grexel

Grexel Systems Ltd Greenhouse Gas Emissions

Inventory 2013

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Table of contents

Introduction

Grexel has a long history as a service provider in the field of energy certification. While in business dedicated to promote renewable energy and cut global emissions Grexel has a standing principle of disclosing and offsetting its own carbon footprint. It is our vision that by doing so we contribute to building a more sustainable future and also show that we hold dear to ourselves the same principles we promote in business.

This document sets out to disclose the GHG emissions inventory of Grexel Systems Ltd. The inventory was formed for the second time with improvements compared to previous year.

As the basis for calculations and data gathering The Greenhouse Gas Protocol (GHG Protocol http://www.ghgprotocol.org/) was chosen. The GHG Protocol is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions.

According to GHG Protocol's recommendation, emissions induced by Grexel were divided into following scopes in order to clarify and simplify the resulting GHG emissions inventory.

- Scope 1 Emissions from sources owned or controlled by the company.
- Scope 2 Emissions from generation of purchased electricity, heating or cooling.
- Scope 3 Emissions from company's value chain.

GHG Protocol provides sufficient standards and guidance needed to identify and quantify emissions originating from business done by Grexel. By producing such of an emissions inventory, it becomes possible to identify the main sources of our CO_2-emissions and find solutions to reduce them. CO_2-emissions that are unavoidable can then be offset by purchasing sufficient amount of voluntary carbon credits.

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 here assumed to be zero.

Scope 2 – Indirect GHG emissions

As for most companies, indirect GHG emissions from procured electricity, heating and cooling account for a significant percentage in Grexel's GHG emissions inventory. In the inventory the scope 2 emissions have been gathered and allocated for three separate locations: Grexel home office in Finland, an offshore development center in Chennai, India and remote work done in Ukraine. In the first two cases, our consumption is scaled down from the total consumption of the office facility to match the ratio of our business to other operations located in the same property. For remote work in Ukraine the average electricity consumption per employee is assumed to match the electricity consumption per person in Grexel home office.

For our home office in Rantatie Business Park[1] Helsinki, Finland the separate consumption figures for district heating and district cooling were formed by matching the ratios of Grexel office space to complete property space and Grexel office consumption to property consumption in total. The area used by Grexel employees was estimated to be 150 m^2 which is ca. 1,8 % of the building total of 8075 m^2. Similar method was used for estimating electricity consumption. Resulting emissions for Grexel home office were calculated by multiplying allocated consumption figures with corresponding emissions factors.

Rantatie Business Park property uses 100% green electricity (disclosed with Guarantees of Origin) from Nordic Green Energy[2] with no direct GHG emissions.

Table 1: Electricity consumption in Grexel home office 2013

	kWh	tCO2
Electricity consumed by Grexel	9223,00	0,00

District heating and district cooling services are provided by Helsingin Energia[3]. The emissions factors used in calculations were sent on Grexel's request by the corresponding departments at Helsingin Energia.

Table 2: District heating consumption in Grexel home office 2013 [4]

	kWh	tCO2
District heating consumed by property	865 900,00	164,52
District heating consumed by Grexel	16 084,83	3,06

[1] http://www.lindstrominvest.fi/fi-FI/rbp/
[2] http://www.nordicgreen.fi/
[3] http://www.helen.fi/
[4] CO_2 emissions factor for district heating 190 gCO_2/kWh

Table 3: District cooling consumed in Grexel home office 2013 [5]

	kWh	tCO2
District cooling consumed by property	459 800,00	22,99
District cooling consumed by Grexel	8 541,18	0,43

Grexel uses development and support services of an offshore development and resource management center in Chennai, India. Scope 2 boundaries were expanded to also include emissions generated by these offshore operations.

While forming emissions inventory for year 2012 a query was made to Chennai in order to obtain relevant information about the usage of energy by the development and resource management center. According to received answers, the development center produces 50 – 60 % of its electricity from privately owned wind turbine. The rest is provided by electricity from the grid. Property heating and cooling functions are electricity based.

