

## Grexel Systems Ltd Greenhouse Gas Emissions Inventory 2016







GREXEL SYSTEMS LTD  
GREENHOUSE GAS EMISSIONS  
INVENTORY 2016

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# Contents

About Grexel.....	4
Introduction.....	5
Scope 1 - Direct GHG emissions .....	6
Scope 2 - Indirect GHG emissions.....	6
Market-based method.....	6
Location-based method.....	7
Scope 2 assessment.....	8
Scope 3 - Corporate value chain.....	9
Category 1 - Purchased goods and services .....	10
Category 6 - Business travel .....	11
Category 7 - Employee commuting .....	12
Scope 3 assessment.....	12
Inventory overview and comparison.....	13
Retrospect .....	13
Offsetting.....	15
References:.....	16

## About Grexel

Grexel Systems Ltd. (Grexel®) is a Finnish company providing core business infrastructure solutions and services for green commodity markets and environmental banking. Founded in 2001, Grexel has over 100 years of cumulative experience with the energy certificate markets and central certificate registries. Grexel is currently providing certificate registry services and support in ten European countries, covering registries for energy disclosure and support purposes, and is the European market leader in energy certification. The company also has a strong position in regulatory and market engineering, helping the relevant authorities in different regions to best design their green energy markets.



# Introduction

This document sets out to disclose the GHG emissions inventory of Grexel Systems Ltd. Now, already for the fifth consecutive year, we report the emissions as well as compensate them by using emission reduction units.

Calculating and publishing of the GHG inventory is gradually becoming a part of normal business reporting. Over these years, we have used the widely accepted GHG Protocol emissions calculation standard to gather and present our GHG inventory. For our energy consumption, we have adopted the updated Scope 2 Guidance - The Corporate Standard. For our value chain emissions calculation, we have similarly adopted Scope 3 Guidance - The Corporate Value Chain. These documents have proven extremely useful in forming a consistent and well-structured basis for our emissions inventory. Our calculations also contain different emission factors for purchased commodities and services.

In 2016, the overall GHG emissions caused by Grexel were almost the same as in 2015. Emissions per transacted certificate and per turnover € decreased. Our scope 2 (market based) emissions were caused solely by the Grexel main office's district heating. For the first time, the electricity consumed by the Indian office was less than the electricity produced by the company-owned wind turbine.

We experienced a slight increase in Scope 3 category 6 (business travel) emissions whereas the other two categories remained rather stable. The increase in category 6 is mainly caused by the update of the DEFRA emission factors. The flight kilometers remained more or less the same compared to 2015.

## Scope 1 - Direct GHG emissions

As a certification service provider, Grexel® does not own or govern any production devices or other facilities directly emitting GHG emissions. Thus, the Scope 1 emissions for Grexel are considered as zero.

## Scope 2 - Indirect GHG emissions

As required by the Corporate Standard, for year 2016, we are reporting our Scope 2 emissions using both market- and location-based methods.

In both categories, we have included indirect GHG emissions from energy procurements in our home office as well as emissions from remotely done work in India.

In the market-based method calculations, contractual instruments have been used where possible. In the location-based method, in the other hand, we have used country-specific grid average values for emission factors. The used emission factors are presented in Table 1.

Table 1: Emission factors used for Scope 2 calculation

	gCO <sub>2</sub> /kWh
Electricity (commodity value for market-based method)	0,00
Electricity in Finland (grid average for location-based method)	307,17
Electricity in India (grid average for location-based method)	820,00
District Heating	92,00

For 2016, we got our home office scope 2 consumption figures directly from the building administrator. In 2016 we have also added a share of our office building's general, non-allocated electricity consumption, that includes for instance the office cooling. This share is allocated per the space occupied by Grexel in respect to the overall office surface area of the building.

### Market-based method

The market-based method calculation reflects the GHG emissions associated with the choices a consumer makes regarding its electricity supplier or product.

For our home office in Helsinki, the electricity used is completely renewable. The attributes are disclosed by the supplier<sup>1</sup> using Guarantees of Origin and the overall technology-based distribution is 99% hydro power and 1% wind power. Thus, our home office scope 2 emissions are zero when using the market-based method.

