrid) for Tragsa. In 2020, the treatment and management works of the non-pumpable phase will begin. This continues FCC Ámbito's participation in a pioneering acid tar lagoon recovery project in Spain, which arose as a result of the processes of regenerating used automotive oils which have existed since the mid-20th century.

FCC Ámbito has carried out soil decontamination works in Martinhal (Portugal)

Soil decontamination works at a former refinery, which entailed removing more than 122,000 tonnes of contaminated soil that have been valued by ECODEAL.

FCC Environment UK

Municipal waste collection and street cleansing in the District of Central Bedfordshire (England)

The contract was awarded for a period of eight years, with a total order book of €92 million and an option to extend another eight years. A population of over 284,000 people will be served within a district that covers over 718 square kilometres and generates over 120,000 tonnes of waste every year.

Management of municipal recycling centres in the County of Suffolk (England)

The contract for managing and operating 11 municipal recycling centres was awarded to FCC Environment for a period of eight years, with a possible extension of eight more years. The total order book is €43 million. A population of over 738,500 people will be served, a number which is expected to rise significantly over the course of the contract, and more than 62,000 tonnes of waste will be managed.

Waste treatment for the County of East Lothian (Scotland)

In April 2019, FCC Environment was awarded a contract for the thermal treatment of waste in the County of East Lothian, serving a population of around 105,000 people and covering an area of 679 km^2, for a value of €30.5 million. Waste treatment started in November 2019 through the recycling and energy recovery plant in Millerhill, close to Edinburgh, that was developed and is operated by FCC Environment. The contract has a ten-year term, with the possibility of a five-year extension, and manages 35,000 tonnes every year.

FCC Environment UK

Management of the transfer, transport and treatment of residual waste for the County of Hertfordshire (England)

The contract covers the management and operation of waste transfer facilities and the associated transport, together with the treatment and removal of residual waste in the County of Hertfordshire. A population of almost 1.2 million people will be served and it represents an order book of €27 million. The treatment and disposal will be performed through the Great-moor energy recovery plant and Bletchley landfill, which are both run by FCC Environment.

Development of the Lostock Plant of Sustainable Energy (England)

In April, Copenhagen Infrastructure Partners (CIP) and FCC Environment jointly started the development of a waste-to-energy facility in Lostock, with an investment of €570 million. Located in the north east of England, once it is operational, it will be one of the largest energy-from-waste (EfW) plants in Europe. FCC Environment will supply the 600,000 tonnes of waste the plant will process every year, which will contribute to the British government's strategy to reduce landfills and export of waste. It will produce non-fossil electrical power of 60 MW, which is enough to cover the needs of 110,000 homes and will compensate over 200,000 tonnes of CO_2 per year.

Official opening of the Millerhill Energy Recycling and Recovery Centre for Edinburgh and Midlothian (Scotland)

The Millerhill Energy Recovery and Recycling Centre in Midlothian, close to Edinburgh, has been officially opened. The facility represents an investment of £142 million and was developed by FCC Environment in association with the councils of Edinburgh and Midlothian through a contract for designing, financing, constructing and managing the plant for 25 years. The plant is designed to help both cities meet the Scottish government's Zero Waste objectives in 2025 and divert 155,000 tonnes of non-recyclable waste from landfills every year. It will generate clean electricity to supply 32,000 homes and companies across the region.

FCC Environment CEE

10th anniversary of FCC Environment's waste-to-energy facility in Zistersdorf (Austria)

The FCC Environment waste-to-energy facility in Zistersdorf celebrated its 10th anniversary in 2019. The facility has exceeded all expectations in terms of ecological and techno-logical performance. During these 10 years, and with an ex-ceptional team of people, 1 billion kWh of electricity have been generated and over 1.5 million tonnes of waste have been di-verted from landfill, which has helped place the facility as one of the most reliable in Europe and as a waste management model for other countries.

Contract with ÖBB Austria for the collection and disposal of waste at its railway stations

Once again, FCC Environment Austria won the five-year contract for the collection and treatment of waste from the railway stations of the Austrian Railway Company (ÖBB) in the regions of Vienna, Lower Austria, Carinthia and Styria. The size of the contract, which is almost €20 million, positions the company as the largest private waste management entity in the country. ÖBB has been a client of FCC Austria Abfall Service AG for over 20 years, is the largest mobility services provider in Austria and contributes significantly to the protection of the environment, saving around 3.5 million tonnes of CO_2 per year.

FCC Environment Austria renews the contract with AWV Kitzbühel for the railway transport and incineration of waste

In summer 2019, the Kitzbühel Waste Management Association (AWV) launched a tender for the railway transport and incineration of 9,500 tonnes of domestic and bulky waste. AWV Kitzbühel has been a client of FCC Environment Austria for over eight years and the company has managed to renew the contract for another six years, worth €6 million. FCC Austria is committed to its clients, as well as the environment, economy and ecology, so they form an inseparable unit, meaning the contract must be managed exclusively via railway.

FCC Environment CEE

FCC Environment starts the recovery of the KIV/C1Z sewage lagoon (Czech Republic)

The contract for the decontamination and recovery of the KIV/C1Z sewage lagoon in the Czech Republic, signed with DIAMO s.p. in March 2016 for an approximate value of €9.9 million, started in October 2019 and is expected to be completed in 2024. In order to decontaminate and recover the thixotropic sewage lagoon, technology patented by FCC Environment will be used. This technology is based on the formation of an elastic cover made by shredded tyres and other recovery materials. This efficient and tested method for creating elastic covers on sewage lagoons has already been implemented for the recovery of KIV/E sewage beds.