In order to calculate the allocated emissions for the employees in India dedicated to Grexel, an approach similar to Grexel home office emissions calculation was chosen. The calculation was however modified to use a ratio between Grexel-dedicated employees to total work force of the center.

Table 4: Grexel's share of electricity consumed by the offshore development and resource management center

Number of dedicated employees	11	
Number of employees	850	
Complete electricity consumption	2 520,00	MWh
Production from own wind turbine	1 386,00	MWh
Consumption producing emissions	1 134,00	MWh
Consumption allocated to Grexel	14,68	MWh
Emissions factor[6]	810,00	$kgCO_2/MWh$
Emissions	11,89	tCO_2

Grexel also has one remote worker in Ukraine. His electricity consumption was assumed to match the average consumption of one Grexel employee in Finland. The amount of consumed electricity was multiplied by an emissions factor from European Bank for Reconstruction and Development[7].

Table 5: Scope 2 emissions from outsourced work in Ukraine

	kWh	tCO_2/MWh	tCO_2
Remote work in Ukraine	2506,25	0,807	2,02

[5] CO_2 emissions factor for district cooling 50 gCO_2/kWh
[6] CO_2 emissions factor for consumed electricity in India from http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver6.pdf
[7] http://www.ebrd.com/downloads/about/sustainability/cef.pdf

From information above it is possible to conclude scope 2 GHG emissions for Grexel.

Table 6: Grexel System Ltd scope 2 emissions in 2013

	tCO2
Grexel home office electricity consumption	0,00
Grexel home office district heating consumption	3,06
Grexel home office district cooling consumption	0,43
Chennai development center	11,89
Remote work	2,02
Scope 2 total	**17,39**

Scope 3 – Corporate value chain

Scope 3 emissions inventory was calculated using GHG Protocol's standard *Corporate Value Chain (Scope 3)*[8].

The *Corporate value chain* standard allows companies to assess their entire value chain emissions impact by accounting for emissions from 15 categories of scope 3 activities, both upstream and downstream of their operations. For Grexel there are 3 relevant categories among the total of 15.

- 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.

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

In the GHG emissions inventory for 2012 Grexel disclosed all of its purchased goods before the beginning of 2013. All the listed products were given a five-year lifespan during which their emissions would be offset. In this inventory for year 2013 they are grouped as products in their 2nd year of lifespan.

Goods procured during year 2013 are grouped as products in their 1st year of lifespan.

2nd year of lifespan products

Emissions disclosure and reporting for products acquired before 2013 was continued by bases set in emissions inventory for 2012.

[8] http://www.ghgprotocol.org/standards/scope-3-standard

For Grexel home office the procurements were divided into groups of *Office appliances* and *Furniture*. Included are appliances physically in Grexel office (e.g. furniture) or directly in Grexel's use (e.g. servers).

As set out in 2012 inventory the emissions from procurement of *Office appliances and furniture* allocated to outsourced offshore development were also accounted for as emissions from 2nd year of lifespan products.

Table 7: Grexel office appliances (2nd year of lifespan)

Office appliances	Amount (pc.)	Emission factor ($kgCO_2$/pc.)	Product lifespan (yr.)	Emissions per year ($kgCO_2$)
Mobile phone	5	16,00	5,00	16,00
Laptop	3	171,00	5,00	102,60
Desktop computer	8	261,00	5,00	417,60
LCD monitor	13	227,00	5,00	590,20
MFP	2	410,00	5,00	164,00
Server	9	261,00	5,00	469,80
Total				1760,20

Table 8: Grexel office furniture (2nd year of lifespan)

Furniture	Amount (pc.)	Emission factor ($kgCO_2$/pc.)	Product lifespan (yr.)	Emissions ($kgCO_2$)
Desk	9	221,00	5,00	397,80
Chair	15	75,60	5,00	226,80
Storage furniture	12	133,00	5,00	319,20
Partition	10	432,00	5,00	864,00
Total				1807,80

Table 9: Offshore development allocated office appliances and furniture (2nd year of lifespan)

Office appliances and furniture	Amount (pc.)	Emission factor ($kgCO_2$/pc.)	Product lifespan (yr.)	Emissions per year ($kgCO_2$)
Desk	1	221,00	5	44,20
Chair	1	75,60	5	15,12
Storage unit	1	133,00	5	26,60
Desktop computer	1	261,00	5	52,20
LCD monitor	1	227,00	5	45,40
Partition	2	432,00	5	172,80
Emissions per person	-	-	-	356,32
Dedicated employees	12	-	-	-
Total				4275,84

By combining the group emission totals from Tables 7, 8 and 9 we obtain the sum of emissions allocated to scope 3 category 1 products purchased before year 2013.