Table 2: Grexel home office electricity consumption and resulting emissions (market-based method)

	kWh	tCO <sub>2</sub>
Electricity consumption 2016	6484,61	0,00
Share of Office Building's general, non-allocated consumption 2016	12020,93	0,00

Our home office is heated as part of Helsinki's district heating network. For the year 2016, it was not possible to enforce consumer choice in this category as no instruments guaranteeing the renewability of the energy source were available. We are expecting this status to change during 2017 and look forward to promoting emission-free production in district heating as well.

<sup>1</sup> <http://www.nordicgreen.fi>

Table 3: Grexel home office district heating consumption and resulting emissions (market-based method)

	kWh	tCO <sub>2</sub>
District heating consumption 2016	24499,33	2,25

Grexel also employs a development team in India. As this team is part of a bigger corporation functioning in a larger office complex, we have estimated the consumed electricity for our functions by comparing our team size to the total number of employees. The Indian office complex uses grid electricity and electricity from the company-owned wind turbine. In 2016, the electricity produced exceeded the consumption meaning zero emissions.

Table 4: Remote development team electricity consumption and resulting emissions (market-based method)

Number of dedicated employees	8
Number of employees	1258
Complete electricity consumption (MWh)	3485,29
Production from own wind turbine (MWh)	3748,60
Consumption producing emissions (MWh)	0
Consumption allocated to Grexel (MWh) <sup>2</sup>	0
Emissions (tCO <sub>2</sub> )	0,00

Grexel's Scope 2 emissions as calculated using the market-based method are presented in Table 5.

Table 5: Scope 2 emissions (market-based method)

	tCO <sub>2</sub>
Grexel home office electricity consumption	0,00
Grexel home office district heating consumption	2,25
Grexel remote development team electricity consumption	0,00
Total	2,25

## Location-based method

The consumption volumes used in the location-based method are the same as in market-based method. However, the location-based calculation emphasizes the connection between collective consumer demand for electricity and the emissions resulting from local electricity production. That is why here the grid average emissions factors are used across the Scope 2 inventory.

Without contractual instruments, our home office electricity consumption would result in the following emission rates.

Table 6: Grexel home office electricity consumption and resulting emissions (location-based method)

	kWh	tCO <sub>2</sub>
Total electricity consumption 2016	18505,54	5,68

<sup>2</sup> Allocated consumption is zero since the electricity production with Aspire's wind turbine is more than the complete electricity consumption..

The emission figures for district heating would be the same as with the market-based method.

*Table 7: Grexel home office district heating consumption and resulting emissions (location-based method)*

	kWh	tCO <sub>2</sub>
District heating consumption 2016	24499,33	2,25

For the electricity consumed by the development team in India, in location-based method, the grid average is used for all consumed electricity, including the production volumes from the on-site windmill.

*Table 8: Remote development team electricity consumption and resulting emissions (location-based method)*

Number of dedicated employees	8
Number of employees	1258
Complete electricity consumption (MWh)	3485,29
Consumption producing emissions (MWh)	3485,29
Consumption allocated to Grexel (MWh)	22,16
Emissions factor (tCO <sub>2</sub> /MWh)	0,82
Emissions (tCO <sub>2</sub> )	18,17

The following table summarizes Grexel's Scope 2 emissions when using location-based method.

*Table 9: Scope 2 emissions (location-based method)*

	tCO <sub>2</sub>
Grexel home office electricity consumption	5,68
Grexel home office district heating consumption	2,25
Grexel remote development team electricity consumption	18,17
Total	26,11

## Scope 2 assessment

When comparing different Scope 2 methods, the market-based method produces far more positive results than the location-based equivalent. Compared to 2015, the biggest change appears in remote development team's electricity consumption because of using renewable energy for the whole electricity consumption in the market-based method.