FCC Environment Czech Republic will manage the waste of Hyundai Motor Manufacturing in Nošovice

FCC Environment won the tender for the complex waste management of Hyundai Motor Manufacturing Czech s.r.o. across the whole Czech Republic, which includes the collection and disposal of all waste, as well as the treatment of recovered raw materials. The company will also be responsible for street cleansing and maintenance in winter and summer, as well as ground maintenance. Hyundai is one of the leaders in the automotive industry in the Czech Republic and has been an FCC Environment client since the company started operating in the country in 2008. In 2019, it represented turnover of about €2.69 million.

Waste removal from a former landfill site in České Budějovice (Czech Republic)

In November 2019, FCC Environment Czech Republic signed the contract as general contractor with the consortium formed by Hochtief CZ a.s., Colas CZ a.s. and M Silnice (Hochtief CZ) for the removal of waste from a former landfill site located in the C6 section of the D3 road in South Bohemia, close to the city of České Budějovice. The contract includes the loading, on-site classification, transport and final disposal (at FCC's own or third-party facilities) of the materials, and has a three-year term. The initial estimated volume of waste to manage is 567,800 tonnes and represents an order book of €14.7 million.

FCC Environmental Services

Opening of the new state of the art Material Recycling Facility in Houston (Texas)

In April 2019, the FCC Environmental Services new state of the art Material Recycling Facility was opened in Houston (Texas), in accordance with the contract awarded in 2018 for the design, construction and operation of the plant for 15 years, and which is extendable by another 5 years. It has a treatment capacity of 145,000 tonnes per year and is the second FCC facility of this kind in the USA following the opening of the plant in Dallas. The total order book will exceed $250 million and will provide service to 2.3 million inhabitants. The process line is totally automated and features the latest technological advances in material separation. After the opening, FCC became the main recycler in Texas. The educational centres of both facilities are considered the best initiative for practical education about sustainability and recycling in the State.

Awarding of the 10-year contract for waste collection in Omaha (Nebraska)

The city of Omaha in Nebraska has awarded FCC Environmental Services the contract for the collection of recyclable, bulky and urban solid waste. It represents an order book of €220 million for a period of 10 years, with a possible extension of another 10 years. FCC will provide service to the 465,000 inhabitants of the city through a fleet of 69 trucks powered by Compressed Natural Gas (CNG). This contract will enable FCC to position itself in the Midwest and develop the business in a strategic area for the company in the USA. It has also recently been awarded the five-year contract for the seasonal yard waste collection in Omaha, with the order book amounting to over €6 million, thereby completing the contractual relationship with the city.

Waste collection contract for 7 years in Palm Beach County (Florida)

Palm Beach County in Florida has awarded FCC Environmental Services the contract for waste collection of areas 2 and 3, out of a total of four. The awarded contract represents an order book of €196 million for a period of 7 years. FCC will provide recyclable, pruning, bulky and urban solid waste collection services to the 680,000 inhabitants of the serviced areas, using a fleet of 92 trucks with 138 employees. The company also acquires the exclusive right to commercial collection, which will be a very significant source of additional income.

FCC Environmental Services

Waste collection contract for 7.5 years in Volusia County (Florida)

Volusia County in Florida has awarded FCC Environmental Services the contract for the collection of recyclable, pruning, bulky and urban solid waste. It represents an order book of €75 million for a period of 7.5 years. FCC will provide collection services to the 538,692 inhabitants of the county, using a fleet of 36 trucks, all of which are powered by Compressed Natural Gas (CNG), and employing 60 people in total.

Five-year contract for the collection and transport of biosolid waste from sewage treatment plants in Houston (Texas)

The city of Houston in Texas has renewed its trust in FCC Environmental Services for collecting and transporting biosolid waste from the city's water treatment plants, awarding it a new five-year contract which represents an order book of €27 million. This means FCC will continue providing the service it started in 2014.

Excellence and sustainability

Service excellence

FCC Medio Ambiente has been helping municipalities for more than 100 years with the management of services they offer their citizens. The company is aware of the importance these services have for the local councils, and this constant consideration for customer satisfaction leads it to establish a commitment to quality, which has been recognised by entities outside the organisation. For example, in 1997, it received the ISO 9001 quality certificate, having been the first company certified by AENOR for such services.

FCC Medio Ambiente has always had the certainty that just satisfying customers it is not enough; in today's society it is fundamental to consider all the stakeholders, so the company's commitment covers other areas, such as caring for the environment, seeking efficiency in services, the health and safety of workers, innovation and, especially, working towards the social and labour integration of the disadvantaged groups that may be at risk of exclusion. Over these more than 20 years, this has led the company to obtain new certificates and recognition. In 2019, these are the most notable events in terms of excellence and inclusion:

- For the sixth consecutive year, FCC Medio Ambiente records the 2018 Carbon Footprint in the OECC (Spanish Office for Climate Change).
- New short- and long-term targets for reducing emissions are set. They are part of the firm's new Climate Change strategy for 2050, in line with the objectives of the EU's Roadmap 2050.
- UNE-EN-ISO 9001:2015, UNE-EN-ISO 14001:2015 and UNE-EN ISO 50001:2011 certification is achieved for the companies FCC Equal CEE Andalucía, S.L and FCC Equal CEE Comunidad Valenciana, S.L., including the access control, concierge and vehicle cleaning activities within the scope of FCC Medio Ambiente.
- Extension of the EMAS records for the FCC Medio Ambiente Montalbán plant (Cordoba) and the FCC Ámbito Castellbisbal plant (Barcelona).
- The "*PELUSA* pedal-assisted bicycle with auxiliary electric motor" project is selected by the Ministry for the Ecological Transition and Demographic Challenge (MITECO) as one of the 101 best private-sector initiatives promoting the fight against climate change in the Community #PorElClima.
- The UNE-EN ISO/IEC 17020:2012 accreditation for contaminated land was extended for the Barcelona office of FCC Ámbito.

Sustainability

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.

Of special relevance are the **policies** of **equality** and **labour inclusion** of disadvantaged groups, as well as the promotion of all **actions** that **reinforce the commitment** to the **fight against climate change** and reducing the carbon footprint. The use 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.

The company's **experience** and **professionalism** have enabled it to **anticipate and address** recent **legislative amendments** and those that are scheduled to take effect, primarily regarding **climate change** and the **circular economy**.

With regard to sustainability, it is worth mentioning the following milestones reached by FCC Medio Ambiente throughout 2019:

- Publication of the seventh **Sustainability Report 2017-2018** under the slogan "From commitments to action", which was verified by AENOR with respect to the Global Reporting Initiative guide and its correlation with the Sustainable Development Goals (SDG).
- The 2nd edition of the **Avanza Awards**, which are held every two years, where the corresponding accolades are handed out.

  These prizes started at FCC Medio Ambiente in 2017 in order to recognise the work and effort made by the organisation's staff to contribute every day to improving the company's competitiveness, enhancing the quality of its processes, social integration within the company, respect for the environment and the development and application of innovative solutions or practices. This is all within the organisation's consideration of sustainable development, promotion of occupational well-being and research, development and innovation. The 2019 edition was very successful, both due to the number of candidates submitted and the quality of these candidates. Below is a brief description of the projects recognised in each category.

AVANZA AWARDS

Social initiatives category

Joint winners:

Street Cleansing Proffesionals.

Cultural Change. New role of public cleaning service professionals in L'Hospitalet de Llobregat (Barcelona)

Office: Catalonia I.

Authors: Xavier Vigo Ramonet and Román Belmonte Ramírez.

Design, execution and subsequent assessment of a cultural change process for the FCC workers under the L'Hospitalet de Llobregat (Barcelona) contract, which allows the current mechanical and impersonal work style to be transformed into one that is more professional, closer to the reality of the city's neighbourhoods and with a greater degree of integration and collaboration with its citizens.

Plena Inclusión Training and Awareness Day.

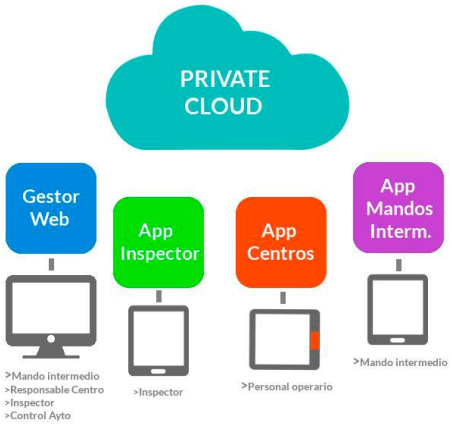
Standardise the company to sheltering people (1st Training and Awareness Raising Day - FCC, S.A. and Plena Inclusión Aragón)

Office: Aragon-La Rioja.

Authors: Diego Tejedor Hernández and Carmelo Jiménez Bozal.

Based on the collaboration agreement between FCC, S.A. and Plena Inclusión Aragón, signed on 5 July 2017 to carry out joint activities for the inclusion of people with intellectual disabilities in the workplace, both entities organised a Training and Awareness Raising Day for employees on 31st of May 2018.

Quality Category



Private Cloud Software Outline.

Comprehensive IT Service Management Device

Office: Murcia-Almeria.

Author: María Esther García Vargas.

Implementation of software or computer application to control and monitor the work to be carried out. Allows fluid communication between FCC and the City Councill as well as providing a quality control system.

AVANZA AWARDS

Innovation category

Revolutionary system for pruning at heights

Office: Levante I.

Authors: Félix Araque Serrano and Francisco José Molina Cortés.

Environment category

Joint winners:

Comb separator in sewer systems Barcelona.

Comb separator in sewer systems: solid waste separator installation

Office: Capital Barcelona and Balearics.

Authors: Fernando Marzo González and Paulino Romero Nevado.

This new system separates the solid waste present in sewage networks during days or periods of heavy rain to prevent such waste from ending up in the sea. The system is installed in the last section of the sewer network, at the sea discharge points, and is made up of by combs/weirs that have hooks distributed in strategic positions to separate the maximum possible amount of solid waste. The aim is to ensure these combs hold back as much bulky waste as possible, which will be collected after the heavy rain periods with manual equipment by the cleaning team.

FCC Ámbito's facility.

Recovery tower for the treatment of the CSP fraction at a glass recycling plant

Office: FCC Ámbito / Northern Office.