Emissions from 2nd year of lifespan scope 3 category 1 products (tCO_2)	7,84

1st year of lifespan products

GHG emissions inventory for products purchased during year 2013 include upstream emissions from acquired office appliances, furniture and paper.

Table 10: Grexel office appliances (1st year of lifespan)

Office appliances	Amount (pc.)	Emission factor ($kgCO_2$/pc.)	Product lifespan (yr.)	Emissions per year ($kgCO_2$)
MFP	1	410,00	5,00	82,00
Total				82,00

Table 11: Grexel office furniture (1st year of lifespan)

Furniture	Amount (pc.)	Emission factor ($kgCO_2$/pc.)	Product lifespan (yr.)	Emissions per year ($kgCO_2$)
Desk	1	221,00	5,00	44,20
Total				44,20

Table 12: Grexel office paper consumption (2013)

Paper consumption	Amount (pc.)	Emission factor ($kgCO_2$/pc.)	Product lifespan (yr.)	Emissions per year ($kgCO_2$)
Copying paper	5	0,99	1,00	12,39
Total				12,39

No additional emissions from procurements were allocated for year 2013 to offshore development and resource management.

Emissions from 1st year of lifespan scope 3 category 1 products ($kgCO_2$)	138,58

By combining the amounts of induced emissions from the 1st and 2nd years of product lifespan we can form a complete figure representing the amount of emissions from category 1.

Emissions from 2nd year of lifespan scope 3 category 1 products (tCO_2)	7,84
Emissions from 1st year of lifespan scope 3 category 1 products (tCO_2)	0,14
Scope 3 category 1 emissions (tCO_2)	**7,98**

Purchased services

As a service, Grexel uses dedicated servers from an offshore provider in the UK. To meet our demand, five servers and one network appliance have been dedicated to Grexel's use. The service provider uses 100% renewable electricity[9] to power their hardware, and thus no CO_2 emissions are induced.

[9] http://www.rackspace.co.uk/green-hosting

Category 6 – Business travel

Companies are advised to include their business related travel by means of transport not owned by the company into GHG emissions inventory scope 3 category 6. Included are business trips longer than 100 km for which travel arrangements are made by Grexel. In addition, 2013 emissions inventory includes Grexel-related business travel done by other than Grexel employees.

For year 2013, this means that scope 3 category 6 will cover business related flights arranged and paid by Grexel as well as business related flights by outsourced workforce. To avoid double compensation, flights that are already compensated by other parties are excluded.

Included flights were categorized according to their haul length. The assumed distances and according emissions were adopted from *2012 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting*[10].

Table 13: Conversions factors and corresponding emissions for business flight haul lengths

Category	Assumed distance	Emissions factor	Emissions (kgCO2)
Short haul	463	0,20124	93,17412
Medium haul	1108	0,11486	127,26488
Long haul	6482	0,13143	851,92926

Table 14: Business related flights and corresponding emissions for Grexel employees in 2013. Lengths include the return flights.