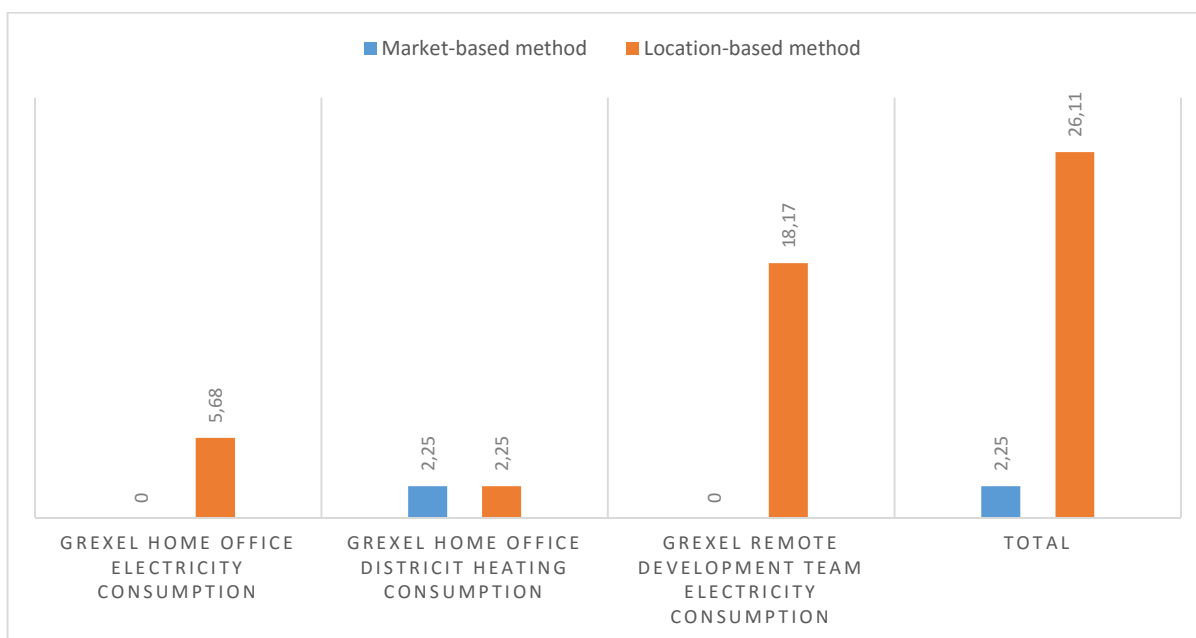


Figure 1: Grexel Scope 2 market- and location-based emission inventories in comparison

For Grexel, the comparison shows that by using available market instruments, it is possible to maintain our business on a more sustainable level. For the remote development team, the results underline the importance and effect of local investments to renewable energy production.

## Scope 3 - Corporate value chain

To calculate indirect emissions from our business value chain, the GHG Protocol's Scope 3 Corporate value chain standard was used. The standard introduces multiple categories designed to help companies gather and quantify their value chain emissions, both up and downstream. There are 15 different usable categories. For Grexel, we have identified three categories that are the most applicable to our business functions.

- Category 1 Purchased goods and services
- Category 6 Business travel
- Category 7 Employee commuting

Category 1 includes all upstream emissions from manufacturing of purchased products and services during the reporting year. Grexel has decided to allocate the emissions resulting from purchased goods to all product lifespan years equally. In practice this means that Grexel will offset one fifth of emissions for five distinct years from product with a lifespan of five years. This approach allows for a more consistent comparison between consecutive years.

Category 6 includes Grexel-related business travel in means of transportation not owned or operated by Grexel.

Category 7 includes transportation of employees between their homes and their worksites during the reporting year.

## Category 1 - Purchased goods and services

Category 1, as defined in the Corporate value chain standard, contains the upstream procurements made by the company. For Grexel, this includes office appliances and furniture for both our home office and the remote development team in India.

For the past three years, Grexel has used the climate calculator (<http://www.ilmastolaskuri.fi/en>) provided by WWF to calculate our Scope 3 Category 1 emissions.

Emissions from Grexel's office appliances and furniture are presented in the following tables.

