

The background of the cover is a vibrant green, featuring a close-up of a plant stem with several clear water droplets. A white line with circular nodes at the top, middle, and bottom connects three semi-transparent green squares. The top square is positioned above the title, the middle square is to the left of the stem, and the bottom square is above the FCC logo.

Greenhouse Gas Emissions Report **2016**



1. FCC Construcción's commitment

FCC Construcción, with more than 115 years' accumulated experience, is the construction company of FCC Group. Its business activities cover every field of construction areas, being a benchmark company in the construction of civil engineering works and buildings, both on the national market as well as internationally. FCC Construcción has a proven experience in the development of concession projects and it has a group of subsidiary companies involved in the industrial and energy sector and in construction-related activities (engineering, prefabrication, installations etc.).

The decrease in the number of projects carried out by FCC Construcción in Spain and the resulting restructuring process of the organisation, aiming at adjusting costs and production, have clearly influenced the indicators of environmental performance of fiscal year 2016. The smaller number of underway construction projects is also reflected in this report, which shows a significant reduction of the Greenhouse Gas emissions in all the scopes of the inventory. Nevertheless, strengthened by the agreements reached in the Conference of the Parties of the United Nations Framework Convention on Climate Change of 2015 (COP21) and 2016 (COP22), we firmly believe that, as a responsible and committed company, we must remain relevant in response to climate change.

FCC Construcción started its Climate Change Strategy in 2010 with the design and implementation of a protocol for the quantification of Greenhouse Gas emissions in the construction sector. Since then, the company prepares and verifies annually its Greenhouse Gas (henceforth, GHG) emissions report, being the first Spanish construction company to have it verified by AENOR and having since 2012 AENOR's Environmental certificate "CO₂ verified", which guarantees both the accuracy of the organisation's Carbon Footprint calculation and the inclusion of the GHG management in the organisation's System and strategy. This initiative was awarded by the organization "Fundación Entorno" in 2012 with a prize in the category "Management for sustainable development" of the European Business Awards for the Environment.

In addition, in the interest of promoting transparency, FCC Construcción has register its carbon footprints from fiscal years 2012 to 2015 in the "Carbon footprint, offsetting and carbon sequestration project Register", created in 2014 by the Spanish Ministry of Agriculture, Fisheries, Food and Environment. With this action, FCC Construcción was the first construction company to appear in said public list. With the carbon footprint of financial year 2015, for the first time, we obtained the "Calculate and Reduce" label of the government, which, in addition to granting recognition and acknowledging the fact of being able to quantify and verify our Greenhouse Gases Emissions, it also identifies the company as an organisation which reduces its carbon footprint effectively. Specifically, FCC Construcción was awarded with this label for proving a 14.06% reduction of the average emission intensity for the triennium 2013-2015 in relation to the triennium 2012-2014, for its total carbon footprint (scopes 1, 2 and 3)

Another communication and environmental awareness approach of 2016 has been the adhesion of FCC Construcción to "[#PorElClima Community](#)", set up after the Paris Agreement, in order to establish commitments for reducing emissions.

We are aware of the work done and its tangible results; this process has allowed us to calculate the organisation carbon footprint, to track down the most carbon-intensive activities, to establish action measures for reducing or avoiding GHG emissions, to raise the awareness of own workers, suppliers and subcontractors and to communicate sector-based Good Practices' examples.

However, the company evolves, from a largely diminished national market to an international setting where we have fewer projects, but they are larger, mainly civil engineering works and located in countries that are more vulnerable to climate change than Spain. Therefore, our short-mid challenges are expanding the verification of the GHG emissions inventory internationally and working on the field related to adaptation to climate change, by assessing the impacts and analysing the vulnerability and opportunities of our company in the different countries in which we operate.

This report includes the GHG inventory for 2016 reporting period recording all emissions from the activities carried out at construction sites and premises of FCC Construcción located in Spain. This report is the responsibility of the Quality and CSR Director.

The report has been prepared according to the requirements of ISO Standard 14064-1:2012: "Greenhouse Gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals" and of the sector guidelines of the European Network of Construction Companies for Research and Development (henceforth, ENCORD), May 2012 edition: "Construction CO₂ Measurement Protocol". Said document has obtained the logo "Built on GHG Protocol", making it the sector guidance of GHG Protocol for construction companies.

The verification of the Greenhouse Gas inventory has been carried out with a limited level of assurance by AENOR. (see annex).