Date	Distance	Category	Emissions ($kgCO_2$)
2013-01-28	1703 km	medium haul	127,26
2013-02-05	790 km	short haul	93,17
2013-03-19	1109 km	medium haul	127,26
2013-03-19	1109 km	medium haul	127,26
2013-04-03	397 km	short haul	93,17
2013-04-03	612 km	short haul	93,17
2013-04-09	1652 km	medium haul	127,26
2013-04-26	1462 km	medium haul	127,26
2013-04-26	1462 km	medium haul	127,26
2013-03-19	1109 km	medium haul	127,26
2013-05-07	6337 km	long haul	851,93
2013-09-11	3367 km	medium haul	127,26
2013-09-24	6337 km	long haul	851,93
2013-09-25	1652 km	medium haul	127,26
2013-10-09	397 km	short haul	93,17
2013-10-29	397 km	short haul	93,17
2013-11-05	1462 km	medium haul	127,26
2013-11-11	397 km	short haul	93,17
2013-11-11	397 km	short haul	93,17
2013-11-14	914 km	medium haul	127,26

[10] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69554/pb13773-ghg-conversion-factors-2012.pdf

Table 15: Business related flights and corresponding emissions for non-Grexel employees in 2013

Date	Category	Emissions ($kgCO_2$)
2013-01-21	short haul	93,17
2013-04-02	short haul	93,17
2013-04-16	short haul	93,17
2013-04-19	short haul	93,17
2013-05-07	short haul	93,17
2013-05-15	short haul	93,17

Using the information on business travel above it is possible to disclose scope 3 category 6 emissions for Grexel.

Scope 3 category 6 emissions (tCO_2)	**4,32**

Category 7 – Employee commuting

As part of GHG emissions inventory calculation done for year 2012, information about employee commuting for Grexel home office employees in Finland and dedicated workers in the development center in India was gathered. For Grexel home office employees the status quo is nearly the same as in 2012.

Table 16: Grexel employee commuting in 2013 (km/week)

	Car	Bus	Train	Tram	Metro	Bike	Walk
Employee 1	11,5				69,0	34,5	
Employee 2			150,0		50,0		50,0
Employee 3							8,0
Employee 4					10,0		30,0
Employee 5		89,0			41,0		
Employee 6				20,0		10,0	
Employee 7							15,0
Employee 8		20,0					

Emissions factors for different means of transportation were found via Helsinki region transport service[11]. Electricity-powered public transportation in Helsinki uses exclusively renewable hydro energy and thus produces no GHG emissions. For other means of transportation emissions factors were obtained from VTT's[12] *Lipasto – Traffic emissions*[13] database.

Table 17: Grexel employee commuting emissions estimate for 2013

	Car	Bus	Train	Tram	Metro	Bike	Walk
2013 estimate (km)	598,0	5668,0	7800,0	1040,0	8840,0	2314,0	5356,0
CO_2 factor (gCO_2/km)	98,00	58,00	0,00	0,00	0,00	0,00	0,00
CO_2 emissions ($kgCO_2$)	58,60	328,74	0,00	0,00	0,00	0,00	0,00

Emissions due Grexel employee commuting in 2013 ($kgCO_2$)	387,35

[11] http://www.reittiopas.fi/en/
[12] Technical Research Centre of Finland
[13] http://lipasto.vtt.fi/indexe.htm

When calculating the emission amounts from employee commuting in India the approach used for year 2012 was chosen. Namely it was assumed that employees working in the development center commute by bus. A yearly estimation of combined commuting kilometres was multiplied by an emissions factor of a typical bus.

Table 18: Offshore development center employee commuting emissions estimate for 2013

Number of dedicated employees	11
Average distance travelled one-way (km)	17,00
Yearly distance estimation (km)	10 200,00
Emissions factor (gCO_2/km)	58,00
Emissions due offshore employee commuting in 2013 ($kgCO_2$)	591,60

By combining emissions from Grexel home office and offshore employee commuting a complete figure for scope 3 category 7 can be calculated.

Emissions due Grexel employee commuting in 2013 ($kgCO_2$)	387,35
Emissions due offshore employee commuting in 2013 ($kgCO_2$)	591,60
Scope 3 category 7 emissions (tCO_2)	**0,98**

Scope 3 total

Scope 3 – corporate value chain emissions for Grexel in relevant categories 1, 6 and 7 are summed in Table 19.

Table 19: Scope 3 emissions in 2013

	tCO2
Scope 3 category 1	7,98
Scope 3 category 6	4,32
Scope 3 category 7	0,98
Scope 3 total	**13,28**

Year 2013 conclusion

During year 2013 Grexel induced **30,67 tCO_2** emissions. Since Grexel does not produce energy, the amount is divided between scopes 2 and 3.