Table 10: Grexel office appliances and resulting emissions

	Amount	Emission factor (tCO2)	Product lifespan (years)	Emissions per year (tCO2)
Mobile phone	5	0,06	5	0,06
Laptop	3	0,16	5	0,09
Desktop computer	11	0,20	5	0,44
LCD monitor	16	0,33	5	1,05
MFP	3	0,41	5	0,25
Server	7	0,20	5	0,28
LED TV	2	0,21	5	0,08
			Total	2,25

Table 11: Grexel office furniture and resulting emissions

	Amount	Emission factor (tCO2)	Product lifespan (years)	Emissions per year (tCO2)
Office table	1	0,22	5	0,04
Office desk (electrical)	9	0,25	5	0,46
Office chair	12	0,03	5	0,08
Saddle chair	1	0,02	5	0,00
Other chair	7	0,01	5	0,01
Storage unit (low)	10	0,05	5	0,10
Storage unit (high)	2	0,07	5	0,03
Partition	10	0,05	5	0,10
			Total	0,83

In addition to more permanent procurements, we have included our office paper consumption in Category 1 resulting in 0,011 tCO2 emissions for 2016.

In consistence with previous years, Grexel's emissions inventory also includes the office appliances and furniture used by our remote development team in India. Each employee is estimated to have a standard set of office appliances and furniture in use. Calculation logic is the same as used with Grexel home office procurements.

Table 12: Grexel remote development team office procurements and resulting emissions

	Amount	Emission factor (tCO2)	Product lifespan (years)	Emissions per year (tCO2)
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Office desk	1	0,22	5	0,04
Office chair	1	0,03	5	0,01
Storage unit (low)	1	0,05	5	0,01
Partition	2	0,05	5	0,02
Desktop computer	1	0,20	5	0,04
LCD monitor	1	0,33	5	0,07
Total per person				0,19
Dedicated employees				8
Total				1,49

Additionally, Grexel has used dedicated servers rented from a datacenter provider in the UK. The service provider uses 100% renewable electricity to power their hardware, and thus no CO<sub>2</sub> emissions are allocated to servers' electricity consumption.

By combining the emissions from both Grexel home office and remote development, a total of 4,57 tCO<sub>2</sub> emissions is allocated to Scope 3 Category 1 for 2016.

### Category 6 - Business travel

The Scope 3 standard recommends companies to include their business-related travel by means of transport not owned by the company into GHG emissions inventory Scope 3 Category 6. We have added business trips longer than 100 km for which travel is paid by Grexel and the cost is not directly forwarded to a customer. In this category, we have initiated the inventory by gathering all Grexel's business related travels that would qualify for Category 6. Flights that have already been offset by some other party are excluded from the calculation.

Included flights were categorized per their haul length. The emission factors were adopted from UK Government GHG Conversion Factors for Company Reporting<sup>3</sup> updated in 2016.

Category	DEFRA category	Distance (km)	Emissions factor (kg/km)
Short haul	Domestic	up to 463	0,27867
Medium haul	Short-haul international	463 - 3700	0,16844
Long haul	Long-haul international	over 3700	0,19162

To estimate the flight distances of reported flights, we used a web-based calculation tool<sup>4</sup>. The below table contains the overview of Grexel flights for year 2016. For security reasons the complete listing of allocated flights has been removed, and only the category-based sum volumes have been presented.

Category	Quantity	Distance (km)	Emissions factor (kg/km)	Emissions (kgCO <sub>2</sub> )
Short haul	6	2109	0,28	587,72
Medium haul	43	39901	0,17	6720,92
Long haul	4	20102	0,19	3851,95
Total	53	62112		11160,58

<sup>3</sup> <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2016>

<sup>4</sup> <http://www.travelmath.com/>

## Category 7 - Employee commuting

Scope 3 Category 7 covers the emissions from employee commuting. We have gathered information about employee commuting for Grexel home office employees in Finland and dedicated workers in the development center in India. For Grexel home office, we used average daily distances per means of transportation multiplied by working days.

The city of Helsinki uses 100% renewable energy for electric public transportation (metro, tram, and train). For emission factors, relevant to combustion-based means of transportation (bus, car, and scooter) a calculation system for traffic exhaust emissions in Finland<sup>5</sup> was used.