Candidates: Carlos Mallén Loras, Damián Cuesta Martín, Marta Agudo Sánchez and Ana María Luengo Aguilar.

This project includes the construction and operation of a CSP (Ceramics, Stones and Porcelains) fraction recovery tower, which consists of rejects from glass recycling plants, producing a clean and high-quality cullet. It fulfils a dual objective: improving the performance of the treatment process and reducing the amount of final waste sent to landfills.

Other sustainability milestones

- FCC Medio Ambiente participates in the 2019 Sustainable Urban Mobility (SUM) Congress (Bilbao).
- FCC Medio Ambiente participated in the Climate Change Conference in San Sebastian.

- FCC Medio Ambiente winner of the World Smart City Awards in the Innovative Idea category.

- Active participation of FCC Medio Ambiente within the framework of the UN Climate Change Conference COP25 Madrid.

- FCC Medio Ambiente launches the “Adopta un amigo” (Adopt a friend) campaign.

Innovation and technology

At national level, approval of a new Spanish Strategy for Science, Technology and Innovation (EECTI) 2021-2027 is expected in 2020, which will include the Priorities established in the Spanish R&D Strategy in artificial intelligence and whose objectives will be defined in the State Science, Technology and Innovation Plans (PECTI), mobilising synergies between the different public administration levels and through the co-development of the public and private sector.

In 2019, the European Commission approved two new projects led by FCC Medio Ambiente whose budgets increase the R&D portfolio by nearly 10 million euros. These projects confirm FCC Medio Ambiente's commitment to innovation, which is in its DNA.

One of the most noteworthy events is that FCC Medio Ambiente won the 2019 World Smart City award in the "Innovative Idea" category for its affordable, versatile and highly energy-efficient industrial e-mobility chassis-platform for urban service vehicles.

The company was the winner amongst several very high-level projects. For FCC Medio Ambiente, this award recognises the teamwork that made it possible to create this technology.

This 100% electric chassis-platform has been developed by a consortium led by FCC Medio Ambiente and Irizar Group, subsidised by European funds in the framework of the CIEN (National Business Research Consortium) programme of the CDTI (Centre for the Development of Industrial Technology) of the Ministry of Economy and Competitiveness, now the Ministry of Economic Affairs and Digital Transformation.

This platform's strategic objective is to facilitate the implementation of affordable electric mobility in urban services with considerable environmental benefits such as the total reduction of polluting emissions and noise, a reduced carbon footprint and maximised energy efficiency.

For another year, FCC Medio Ambiente maintained the certification of its R&D Management System, in accordance with the UNE 166.002 standard.

R&D projects in development or launch phase, which saw **investment of €2,284,482.74** in 2019, can be classified into **four technological or knowledge areas:**

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

In 2019, the European Commission approved two **new projects** led by FCC Medio Ambiente whose budgets increase the R&D portfolio by nearly **10 million euros**. These projects confirm FCC Medio Ambiente **commitment to innovation**, which is in its DNA.

VEMTESU project in collections.

e-mobility platform in operation.

Most significant projects of the R&D Management System

VEHICLES, MOBILE MACHINERY AND FACILITIES

Projects associated with **trucks**

The definitive consolidation of the electric technologies available in our company was made in 2019, providing real service on the street.

Here, the project known as VEMTESU (Development of Highly-Efficient Electric Traction Vehicular, Modular and Self-supporting Platforms for Urban Services) began operations as a side-loading waste compactor in various municipalities in Spain, where it successfully met not only high energy efficiency targets, but it also substantially improves the performance of equivalent equipment with similar bodywork.

With this project, energy savings ranging from 40 to 50% are achieved depending on the municipality, type of route, number of collections and fraction of waste collected, which provides an idea of the considerable reduction in exhaust gases and greenhouse gases (CO_2) into the atmosphere.

During 2019, a second unit with the same operating philosophy was developed but as a rear-loading collector, which will enter service shortly with similar aims as its predecessor.

Projects associated with **machinery**

FCC Austria Abfall Service AG, took part in the EU project "Assets4rail" as drainage cleaning system experts

In 2015 FCC Environment Austria began developing new technology to meet the needs of the Austrian Railway Company (ÖBB) for cleaning drainage systems in railway tunnels without blocking the traffic.

As a result of this project, FCC Environment became part of an EU project called *Assets4rail* that started in December 2018. *Assets4rail* is a 30-month *Shift2Rail* project that will contribute to change society to Railway mode by exploring, adapting and testing cutting-edge technologies to monitor and maintain railway assets.

The main aim of the project is to develop a set of cost-effective, innovative measurement and monitoring devices and specific assets. These will not only collect and deliver the status data of the railway system (tunnel/bridges/track geometry/safety systems/rolling stock), but will also process and analyse the information of the Construction Information Models with the integrated algorithms to generate relevant information related to the maintenance infrastructure and support the asset management decisions.

Electric sweeper with capacity of 2 m^3.

Prototype electric sweeper with capacity of 4/5 m^3.

Projects associated with **sweepers**

Reduced-size electric sweepers

During 2019, and continuing the electrical equipment consolidation, the company implemented the first fleet of small-size electric sweepers with a capacity of 2 m^3.

These are self-propelled, articulated and employing suction and are already in operation in cities such as Barcelona, Vigo, Bilbao or Torrejón de Ardoz (Madrid).

