Grexel Systems Ltd Greenhouse Gas Emissions 2012

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1. Introduction

Grexel Systems Ltd is a service provider company in the area of energy certification. Our mission is to enable a clean energy economy by providing regulatory engineering services and core market technology solutions for government bodies mandated to establish markets for environmental commodities or rights.

Grexel is a pioneer in energy certification field. Our experts have more than 50 years of cumulative experience with the energy certificate markets and central certificate registries. Grexel is the EECS Issuing Body and registry operator of Guarantees of Origin in Finland and Sweden and is a long-time member of the Association of Issuing Bodies - AIB. In addition, Grexel manages and further develops central registries for Denmark, Germany, Luxembourg, Norway and Iceland. In total, more than 1000 TWh of electricity certificates have been issued in registries developed and managed by Grexel.

As a responsible actor in field of energy certification Grexel has decided to disclose its carbon footprint and compensate it by retiring high quality VER (Voluntary Emission Reduction) units. In order to do so a greenhouse gas (GHG) emissions inventory has been established. 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.

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 induced by us and our value chain. By producing this kind of an emissions inventory it will become possible to identify the main sources of our CO_2-emissions and find solutions to reduce them. Remaining CO_2-emissions will be offset by purchasing sufficient amount of carbon credits.

The standard time period for reporting and offsetting GHG emissions is one year. However since Grexel has not reported its emissions in the past, in some cases a longer time window is used to gather relevant CO_2 sources. In these cases emissions from previous years are either accounted for all at once or distributed to multiple years according to the lifespan of the source.

2. Scope 1 – Direct GHG emissions

Scope 1 emissions consist of GHG emissions from sources owned or controlled by the company. Grexel does not own or control devices that would fall under this category and thus can declare its scope 1 emissions to be zero.

3. Scope 2 – Indirect GHG emissions

Scope 2 covers emissions resulting from generation of purchased electricity, heat or cooling. Our home office is located in Rantatie Business Park (Hermannin rantatie 8, FI-00580 Helsinki) which uses electricity from Nordic Green Energy and district heating and district cooling from Helsingin Energia. In order to disclose our emissions the proportion of space used by our employees was compared to the complete volume of the building. The obtained percentage was then used as a factor identifying our share of energy consumption in comparison with overall energy load. Rantatie Business Park uses 100% renewable electricity (verified by Guarantees of Origin) and thus does not induce any accountable GHG emissions from its electricity consumption.

In order to calculate emissions from district heating and cooling the complete consumption in both cases was multiplied by an emissions factor. Corresponding share was then allocated to our GHG emissions inventory. Emissions factors were obtained from Helsingin Energia departments of district heating and district cooling.

The following table presents the scope 2 emissions for Grexel office.

Table 1: Scope 2 CO_2 emissions for Grexel office (2012)

	Unit	Building total	Grexel office
Area	m2	8075.00	150.00
Percentage of total		100.00%	1.86%
Electricity	kWh	942000.00	17498.45
CO2 emissions	tCO2	0.00	0.00
Heating	kWh	1004000.00	18650.15
CO2 emissions factor	gCO2/kWh	190.00	190.00
CO2 emissions	tCO2	190.76	3.54
Cooling	kWh	469000.00	8712.07
CO2 emissions factor	gCO2/kWh	50.00	50.00
CO2 emissions	tCO2	23.45	0.44
Scope 2	**tCO2**	**214.21**	**3.98**

Boundaries of our scope 2 inventory were expanded to include electricity used by offshore development center in Chennai, India. In order to calculate the share of our development center out of the emissions induced by the whole resource management company hosting the Grexel team, information about complete electricity consumption of the India office was obtained, and further divided by the total number of employees. Building heating and cooling in the Chennai offices is

electricity based and thus included in the electricity consumption. To make our inventory flexible allowing changes in dedicated employees abroad, we decided to introduce a standard emissions-per-person quantity of CO_2 GHG which is annually multiplied by average amount of personnel working for Grexel.

