



GREXEL SYSTEMS LTD
GREENHOUSE GAS EMISSIONS
INVENTORY 2017

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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 twelve 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.

The reported emissions have been compensated by using emission reduction units, already for the sixth consecutive year.

We use 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 2017, the total emissions dropped 27%, mainly due to the fact that, for the first time, all the consumption related to Indirect GHG emissions was renewable, including the district heating of the home office. There was also a drastic reduction in business travel. According to the market-based method, the Scope 2 total emissions were null. Also, considering the location-based method, the emissions of Scope 2 decreased by 19%.

For Scope 3, the overall drop was 19% including a significant reduction in business travel and a minor drop in purchased goods and services. The only item to increase in the GHG calculation, compared to the year before, was the employee commuting.

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 2017, we report 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 ₂ /kWh
Electricity (commodity value for market-based method)	0,0
District Heating (commodity value for market-based method)	0,00
Electricity in Finland (grid average for location-based method)	287,81
Electricity in India (grid average for location-based method)	820,00
District Heating (grid average for location-based method)	163,00

For 2017, we got our home office scope 2 consumption figures directly from the building administrator including a share of our office building's non-allocated general electricity consumption, e.g. the office cooling. This share is allocated per surface 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 supplier¹ using Guarantees of Origin and the overall technology-based distribution is 99% hydro power and 1% wind power. Thus, our home office's 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 ₂
Electricity consumption 2016	7069,8	0,00
Share of Office Building's general, non-allocated consumption 2016	12038,14	0,00

¹ <http://www.nordicgreen.fi>

Our home office is heated as part of Helsinki’s district heating network. In 2017, it was finally possible to enforce consumer choice in this category and have emission-free production in district heating as well.

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

	kWh	tCO2
District heating consumption 2016	20939,64	0,00

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 was equal to the consumption meaning zero emissions.

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

Number of dedicated employees	10
Number of employees	2200
Complete electricity consumption (MWh)	3300
Production from own wind turbine (MWh)	3300
Consumption producing emissions (MWh)	0
Consumption allocated to Grexel (MWh) ²	0
Emissions (tCO2)	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)

	tCO2
Grexel home office electricity consumption	0,00
Grexel home office district heating consumption	0,00
Grexel remote development team electricity consumption	0,00
Total	0,00

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	tCO2
Total electricity consumption 2017	19107,94	5,50

Also the district heating, without the contractual instruments would result in higher emissions.

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

	kWh	tCO2
District heating consumption 2017	20939,64	3,41

For the electricity consumed by the development team in India, in location-based method, the grid average is used for all consumed electricity.

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

Number of dedicated employees	10
Number of employees	2200
Complete electricity consumption (MWh)	3300
Consumption producing emissions (MWh)	3300
Consumption allocated to Grexel (MWh)	15
Emissions factor (tCO2/MWh)	0,82
Emissions (tCO2)	12,3

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

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

	tCO2
Grexel home office electricity consumption	5,50
Grexel home office district heating consumption	3,41
Grexel remote development team electricity consumption	12,3
Total	21,21

Scope 2 assessment

When comparing different Scope 2 methods, the market-based method produces far more positive results than the location-based equivalent.

In 2017, the market-based method resulted in zero emissions thanks to the introduction of renewable energy regarding the home office district heating and, as far as the location based method is concerned, the decrease was mainly thanks to the reduction in the electricity consumption allocated to the Indian development team working for Grexel.

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 home office and the remote development team in India.

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	0	0,06	5	0,00
Laptop	3	0,16	5	0,09
Desktop computer	5	0,20	5	0,20
LCD monitor	7	0,33	5	0,46
MFP	2	0,41	5	0,16
Server	0	0,20	5	0
LED TV	2	0,21	5	0,08
			Total	1,00

Table 11: Grexel office furniture and resulting emissions

	Amount	Emission factor (tCO2)	Product lifespan (years)	Emissions per year (tCO2)
Office table	0	0,22	5	0,00
Office desk (electrical)	9	0,25	5	0,46
Office chair	3	0,03	5	0,02
Saddle chair	0	0,02	5	0,00
Other chair	0	0,01	5	0,00
Storage unit (low)	0	0,05	5	0,00
Storage unit (high)	0	0,07	5	0,00
Partition	0	0,05	5	0,00
			Total	0,48

In addition to more permanent procurements, we have included our office paper consumption in Category 1 resulting in 0,005 tCO2 emissions for 2017.