Thanks to abandoning fossil fuels and lower maintenance, service and repair expenses, operating costs are 75% lower than those of conventional diesel vehicles. A single sweeper can save around 26 tonnes of CO_2 emissions per year.

Dual-function electric sweepers

Another major R&D achievement was the manufacture and first in-service testing of larger-sized sweepers—the only one so far on the market—whose development is the result of close collaboration between a Dutch manufacturer and FCC Medio Ambiente's Machinery department.

It is a 4/5 m^3 capacity sweeper, self-propelled, with suction and fully electric. Although the first prototype is a sweeper, the intention is for it to be DUAL, i.e., maintaining its capacity as a sweeper but also providing it with a water tank of up to 1.75 m^3 which, via two poles and two water pumps, it will be capable of cleaning the street while vacuuming the residue.

The energy storage capacity of the installed battery allows, with an intermediate fast charge, to perform two work shifts in one day.

Self-propelled electric cleaning trolleys.

Self-propelled electric trolley with platform.

PELUSA assisted pedaling tricycle with auxiliary electric motor.

Projects associated with **auxiliary equipment**

Electric trolleys

Two new pieces of auxiliary cleaning equipment were developed in 2019. These are two trolleys for the street cleaning service, manufactured from fibreglass-reinforced polyester resin, made up of a main base body holding two 120-litre load buckets.

The trolleys are electric powered to facilitate travel around the city, incorporating an accompanying electric motor, powered by an electric battery.

Movement is controlled by means of a joystick that regulates travel (transfer speed). The difference between them is that a platform for personnel has been included into one of the trolleys.

This equipment has a simple on-board computer that includes GPS location, with a SIM card for sending data via GPRS, and an antenna for communications. This allows data on the equipment's position to be transferred in real time, as well as sending data from sensors and telemetries. Among its many advantages, the high level of precision and robustness stand out.

Both trolleys were shown worldwide at the Smart City Expo World Congress held in Barcelona in November.

Electric tricycle

FCC's PELUSA version 1 is a highly manageable equipment with an assisted pedal cycle and an auxiliary electric motor. It allows increased efficiency of street cleaning and ground maintenance services through the optimisation of urban movements with zero emissions and minimised noise.

Projects associated with **containers**

GREEN RECYCLING: Weight control and user access system for containers - scale

FCC and Deusto Sistemas have developed a user identification system (by means of an RFID card) and weighing control integrated in a smart container with an electronic lock. Weighing is done either from four weighing points located on the container supports or by two transverse weighing bars depending on the design of the container.

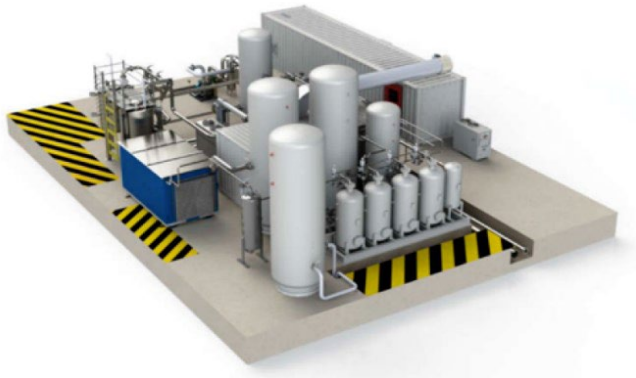
MANAGEMENT AND RECYCLING OF WASTE. CIRCULAR ECONOMY

A commitment to **biomethane**

FCC Medio Ambiente is committing to turning the "waste treatment centre" into a "biomethane fuel producer" with the capacity to supply all types of vehicles. To do this, it has started research with the development of two projects financed under the EU LIFE programme:

LIFE LANDFILL BIOFUEL (LIFE18 ENV/ES/000256: Integral management of the biogas from landfills for use as vehicle fuel) (2019-2022)

Project developed by a consortium made up of seven entities (FCC Medio Ambiente as project leader, Sysadvance, Gasnam, Cartif, Seat, Iveco and University of Granada), co-financed by the European LIFE programme and approved in June 2019.



LIFE LANDFILL BIOFUEL (LIFE18 ENV/ES/000256: Integral management of the biogas from landfills for use as vehicle fuel).

Development of the circular economy and decarbonisation of transport

The Landfill Biofuel Project aims to enrich landfill biogas to produce biomethane suitable for vehicular use. The objective is more efficient management by obtaining biomethane from a native and abundant energy source.

The biomethane obtained will be used in an IVECO waste collection truck owned by FCC Medio Ambiente, and three SEAT cars. It has a budget of €4.67 million and will last 3.5 years. Once this period ends, it will be replicated in FCC's other landfills in Europe.

METHAmorphosis (LIFE 14/CCM/ES/000865: Waste streams treatment for obtaining safe reclaimed water and biomethane for transport sector to mitigate GHG emissions) (2015-2020)

The METHAmorphosis project, funded by the EU's LIFE programme, is an example of exploiting synergies in the FCC Group, between FCC Medio Ambiente and Aqualia. The objective is to develop an innovative process for treating effluents and obtaining biofuel (biomethane) from municipal waste as well as agro-industrial waste. Two prototypes have been built:

- UMBRELLA (FCC Medio Ambiente and Aqualia - Ecoparc del Besòs Urban Waste Plant).
- METHAGRO (Porgaporcs - Ecobiogas agro-industrial waste plant).