Table 2 presents the total and per allocated employee emissions induced by Grexel development center.

Table 2: Scope 2 CO_2 emissions induced by the resource management company hosting Grexel development center

Average number of dedicated employees	Average number of employees	Complete electricity consumption (MWh)	Production from own renewables (wind) (MWh)	Consumption producing emissions (MWh)	Consumption allocated to Grexel (MWh)	Emissions factor (kgCO2/MWh)	Emissions (tCO2)	Average emissions per allocated employee (kgCO2/p)
12.00	850.00	2520.00	1386.00	1134.00	16.01	810.00	**12.97**	1.08

By combining the two tables above we can approximate our Scope 2 emissions to be **16.95 tCO_2**.

4. Scope 3 – Corporate value chain

A GHG Protocol standard *Corporate Value Chain (Scope 3) Accounting and Reporting Standard* (http://www.ghgprotocol.org/standards/scope-3-standard) was used to identify and calculate our scope 3 emissions.

GHG Protocols scope 3 standard allows a company to assess its entire value chain emissions impact. In our case the majority of emissions come from scope 3 sources. Among 15 scope 3 categories we have identified 3 as most relevant to us. These categories are:

Category 1 Purchased goods and services

Category 6 Business travel

Category 7 Employee Commuting

Category 1 includes all upstream emissions from the production of products purchased or acquired by the company in the reporting year. Category 6 holds transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company). Category 7 includes transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).

4.1. Purchased goods and services (Category 1)

Our purchased goods consist mainly of office appliances, furniture and hardware required to support our websites and databases. All items currently in use were listed with no notion of purchase date. In order to keep the inventory and disclosure consistent, a constant emissions-due-procurement quantity per person was calculated thus making inventory flexible regarding yearly fluctuations in amount of outsourced work and resulting size of allocated staff.

The emissions calculations used CO_2 emissions factors that were multiplied by corresponding amount of each item group. Listing of emission factor sources is included in appendix 1.

Product lifespans were introduced in order to reconcile the gain in using the procurements and the emissions they inflict. The same approach was applied to the Grexel home office and the development center. Following tables present the category 1 emissions for Grexel office.

Table 3: Scope 3, category 1 emissions for Grexel office

Office appliances	Amount (pc)	Emission factor kgCO2/pc	Product lifespan (yr.)	Emissions (kgCO2)
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	4	261.00	5.00	208.80
Total				1499.20

Paper consumption	Amount (pc)	Emission factor (kgCO2/kg)	Product lifespan (yr.)	Emissions (kgCO2)
Copying paper (1pc = 2.5kg)	9	0.99	1.00	22.30
Total				22.30

Furniture	Amount (pc)	Emission factor (kgCO2/pc)	Product lifespan (yr.)	Emissions (kgCO2)
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

Scope 3 Procurement emissions for Grexel (kgCO2)	**3329.30**

Table 4 presents the procurement emissions from the development center.

Table 4: Scope 3 category 1 emissions for employees allocated to Grexel in the resource management company hosting the development center

Office appliances and furniture per person	Amount (pc)	Emission factor kgCO2/pc	Product lifespan (yr.)	Emissions (kgCO2)
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
Total emissions per person				356.32

Number of employees allocated to Grexel	12
Scope 3 Procurement emissions for Grexel development center (kgCO2)	**4275.84**

Overall allocated Scope 3 category 1 emissions are **7.60 tCO_2**.

4.2. Business travel (Category 6)

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. We have decided to include business trips longer than 100 km for which travel arrangements are made by Grexel into that category.

For year 2012 this means that scope 3 will cover business related flights paid by Grexel. To avoid double counting flights that are already compensated by other parties are excluded.

Included flights were categorized according to the haul length. The logic for classifying the flights was adopted from *2012 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting*. Listing of emission factor sources is included in appendix 1.