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)
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	10
			Total	1,86

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 CO2 emissions are allocated to servers' electricity consumption.

By combining the emissions from both Grexel home office and remote development, a total of 3,34 tCO2 emissions is allocated to Scope 3 Category 1 for 2017.

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 Reporting³ updated in 2017.

Table 13: Business travel emission factors

Category	DEFRA category	Distance (km)	Emissions factor (kg/km)
Short haul	Domestic	up to 463	0,26744
Medium haul	Short-haul international	463 - 3700	0,16103
Long haul	Long-haul international	over 3700	0,19745

To estimate the flight distances of reported flights, we used a web-based calculation tool⁴. 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.

Table 14: Grexel business travel emissions

Category	Quantity	Distance (km)	Emissions factor (kg/km)	Emissions (kgCO ₂)
Short haul	8	2768	0,27	740,27
Medium haul	24	31787	0,16	5118,66
Long haul	0	0	0,19	0
Total		34555		5858,93

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 and car) a calculation system for traffic exhaust emissions in Finland⁵ was used.

³ <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

⁴ <http://www.travelmath.com/>

⁵ <http://lipasto.vtt.fi>

Table 15: Grexel total distances commuted per means of transportation for Grexel home office employees

	Walking	Bike	Metro	Tram	Train	Bus	Car
km in 2017	3111,2	0,0	6584,0	0	5050,0	17314,4	4197,4
gCO2/km	0,00	0,00	0,00	0,00	0,00	52,00	89,00
kgCO2	0,00	0,00	0,00	0,00	0,00	900	374
						Total	1274
						tCO2	1,27

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 days⁶.

Table 16: Indian development team's emissions

Number of dedicated employees	10
Average distance travelled one-way (km)	17
Average distance travelled in one year (km)	85680
Emissions factor (gCO2/km)	89
Emissions due offshore employee commuting (tCO2)	7,62

By combining the emissions from both Grexel home office and remote development team employee commutation, a total of 8,90 tCO2 emissions is allocated to Scope 3 Category 7 for 2017.

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 17: Grexel Scope 3 emissions

Category 1 - Purchased goods and services	3,34
Category 6 - Business travel	5,86
Category 7 - Employee commuting	8,90
Total	18,10