2. Organisational boundaries, operational boundaries and exclusions

2.1. Organisational boundaries

FCC Construcción uses the operational control approach for GHG emissions recording and for consolidation of GHG emissions data. This approach is recommended best practice, since it is the most appropriate for the activities of the construction sector. For the quantification of scope 1 and scope 2 emissions (emissions associated with the consumption of fuel and electricity), the GHG inventory does only consider those emissions over which the company has financial control, that is, the emissions deriving from consumption whose costs are assumed by FCC Construcción.

The information included in the GHG inventory for 2016 reporting period contains data of all centres located in Spain, taking centres to mean construction sites and premises (offices, warehouses and plant storage / maintenance facilities).

2.2. Operational boundaries

The emissions of the centres within the organisational boundaries of FCC Construcción are quantified, assuming the following scopes:

Scope 1: Direct GHG emissions

These are emissions from sources that are owned or controlled by the company. They include emissions deriving from the burning of fuel used by FCC Construcción. They can be broken down into:

- Emissions associated with fuel used at projects (construction sites).
- Emissions associated with fuel used at premises (offices, warehouses, plant storage /maintenance facilities).

Scope 2: Indirect GHG emissions

Scope 2 emissions are a consequence of the organisation's activities, but they occur at the facility where electricity is generated. They include emissions from the generation of purchased electricity consumed by FCC Construcción. They can be broken down into:

- Emissions associated with electricity used at projects.
- Emissions associated with electricity used at premises.

Scope 3: Other indirect GHG emissions

These emissions are a consequence of the company's activities, but they occur from sources not owned or controlled by FCC Construcción. It has been decided to include the following emissions under scope 3:

- Emissions associated with the production and transport of purchased materials.
They include emissions from the manufacture and transport to site of concrete, bituminous products (asphalt), steel, non-ferrous metals, brick and glass and emissions from transport to site of earth and graded aggregates.
- Emissions associated with the subcontracted work units.
They include earth-moving works.
- Emissions associated with the transport and management of surplus waste and materials.
They include emissions from the transport of surplus earth and surplus clean rubble and emissions from the transport and disposal in landfill of municipal waste and wood waste.
- Emissions associated with employee business travel.
- Emissions deriving from losses due to electricity transport and distribution.

2.3. Exclusions

FCC Construcción has decided to exclude from quantification any fugitive emissions from air-conditioning leaks from equipment controlled by the company, given its low representativeness (approximately 1%) with regard to the total emissions.

3. Uncertainty and maximum relative importance

The emissions' estimation uncertainty is a combination of the uncertainty in emission factors and in activity data.

The emission factors deployed to draw up FCC Construcción greenhouse gas inventory are obtained from official sources and they are specific to each emission source category. The selection of these emission factors is carried out aiming to reduce uncertainty, as far as proves possible. Unless there is clear evidence otherwise, it is assumed that the probability density functions are normal and hence that the uncertainty in emission factors is low.

The activity data derive from billing data, delivery notes, measurements and data from the construction project. Based on the supplementary guidance document about uncertainty assessment ("Guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty") drawn up by ECCR under the "GHG Protocol", we can assume that the origin of the FCC Construcción activity data guarantees the maximum achievable certainty for the various GHG emission sources.

A maximum relative importance level of 7% has been established with regard to the total reported Greenhouse Gas emissions.

4. Quantification of GHG emissions

This section contains the GHG emissions' quantification of FCC Construcción in 2016 and compares them with the emissions of previous reporting periods.

Firstly, the emissions are classified by scopes as defined in the Standard UNE-ISO 14064-1.

Greenhouse Gas Emissions Report 2016

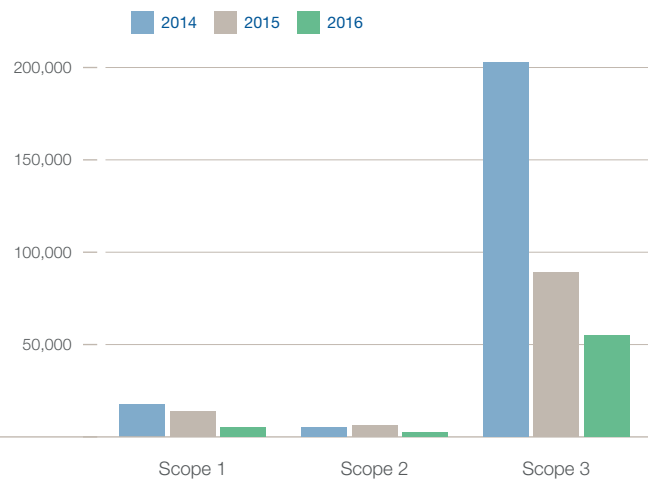


Emissions classified by scopes (according to UNE-ISO 14064-1:2012)