The European Commission has placed 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"*. METHA appears within the five policies related to climate change in the EU, which has a budget of €200 billion for the period 2014-2020.

Waste streams treatment for obtaining safe reclaimed water and biomethane for transport sector to mitigate GHG emissions
Life-Methamorphosis – LIFE14 CCM/ES/000865

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

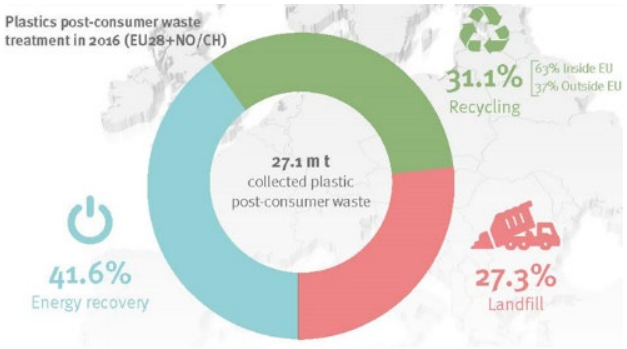
Creating a circular economy **for plastic**

FCC Medio Ambiente's strategic objective is to avoid disposal of plastics in urban waste and reduce their energy-recovery processing through the implementation of innovative recycling processes. This new line of research has been in development since 2018 at the Ecocentral waste treatment plant in Granada:

PLASMIX (LIFE18 ENV/ES/000045: Plastic Mix Recovery and PP& PS Recycling from Municipal Solid Waste) (2019-2022)

Project developed by a consortium made up of seven entities (FCC Medio Ambiente as project leader, Stadler, Lindner, Pellenc, Andaltec, Anaip and University of Granada), co-financed by the European LIFE programme and approved in June 2019.

The Plasmix Project aims to study the recovery and flow of Plastics Mix from municipal waste, searching for the optimal recovery line for each type of material present in said flow (PP, PSE, PVC).

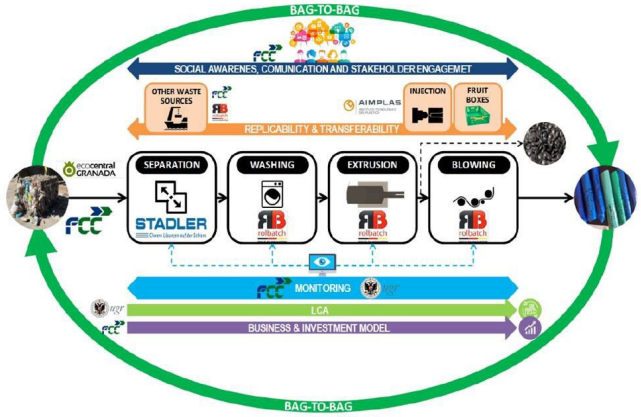


These materials will be recycled into high-quality granules for use in new products, including food packaging.

It has a budget of €5.33 million and will last 3.5 years.

LIFE4FILM (LIFE17 ENV/ES/000229 Post-consumption film plastic recycling from municipal solid waste). Spain and Germany (2018 –2021)

The main objective of LIFE4FILM, a project led by FCC Medio Ambiente, is to avoid landfill or energy recovery of plastic film (LDPE) present in urban waste through an innovative recycling process on a semi-industrial scale using a 10,000 t/year capacity recovery line at the Ecocentral plant in Granada, with the aim of demonstrating its profitability and replicability at a European level.



Life4Film scheme.

The sustainable path in waste management: optimisation of **composting**

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

A CIEN (National Business Research Consortium) programme of the CDTI (Centre for the Development of Industrial Technology), led by FCC Medio Ambiente, which 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 USW and digested biomethanisation.

The CTR in "Las Marinas" (El Campello, Alicante): Microorganisms that create extra oxygen

The "Las Marinas" Integral Waste Treatment Plant in El Campello (Alicante) applies a "cocktail" of microbiological species to the entire organic range of the waste, including bacteria, fermentative fungi, yeasts, actinomycetes and enzymes, to increase the supply of oxygen into the environment under static plateau conditions and reduce odours, following the success of the R&D project entitled "Composting trial with the application of microbiological products".

Creation of new by-products and **biomaterials**

SCALIBUR (Scalable Technologies for Bio-Urban Waste Recovery)

SCALIBUR is a project from the Horizon 2020 call, led by ITENE (ES), in which FCC Medio Ambiente and Aqualia participate as well as various entities from different European Union countries.

Prototypes will be rolled out in three pilot cities across Europe: Madrid (Spain), Albano Laziale (Italy) and Kozani (Greece) to carry out a comprehensive study on urban waste quality, logistics and treatment systems and WWTP sludge to obtain new by-products and biomaterials with a high-added value for the chemicals industry. FCC Medio Ambiente will apply a bioelectrochemical process to biogas obtained by means of biomethanisation to produce alcohols and provide biowaste to CENER (National Renewable Energies Centre), which will investigate the production of biopesticides and bioplastics through enzymatic hydrolysis followed by fermentation.

SCALIBUR
LEADING A REVOLUTION IN BIOWASTE RECYCLING

HORIZON 2020

Creation of Biowaste Clubs: in addition, social awareness raising actions will be undertaken as part of strategies to stimulate participation among society.