⁶ <http://www.workingdays.in/>

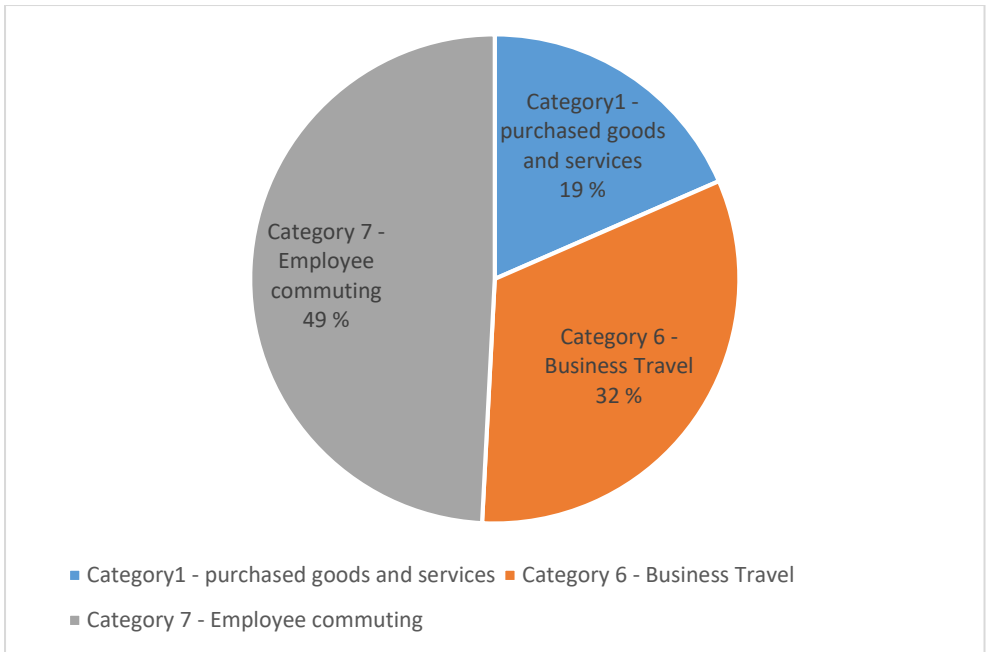


Figure 1: Grexel Scope 3 emissions

Inventory overview and comparison

Our GHG emissions inventory for 2017 is presented in Table . Our emissions in scopes 1 and 2 are zero 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 18: GHG emissions summary for 2017

	2017
Scope 1 - Direct GHG emissions	0,00
Scope 2 - Indirect GHG emissions	0,00
Market-based method	0,00
(Location-based method)	21,21
Scope 3 - Corporate value chain	18,10
Category 1 - Purchased goods and services	3,34
Category 6 - Business travel	5,86
Category 7 - Employee commuting	8,90
Total	18,10

Retrospect

Grexel has disclosed and offset all its emissions since 2012. The following table summarizes the evolution of Grexel-induced emissions during 2012 – 2017.

Table 19: GHG emissions 2012 - 2017

	2012	2013	2014	2015	2016	2017
Scope 1 - Direct GHG emissions	0,00	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	0,00
Market-based method	16,95	17,39	17,50	3,80	2,25	0,00
(Location-based method)	-	-	30,13	33,42	26,11	21,21
Scope 3 - Corporate value chain	13,00	13,28	13,36	20,00	22,45	18,10
Category 1 - Purchased goods and services	7,61	7,98	4,58	4,65	4,57	3,34
Category 6 - Business travel	4,81	4,32	7,66	7,95	11,16	5,86
Category 7 - Employee commuting	0,59	0,98	1,12	7,40	6,72	8,90
Total	29,95	30,67	30,86	23,80	24,71	18,10

The below figure illustrates the total emissions by Grexel across the years using the market-based method.