Table 13: Grexel total distances commuted per means of transportation for Grexel home office employees

	Walking	Bike	Metro	Tram	Train	Bus	Car	Scooter
km in 2016	3043,8	0,0	3948,1	917	2807,8	9682,9	2300	0
gCO2/km	0,00	0,00	0,00	0,00	0,00	58,00	98,00	34,00
kgCO2	0,00	0,00	0,00	0,00	0,00	514,84	225,4	0
							Total	787,0082
							tCO2	0,79

As during previous years, it was assumed that employees working in the Indian development center commute by bus. A yearly estimation of combined commuting kilometers was multiplied by an emissions factor per passenger km and multiplied by the number of dedicated employees. The average distance travelled in one year was calculated using Indian working days<sup>6</sup>.

Number of dedicated employees	8
Average distance travelled one-way (km)	17
Average distance travelled in one year (km)	66640
Emissions factor (gCO2/km)	89
Emissions due offshore employee commuting (tCO2)	5,93

By combining the emissions from both Grexel home office and remote development team employee commutation, a total of 6,72 tCO2 emissions is allocated to Scope 3 Category 7 for 2016.

## Scope 3 assessment

In Scope 3, our emissions are divided between categories 1 6 and 7. The lifespan concept used for procurements has been useful in making the inventory more stable and also enabling the company to lower its Category 1 emissions when a procurement is used longer than its lifespan estimates.

The overall emissions per category in Scope 3 are presented in the below table and figure.

Table 13: Grexel Scope 3 emissions

Category 1 - Purchased goods and services	4,57
Category 6 - Business travel	11,16
Category 7 - Employee commuting	6,72
Total	22,45

<sup>5</sup> <http://lipasto.vtt.fi>

<sup>6</sup> <http://www.workingdays.in/>

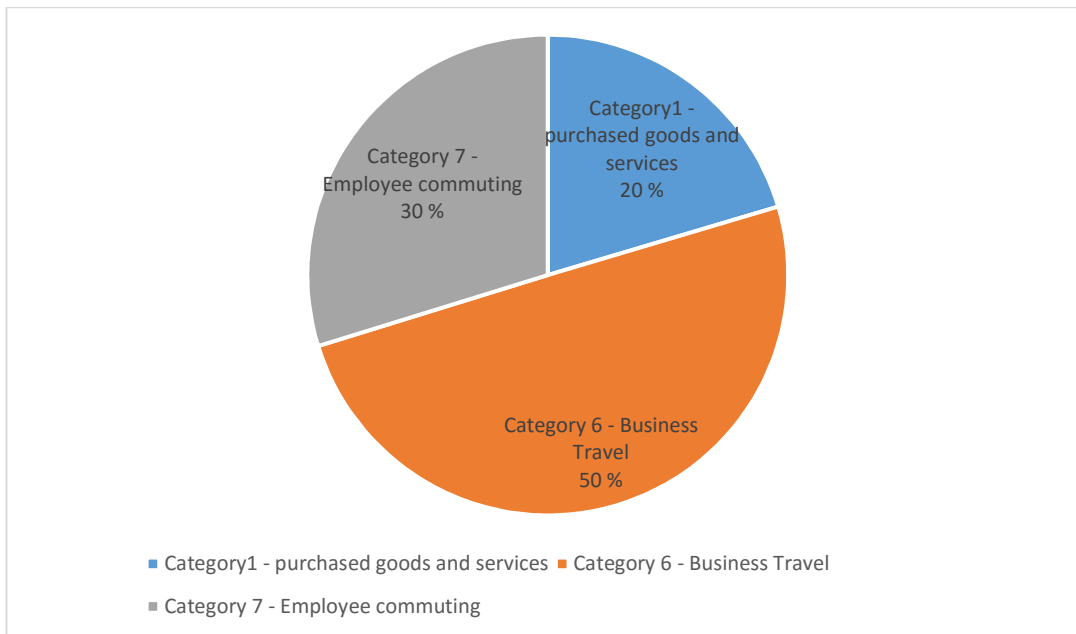


Figure 2: Grexel Scope 3 emissions

The dominating Category 6 - Business travel is typical to our kind of company which has all of its customers and potentials abroad, requiring relatively high amount of travelling.