Líder: Socios:

ITENE, FCC Medio Ambiente, MADRID, SmVaK, CLUBE, CENER, visum, exergy, CITY OF LUND, Greenovate! EUROPE, anci lazio, aeris, NOVAMONT, UNIMORE, ZETADEC, wetsus, KOUR ENERGY Srl, cscp, Brabantse Delta, ASA

B-FERST Bio-based fertilising products as the best practice for agricultural management sustainability

Objective: Integrate the recovery of biowaste in agriculture by creating new mineral and organomineral fertilisers as well as developing the corresponding nutrient mixtures for agricultural application.

Líder: Fertiberia

Socios: FCC Aqualia, FCC Medio Ambiente, Universidad de León, Novamont, D&M, FKuR, AgriSat Iberia, Vlaanderen verbeelding werkt, AgFutura Technologies, Arcadia International, IUNG, Regional Environmental Center

DEEP PURPLE Domestic Extraction of Emerging Products with Purple Phototrophic Bacteria

Objective: investigate, at a pilot scale, the integrated application of the most innovative techniques in the management of the different effluents generated in the organic waste treatment facility (digestate, leachate and biogas), by applying purple phototropic bacteria for the recovery of by-products, such as polyhydroxyalkanoates and hydrogen, single cells, or nitrogen and phosphorus for use as fertilisers.

Líder: FCC Aqualia

Socios: FCC Medio Ambiente, TU Delft, Universidad Rey Juan Carlos, UVa, BioEconomy Cluster, exergy, IRIS, Materia Nova, Avecom, asegre, Confagricoltura, National University of Ireland, Galway

INFORMATION AND COMMUNICATION TECHNOLOGIES

VISION

Within the framework of providing services to cities, it is essential to have ICT (Information and Communication Technology) tools that support the provision of effective, efficient, sustainable and comprehensive services: truly smart services.

This goal cannot be achieved if there are no systems available allowing to collect company's *know-how*, capitalising on these systems the best practices, efficient processes, optimised communications, etc. and offering all the agents that interact in a city (administration - citizens - companies) modern and collaborative tools that make possible an agile management of the information that results in an optimal service provision

FCC Medio Ambiente has developed "**VISION - Intelligent platform for the provision of citizen services**" which allows us to meet the objectives described, responding to the current requirements of our customers and being prepared for the future challenges that appear in the provision of our services.

A comprehensive service management focused on excellence in its provision requires maximum coordination of all areas involved in a given operation.

It is necessary for production, legal, environmental, human resources, machinery and training-related aspects, etc. to be jointly managed through an integrated system.

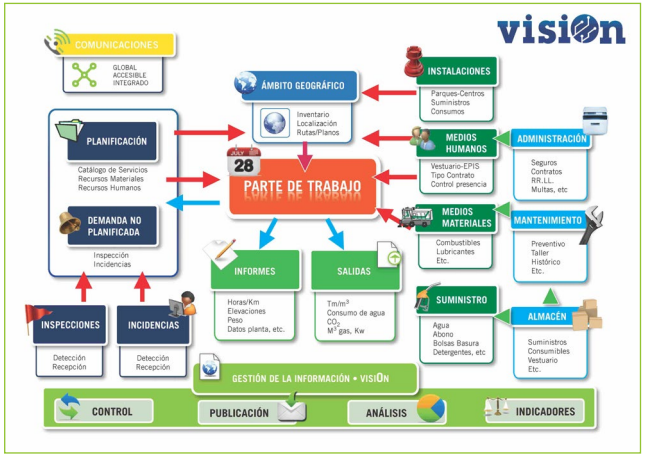
VISION incorporates the different functional modules in a single environment, sharing information, processes, validations and services that facilitate moving towards excellence in the work-place.

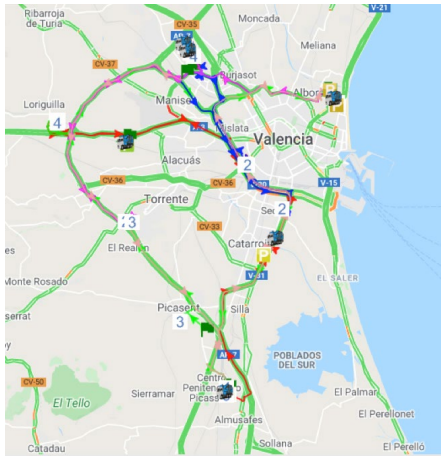
During 2019, work was undertaken in various environments, both in the daily service provision and supporting operations, as well as in the integration and continuous improvement of the company's general processes.

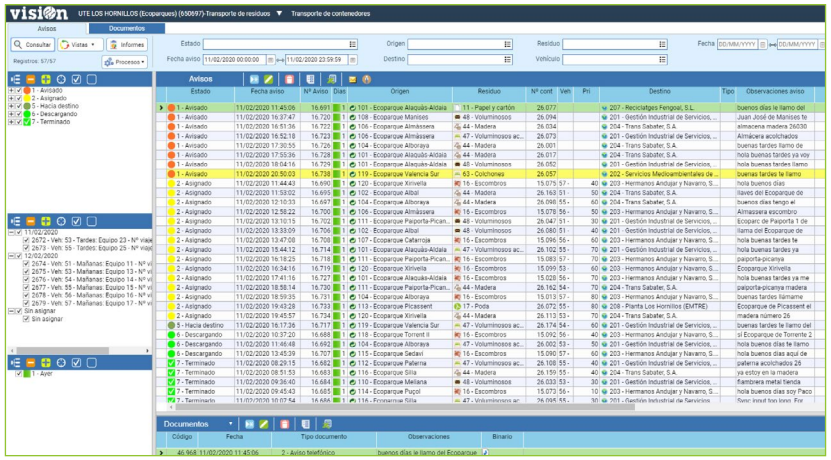
With the widespread roll-out of the VISION project to all contracts, all departments work jointly to design and maintain a work environment that is technologically up-to-date and unified, which allows the company's *know-how* to be gathered and put it to value through technological tools.