Table 20: Grexel GHG emissions 2013

	tCO2
Scope 1	0,00
Scope 2	17,39
Scope 3	13,28
Total	**30,67**

Scope 2 inventory is dominated by emissions from offshore electricity consumption although a good share of the consumption in India is covered with own renewable production and is thus emission-free.

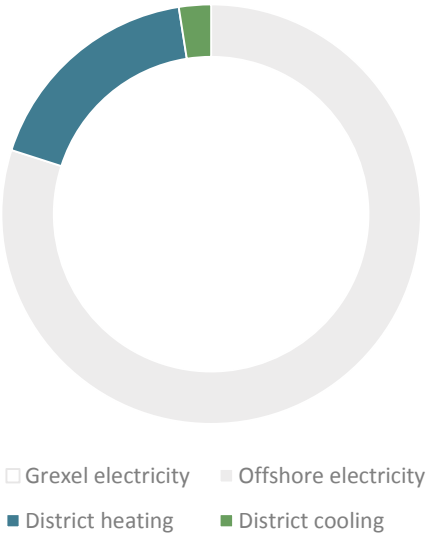

Figure 2: Scope 2 emissions 2013

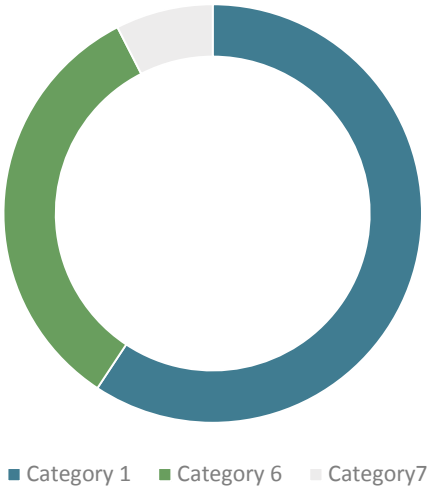

Figure 1: Scope 3 emissions 2013

Scope 2 inventory for Grexel home office consist of resulting emissions from district heating and cooling. The emissions, mainly due heating, are however moderate compared to offshore figures.

Similarly to year 2012, scope 3 consists mainly of emissions from procurements (Category 1) and business travel (Category 6) leaving employee commutation (Category 7) in their shadow.

Year 2012 in comparison

Overall induced emissions remained at the same level for years 2012 and 2013. Increases in categories with new additions (e.g. business flights by offshore employees) were compensated by decreases in other categories.

On the level of GHG Protocol's scopes 2 and 3 we can see the relatively small changes in emission amounts.