## Inventory overview and comparison

Our GHG emissions inventory for 2016 is presented in Table 14. Our emissions in scopes 1 and 2 are very low compared to our value chain emissions. This is mainly because of our choice to prefer renewables in our energy procurements. This is also evident when comparing our Scope 2 market-based approach to the location-based equivalent.

Table 14: GHG emissions

	2016
Scope 1 - Direct GHG emissions	0,00
Scope 2 - Indirect GHG emissions	2,25
Market-based method	2,25
(Location-based method)	26,11
Scope 3 - Corporate value chain	22,45
Category 1 - Purchased goods and services	4,57
Category 6 - Business travel	11,16
Category 7 - Employee commuting	6,72
Total	24,71

## Retrospect

Grexel has disclosed and offset all its emissions since 2012. The following table summarizes the evolution of Grexel-induced emissions during 2012 – 2016.



	2012	2013	2014	2015	2016
Scope 1 - Direct GHG emissions	0,00	0,00	0,00	0,00	0,00
Scope 2 - Indirect GHG emissions	16,95	17,39	17,50	3,80	2,25
Market-based method	16,95	17,39	17,50	3,80	2,25
(Location-based method)	-	-	30,13	33,42	26,11
Scope 3 - Corporate value chain	13,00	13,28	13,36	20,00	22,45
Category 1 - Purchased goods and services	7,61	7,98	4,58	4,65	4,57
Category 6 - Business travel	4,81	4,32	7,66	7,95	11,16
Category 7 - Employee commuting	0,59	0,98	1,12	7,40	6,72
Total	29,95	30,67	30,86	23,80	24,71

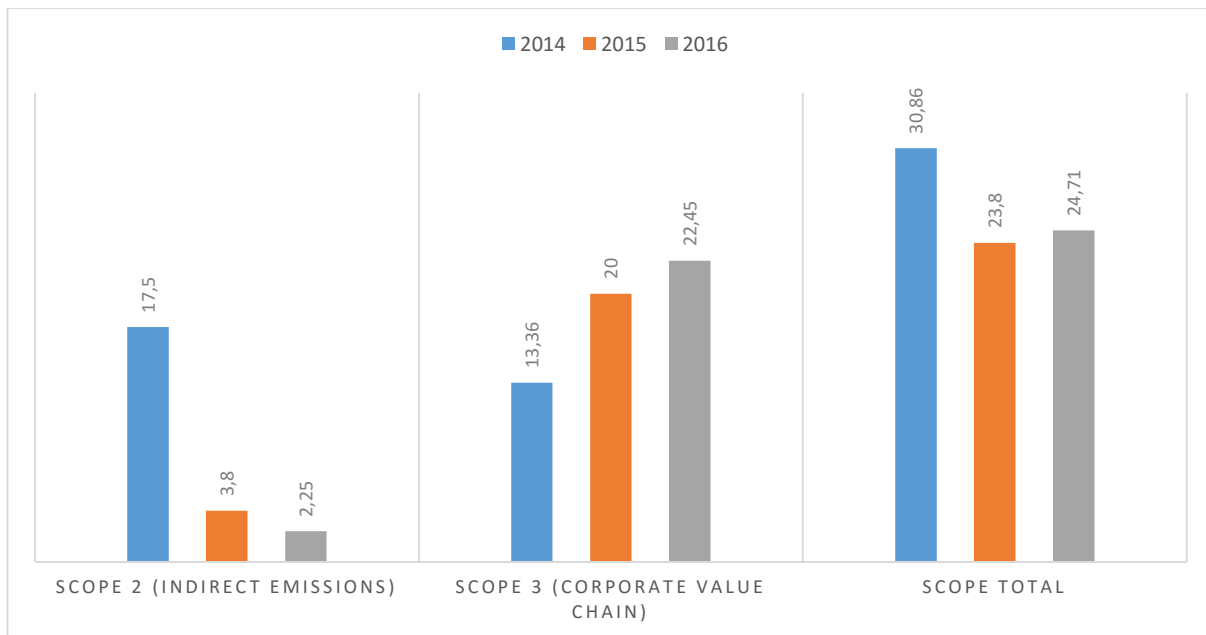


Figure 3: GHG emissions per scope for 2014-2016

Another way to study the evolution of Grexel's GHG emissions is to compare them to the size of Grexel's business. We have chosen two indicators, the number of transacted certificates in registries maintained by Grexel and the company turnover.