	t CO ₂ e 2011	t CO ₂ e 2012	t CO ₂ e 2013	t CO ₂ e 2014	t CO ₂ e 2015	t CO ₂ e 2016
Scope 1: Direct GHG emissions	28,357.76	20,749.74	16,870.07	17,778.58	13,588.02	4,960.20
Associated with fuel used at projects	25,677.81	19,455.81	16,102.04	17,371.73	12,889.49	3,785.59
Associated with fuel used at premises	2,679.95	1,293.93	768.03	406.85	698.53	1,174.61
Scope 2: Indirect GHG emissions	13,101.64	7,966.56	4,596.33	5,011.80	6,057.94	2,631.82
Associated with electricity used at projects	12,160.22	6,883.29	3,738.22	4,358.09	5,402.88	2,055.96
Associated with electricity used at premises	940.62	1,081.55	856.50	651.77	654.06	575.86
Associated with electricity used as vehicle fuel	0.81	1.72	1.62	1.94	1.00	0.00
Scope 3: Other indirect emissions	197,934.39	305,762.47	287,451.25	202,698.57	89,279.94	55,005.96
Associated with the production and transport of purchased materials	141,144.12	255,177.16	235,892.22	166,047.60	62,021.89	39,154.38
Associated with the subcontracted work units	32,137.98	24,862.66	18,435.71	13,379.13	10,473.26	6,349.30
Associated with the transport and management of surplus waste and materials	17,960.24	17,008.33	21,229.69	10,846.66	6,714.70	2,880.55
Associated with employee business travel	6,123.98	8,430.02	11,721.91	11,998.07	9,615.97	6,393.86
Deriving from losses due to electricity transport and distribution	568.07	284.30	171.72	427.11	454.12	227.87
Total Emissions	239,393.79	334,478.77	308,917.65	225,488.95	108,925.90	62,597.98

GHG emissions of FCC Construcción decrease 43% in 2016

The slowdown in the construction activity of Spain and the fact of having finished a lot of projects in 2016 implies a significant decrease of the Greenhouse Gas emissions, in all the scopes of the inventory.



Specifically for Scope 1, the GHG emissions of financial year 2016 are reported by Greenhouse Gas type.

Scope 1 Emissions, classified by GHG Type

	t CO ₂ e 2016		
	Total	Projects	Premises
CO ₂	4,943.44	3,722.66	1,170.78
CH ₄	5.79	4.47	1.32
N ₂ O	10.96	8.46	2.50
All	4,960.19	3,785.59	1,174.60

In addition, the emissions are also classified and reported according to the emission blocks of the ENCORD sector guidelines.

Emissions classified by emission blocks (according to ENCORD guidelines)

	t CO ₂ e 2011	t CO ₂ e 2012	t CO ₂ e 2013	t CO ₂ e 2014	t CO ₂ e 2015	t CO ₂ e 2016
Construction⁽¹⁾						
1. Fuel (projects)	25,677.81	19,455.81	16,102.04	17,371.73	12,889.49	3,785.59
2. Fuel (premises)	2,679.95	1,293.93	768.03	406.85	698.53	1,174.61
3. Process and fugitive emissions ⁽²⁾	0.00	0.00	0.00	0.00	0.00	0.00
4. Electricity (projects)	12,160.22	6,883.29	3,738.22	4,358.09	5,402.88	2,055.96
5. Electricity (premises)	940.62	1,081.55	856.50	651.77	654.06	575.86
6. Heat	0.00	0.00	0.00	0.00	0.00	0.00
7. Vehicle fuel ⁽³⁾	1,446.61	710.52	407.55	366.88	392.46	322.64
8. Public transport	4,678.18	7,721.22	11,315.98	11,633.13	9,224.51	6,071.23
9. Subcontractor	32,137.98	24,862.66	18,435.71	13,379.13	10,473.26	6,349.30
10. Waste	17,960.24	17,008.33	21,229.69	10,846.66	6,714.70	2,880.55
11. Materials	141,144.12	255,177.16	235,892.22	166,047.60	62,021.89	39,154.38
Total emissions	238.825,72	334.194,47	308.745,93	225.061,84	108.471,78	62.370,11⁽⁴⁾

⁽¹⁾ The ENCORD sector protocol divides the construction sector into three key areas of operation: the materials manufacture stage (off-site production and transport of materials used for construction); the construction stage (project design, execution of the works, including demolition and refurbishment and on-site materials manufacture); and the operation stage (management or use of the final product). All FCC Construcción activities are included in the construction stage.