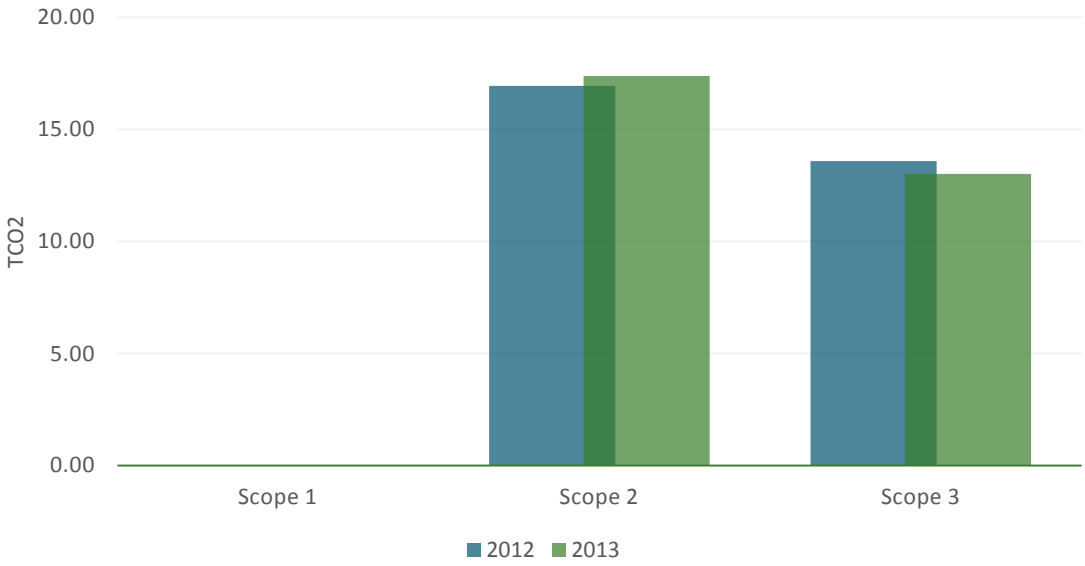

Figure 3: GHG emissions in 2012 and 2013

Scope 2 covers emissions from energy procurement for Grexel home office in Finland as well as energy consumed by outsourced operations. Scope 2 emissions inventory for 2013 deviates slightly from year 2012 with added amount of emissions due remote work in Ukraine. Although the relatively high electricity consumption per employee in Grexel home office is compensated by usage of emission-free renewable electricity, the allocation of such electricity consumption to offshore activities in Ukraine has a significant effect of increasing scope 2 emissions in total. The rise in scope 2 is restrained partly by diminished consumption of district heating and district cooling in Grexel Helsinki office.

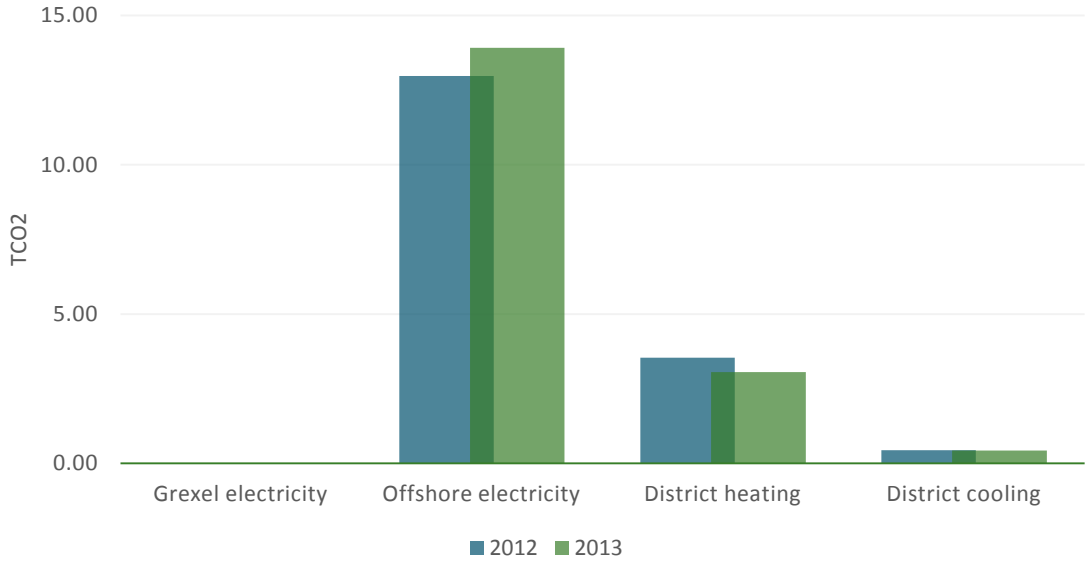

Figure 4: Scope 2 GHG emissions in 2012 and 2013

Scope 3 emissions cover the emissions induced by our value chain. Scope 3 category 6, covering business related travel, was updated to include Grexel-related flights by other than Grexel employees. Despite broadening the travel scope, the category 6 emissions were slightly reduced. This is mostly due relatively large percentage of short hauls within the complete flight list.