The variety of aspects undertaken during this year is remarkable as the list below shows:

- Logistics support system for managing the removal and transport of waste from large producers to authorised managers.
- Automated receipt of job postings through voice recognition.
- Integration of session control systems.
- Inventory of garden irrigation systems.
- Automated calculation of the organisation's carbon footprint.
- Integrating the platform with other procurement systems.
- Control and monitoring system for tender processes.







VISION hardware and software.

FCC ONLINE SOLUTIONS: applications that allow customers to request container rental and collection services online

FCC Environment CEE is developing the innovative strategy of offering online digital solutions to its customers. Following the successful launch of the *Abfall Online* Service in Austria, which achieved 60% growth in 2018/2019, a similar solution was introduced in Bulgaria and preparation began for the launch of three online services in Slovakia for 2020: *odpadyonline.sk, Harmonogramy and Reuse*. These online solutions transfer the waste management process for private customers to being online through the web store at www.abfallserviceonline.at or through the *Abfall Service online* smartphone app.

Abfall Service online powered by FCC

SUSTAINABLE DEVELOPMENT

KET4F-Gas Project

In 2019, the Interreg SUDOE project "KET4F-Gas - Reduction of the Environmental Impact of Fluorinated Gases in the Sudoe Space through Key Enabling Technologies", in which FCC Ámbito is a part, has continued to be developed. 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 aims 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 potent than CO_2, and remain trapped in the atmosphere for thousands of years. KET4F-Gas 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 project poster.

KET4F-Gas will last for three years and receive total funding of 1.7 million euros. The project is made up of 14 partners and 6 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.

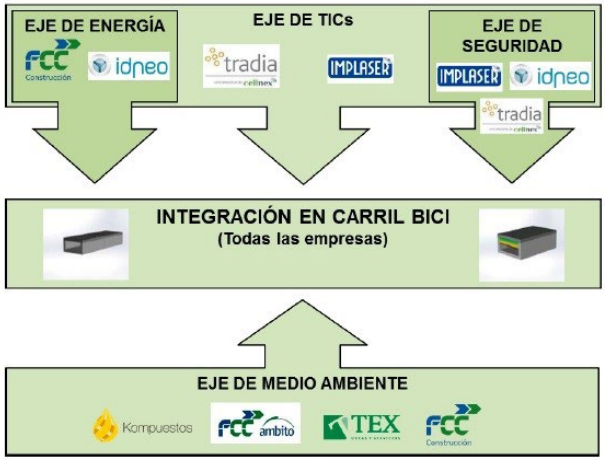
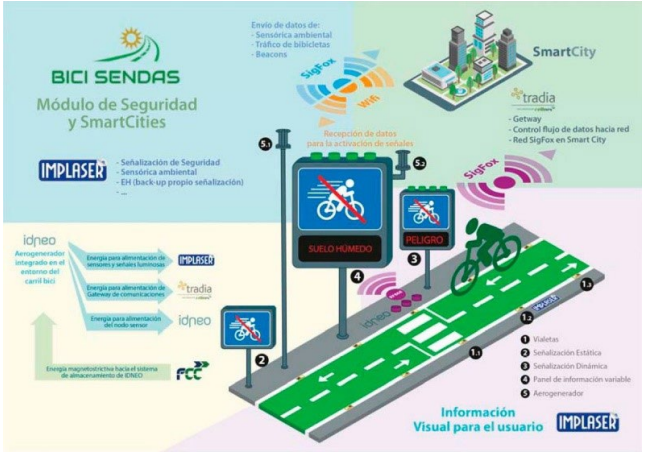
Cycle lane project

FCC Ámbito takes part in the CIEN "Cycle lane" project, led by FCC Construcción. The objective of this project, which started in 2019, is to develop a new generation of modular cycle lanes, produced with sustainable materials and that can be custom designed to integrate various technologies according to the needs to be covered.

The technologies to be incorporated into the modules focus on four axes: Environment, Energy, Security and ICT (Smart Society).

As well as these two FCC Group companies, other companies such as IMPLASER, Idneo, Kompuestos, Tradia and TEX Obras y Servicios are part of the consortium. This project is supported by Sant Boi de Llobregat (Barcelona) City Council and the Cycling Association "European Cyclists' Federation", who help to better understand the general impact that the results obtained from the project may have.

Among others, the specific objectives of FCC Ámbito include:

1. Waste valorisation
2. Development of biodecontamination techniques
3. Integrating materials developed with other technologies researched in the project in the form of a final demonstrator.

The project lasts for four years (2019-2023), and is supported by the most advanced universities and technological centres in the areas of the project's objectives: CSIC (Spanish National Research Council), University of Zaragoza, UPC (Polytechnic University of Catalonia), AITIIP, CIMNE (International Centre for Numerical Methods in Engineering), LEITAT and Lurederra.