⁽²⁾ See section "2.3. Exclusions".

⁽³⁾ The emission block 7 only considers emissions associated to the use of vehicles powered by electricity and emissions associated to leased or privately owned vehicles used for business travel. Emissions associated to the business travel in company owned vehicles are included under the quantification of emissions associated with fuel consumption at construction sites and premises, corresponding to emission blocks 1 and 2, respectively.

⁽⁴⁾ The total emissions quantified in accordance with ENCORD guidelines do not coincide with the total emissions quantified according to the Standard UNE-ISO 14064-1. This is due to the fact that ENCORD guidelines do not include a category to classify "emissions deriving from losses due to electricity transport and distribution" which in 2016 stand at 227.87 t CO₂ eq. verified.

5. Avoided emissions

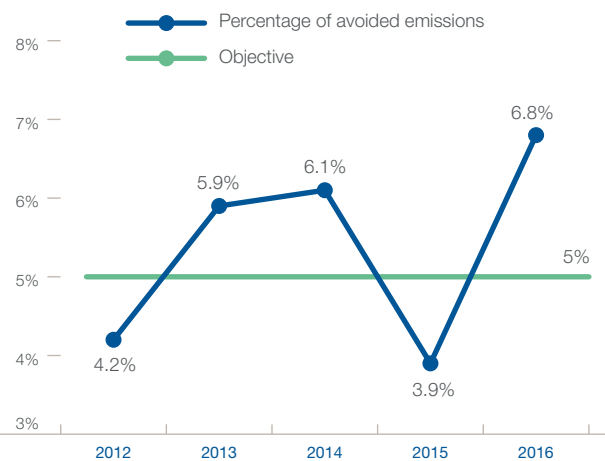
This section sets out a quantification of the avoided Greenhouse Gas emissions from 2011 to 2016 due to the implementation of environmental good practices on site. The report details the emissions which are no longer produced by implementing the following directed actions, as defined according to the terminology of Standard UNE-ISO 14064:

Avoided emissions

	t CO ₂ e 2011	t CO ₂ e 2012	t CO ₂ e 2013	t CO ₂ e 2014	t CO ₂ e 2015	t CO ₂ e 2016
Avoided emissions						
By reusing surplus material on site and not taking it to landfill	11,783.15	13,092.22	18,673.31	14,075.63	3,932.01	4,360.17
By pH neutralization with CO ₂	488.48	451.93	0.00	0.00	0.00	49.05
By suitable maintenance of the machinery operating on site	1,361.73	744.65	533.43	368.46	437.45	163.39
Due to vehicle speed control on site	80.71	74.67	101.13	78.94	26.92	21.66
Due to the use of electric vehicles	1.94	3.02	2.93	3.35	1.48	0.00
Total emissions	13,716.01	14,366.49	19,310.80	14,526.38	4,397.86	4,594.27

Our environmental Good Practices continue to contribute to GHG emissions **reduction**.

By applying environmental good practices **4,594.27 t CO₂e were not released** to the atmosphere. These avoided emissions would have meant **6.8% of the total** organisation's emissions.



6. Base year

Despite the fact that FCC Construcción already verified its GHG inventory for 2010 in accordance with the Standard UNE-ISO 14064-1:2006 and the ENCORD sector guidelines, 2011 has been selected as historic base year for GHG emissions to be compared over time, while the GHG inventory for 2010 reporting period has been considered as an initial inventory, useful for understanding the company's situation.

In 2012, some of the base year emissions concepts for 2011 were recalculated. The causes which led to the recalculation of said emissions can be found in the [GHG emissions report 2012](#), available at the web site of FCC Construcción. Also in fiscal year 2014, some of the base year emissions concepts (from 2011 to 2013) were recalculated. Both the updated emission data and the causes which led to the recalculation of said emissions can be found in the [GHG emissions report 2014](#), available at the company's web site.