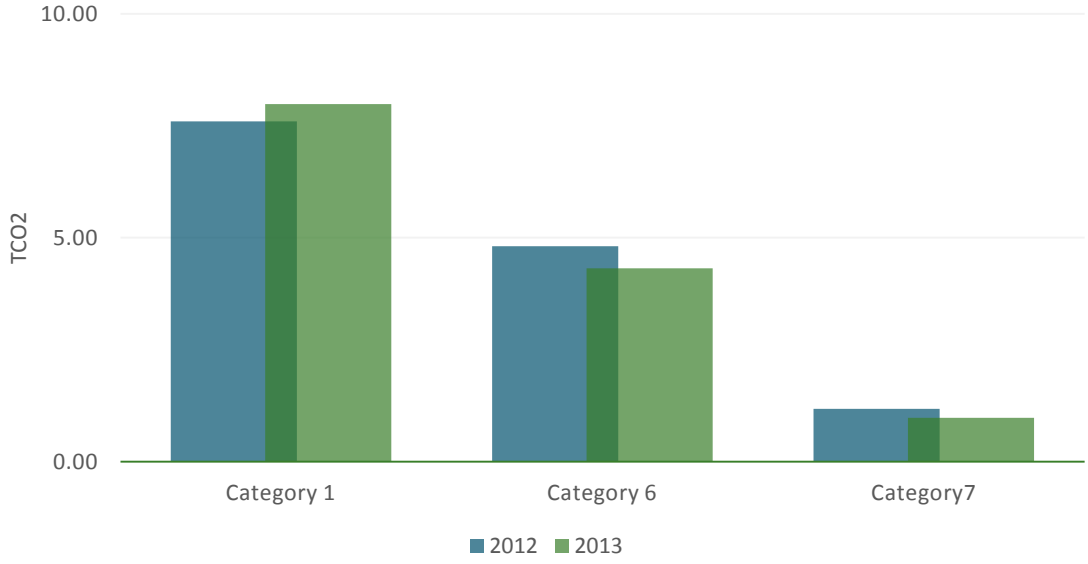

Figure 5: Scope 3 emissions in 2012 and 2013

As mentioned before, purchased goods and services inventory (category 1) is built so that it takes into account the different lifespans of products. By doing so, the inventory divides the allocated emissions to better reflect year to year activities rather than single purchases. This also means that category 1 will continue to grow at least until year 2017, which marks the end of lifespan for firstly introduced procurements (with lifespan of 5 years) in that category. Category 1 increased slightly due few purchases in Grexel home office.

Finally it is worth noting that although in 2012 the employee commuting emissions were remarkably low they were further reduced in 2013 by selecting even more sustainable means of transport with lower carbon emissions.

Offsetting

We recognize that not all GHG emissions can be reduced to the level of carbon-neutral business. For this reason Grexel has decided to offset its emissions by purchasing 31 Gold Standard Voluntary Emission Reduction (VER) units from the following emission reduction projects:

Düzova Wind Power Project[14]	Turkey	MarkIt ID 103000000002255
AY-YILDIZ 15 MW WPP[15]	Turkey	Markit ID 103000000002293

Both projects meet the Gold Standard[16] requirements and support building additional wind power. The certificate[17] confirming the retirement of the VERs can be found on Grexel website[18]. These VERs will help Turkey to stimulate and commercialize the use of grid connected renewable energy technologies and markets.

[14] http://mer.markit.com/br-reg/public/project.jsp?project_id=103000000002255
[15] http://mer.markit.com/br-reg/public/project.jsp?project_id=103000000002293
[16] http://www.cdmgoldstandard.org/
[17] http://www.grexel.com/sites/grexel.com/files/ver_cancellation_certificate_grexel_2013_emissions.pdf
[18] http://www.grexel.com/

Appendix 1: Emission factor sources

Scope 2	
Electricity	http://www.nordicgreen.fi/ http://www.ebrd.com/downloads/about/sustainability/cef.pdf http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver6.pdf
District heating	http://www.helen.fi/kaukolampo/index.html
District cooling	http://www.helen.fi/kaukojaahdytys/index.html
Scope 3	
Category 1	http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/a8a9bf6c78cd6225ca257826001028ab/ http://www.ilmastolaskuri.fi/fi/en/user/page/show/name/officeappliances http://www.ghgprotocol.org/Third-Party-Databases
Category 6	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69554/pb13773-ghg-conversion-factors-2012.pdf
Category 7	http://lipasto.vtt.fi/indexe.htm http://www.reittiopas.fi/en/