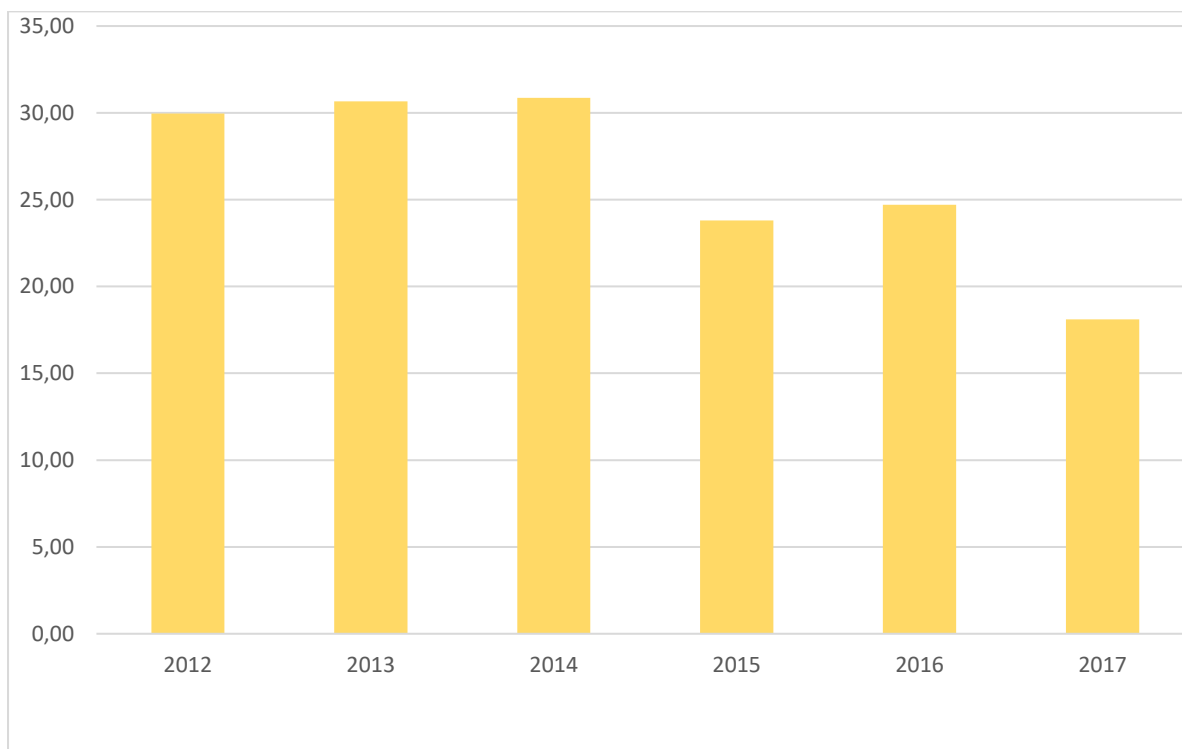


Figure 2: Total GHG emissions 2012 - 2017

If we look at the Scope 2 in detail with the location-based method, we can see that also applying this approach the emissions in this category have decreased.

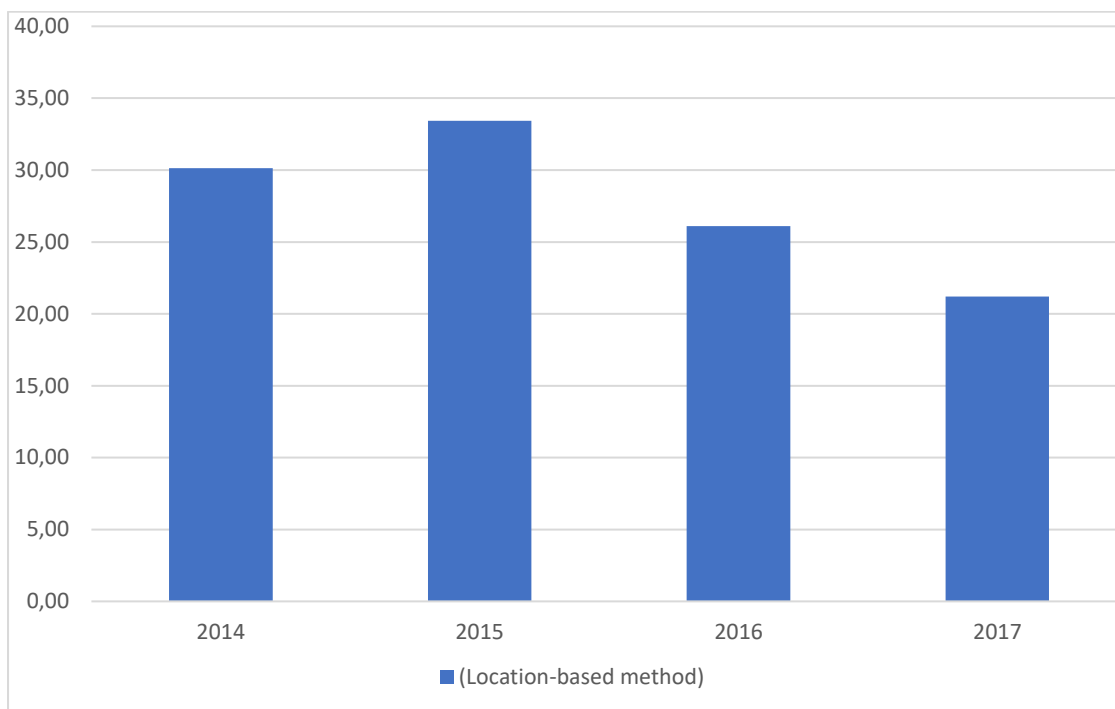


Figure 3: Scope 2 Indirect GHG emissions with location-based method

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](#)⁷.

More information about the source project can be found [here](#)⁸.

References

- [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/>.

⁷ http://cmo.grexel.com/CancellationStatements/CancellationStatement_124233_dbaa6e3e-2be5-43df-a82b-2866ee8da612.pdf

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