Although there are no significant changes in 2016 that justify the need of recalculating the emissions of previous periods, the recalculation of the base year emissions will be carried out when any of the following aspects occurs:

- Changes in the operational boundaries that result in a significant change in the GHG emissions.
- Structural changes at FCC Construcción that have a significant impact on the company's base year GHG emissions.
- Changes in the GHG quantification methodologies and/or improvement in the accuracy of the emission factors that result in a significant change in the quantified GHG emissions data.
- Discovery of significant errors or of an accumulation of an important number of non-significant errors which, in an aggregate figure, have relevant consequences on the total quantified GHG emissions.

7. Quantification methodologies

FCC Construcción determines its Greenhouse Gas emissions using a calculation approach, multiplying the activity data compiled at each construction site or premise by the documented GHG emission factors which are selected and updated periodically at corporate level.

FCC Construcción uses a centralised approach, consolidating the activity data gathered at each construction site or premise and quantifying the GHG emissions at corporate level, though being able to create GHG emission reports at different levels (by project, business area, client type, geographical distribution, etc.)

Reference is made below to the quantification methodologies and GHG emission factors used to draw up this report.

Scope 1: Direct GHG emissions

- **Emissions associated with fuel consumption.**

To calculate these emissions, fuel consumption (at construction sites or at premises), according to FCC Construcción billing, is multiplied by the emission factors which have been calculated using the data from the spreadsheet “Organisation’s carbon footprint - Scope 1+2” of the Spanish Ministry of Agriculture, Fisheries, Food and Environment (MAPAMA) in its 9th version (july 2017) and the data from Table 2.3 of “2006 IPCC Guidelines for National Greenhouse Gas Inventories”.

Scope 2: Indirect GHG emissions

- **Emissions associated with electricity consumption.**

To calculate these emissions, electricity consumption (at construction sites, at premises or in the electric vehicle fleet), according to FCC Construcción billing, is multiplied by the emission factor from the spreadsheet “Organisation’s carbon footprint - Scope 1+2” of the Spanish Ministry of Agriculture, Fisheries, Food and Environment (MAPAMA) in its 9th version (july 2017).

Scope 3: Other indirect GHG emissions

- **Emissions associated with the production and transport of purchased materials.**

The quantification methodology is based on activity data (materials’ production and consumption data and the distance travelled from their production site to the construction site) and on the emission factors associated with the production and transport of said materials.

The emission factor for asphalt (bituminous products) has been obtained from the verified emissions of FCC Construcción’s own premises, the emission factors for steel, non-ferrous metals, brick and glass have been obtained from a study of Cantabria University and the emission factor for concrete has been obtained from historical data of FCC Construcción plants’ electricity consumption.

The emission factors associated with transport have been obtained from the Annexes to the report by the UK Department for Environment, Food and Rural Affairs (DEFRA) “2016 Government GHG Conversion Factors for Company Reporting”.

- **Emissions associated with the subcontracted work units**

To calculate emissions associated with earth-moving works, the methodology uses an emission factor which is calculated based on a study of the Machinery Directorate of FCC Construcción that determines the amount and type of fuel required to carry out earth-moving of a certain size and using the fuel emission factors from the spreadsheet “Organisation’s carbon footprint - Scope 1+2” of the Spanish Ministry of Agriculture, Fisheries, Food and Environment (MAPAMA) in its 9th version (july 2017) and the data from Table 2.3 of “2006 IPCC Guidelines for National Greenhouse Gas Inventories”.

- **Emissions associated with the transport and management of surplus waste and materials.**

The emissions associated with the transport and management of wastes and surplus materials are calculated, considering as activity data both the volumes of surplus rubble and earth and the weight of municipal waste and wood waste generated on site, as well as the distances from the construction site or premise to its final destination.

The emission factors associated with transport and landfill disposal have been obtained from Annexes to the report by the UK Department for Environment, Food and Rural Affairs (DEFRA) “2016 Government GHG Conversion Factors for Company Reporting”.

- **Emissions associated with employee business travels.**

The activity data required for calculating these emissions, in other words, the kilometres travelled by FCC Construcción employees in business travels, are supplied by the Corporate Department which obtains these data from the reports provided by the different suppliers.

The emission factors associated to the different forms of transport (car, coach, train, plane) derive from the Annexes to the Report by the UK Department for Environment, Food and Rural Affairs (DEFRA) “2016 Government GHG Conversion Factors for Company Reporting”.

- **Emissions deriving from losses due to electricity transport and distribution**

These emissions are obtained as a product of the electricity consumption multiplied by an electricity distribution losses factor which is to be found in the Annexes to the DEFRA Report “2016 Government GHG Conversion Factors for Company Reporting”.