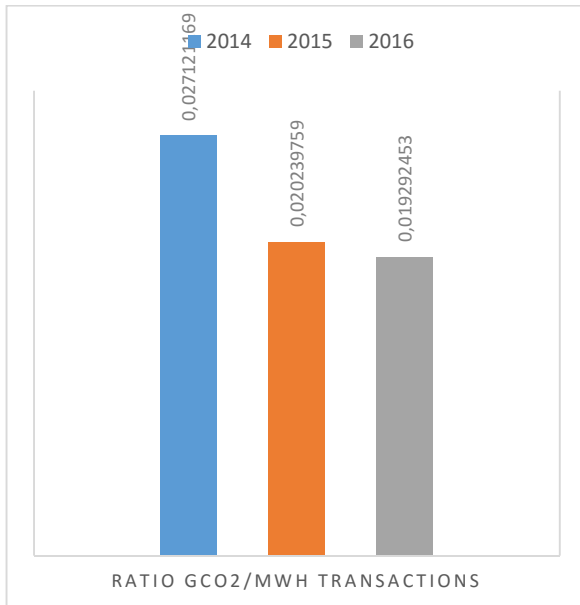


Figure 4: GHG emissions gCO<sub>2</sub> per MWh transacted certificate 2014-2016

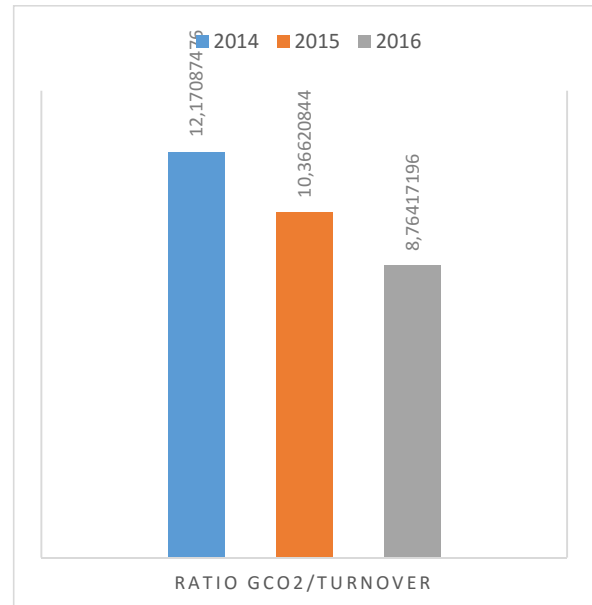


Figure 5: GHG emissions gCO<sub>2</sub> per company turnover €2014-2016

## Offsetting

In order to offset our business-related emissions, we have used Certified Emission Reduction (CER) units imported to Grexel's GECCO domain certificate bank. The units are originally from a Shaanxi Shenmu Hengdong waste gas based electricity generation project (UNFCCC Project no. 4292). The links to the cancellation statement and project information site can be found below.

The cancellation statement for emission offsets can be found [here](http://cmo.grexel.com/CancellationStatements/CancellationStatement_112412_58e78682-1981-4ef2-ab03-be80099eebed.pdf)<sup>7</sup>.

More information about the source project can be found [here](https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1293113907.36/view)<sup>8</sup>.

<sup>7</sup> [http://cmo.grexel.com/CancellationStatements/CancellationStatement\\_112412\\_58e78682-1981-4ef2-ab03-be80099eebed.pdf](http://cmo.grexel.com/CancellationStatements/CancellationStatement_112412_58e78682-1981-4ef2-ab03-be80099eebed.pdf)

<sup>8</sup> <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1293113907.36/view>

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- [1] S. Bhawan and R. Puram, "CO2 Baseline Database for the Indian Power Sector User Guide Version 10.0," Government of India Ministry of Power Central Electricity Authority, New Delhi, 2014.
- [2] WRI and WBCSD, "Greenhouse Gas Protocol," 2012. [Online]. Available: <http://www.ghgprotocol.org/>.



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