Table 5: Scope 3 category 6 flight categories and corresponding emissions and factors

Category	DEFRA category	Assumed distance (km)	Emissions factor ($kgCO_2$/pkm)	Emissions ($kgCO_2$)
Short haul	Domestic	463	0.20124	93.17412
Medium haul	Short-haul international	1108	0.11486	127.26488
Long haul	Long-haul international	6482	0.13143	851.92926

Listing of business related flights for Grexel eligible for scope 3 category 6 is presented in table 6.

Table 6: Scope 3 category 6 emissions for Grexel (2012)

Date	Category	Emissions
2012-05-02	Medium haul	127.26
2012-07-05	Medium haul	127.26
2012-06-27	Medium haul	127.26
2012-07-09	Medium haul	127.26
2012-04-21	Long haul	851.93
2012-04-23	Medium haul	127.26
2012-05-11	Long haul	851.93
2012-05-30	Medium haul	127.26
2012-05-28	Medium haul	127.26
2012-08-29	Long haul	851.93
2012-10-04	Medium haul	127.26
2012-09-11	Medium haul	127.26
2012-10-16	Medium haul	127.26
2012-10-27	Long haul	851.93
2012-11-07	Medium haul	127.26
2012-11-12	Long haul	851.93
	Scope 3 business flights	**4807.63**

Business travelling related emissions are thus **4.81 tCO_2.**

4.3. Employee commuting (Category 7)

Calculations for employee commuting were included into scope 3 in order to increase the accuracy of the inventory. Data was gathered from entire staff working in Grexel office in Hermannin Rantatie 8. Results, presented in table 7, show that our employees travel to work using public transport and by bike or walking. Occasionally private cars are also in use.

For outsourced work we have calculated an average emission constant per person. It was assumed that employees in India commute by bus, which is by far the most common means of transportation among IT-specialists working in major software companies in India. In order to solve the problematic variance in commuting distance as a result of changing dedicated workers and to make year-to-year comparison easier, a general commuting distance was decided after consulting our outsourced workers. Emissions were then calculated using this default inflicted amount.

Emissions factors for each means of transport were found via Helsinki region transport service. Emissions for biking and walking are naturally zero. However this is the case also for commuting by train or metro since these use completely renewable hydro energy. Thus emissions are caused only by commuting by bus or a private car. Listing of emission factor sources is included in appendix 1.

Table 7 presents the employee commuting emissions for Grexel.

Table 7: Scope 3 category 7 emissions for Grexel office (2012)

	Car	Bus	Train	Metro	Bike	Walk
Employee 1	11.5			69.0	34.5	
Employee 2	40.0		150.0	50.0		10.0
Employee 3						8.0
Employee 4				10.0		30.0
Employee 5		89.0		41.0		
Employee 6					30.0	
Employee 7						15.0
Employee 8		20.0				
Week estimate	51.5	109.0	150.0	170.0	64.5	63.0
Year estimate	2678.0	5668.0	7800.0	8840.0	3354.0	3276.0
CO2 factor	98.0	58.0	0.0	0.0	0.0	0.0
CO2 emissions	262.4	328.7	0.0	0.0	0.0	0.0

Scope 3 Employee commuting	**591.2 kgCO_2**

Table 8 presents the results for employee commuting in the development center.

Table 8: Scope 3 category 7 emissions for the development center

Number of dedicated employees	Average distance travelled one-way (km)	Yearly distance estimation (km)	Emissions factor (gCO2/km)	Total emissions (kgCO2)	Average emissions per person (kgCO2)
12	17	10200	58.00	**591.60**	49.30

Combined emissions from employee commuting are thus **1.18 tCO_2**.

5. Conclusion

Business done by Grexel Systems Ltd induced c. 30000 $kgCO_2$ (30 tCO_2) emissions in year 2012 (accounting for entire collection of office furniture and supplies).

A simple sum calculation over scope 1 to 3 emissions is presented in the following table.

Table 9: GHG emissions for Grexel (2012)

Scope 1	Scope 2		Scope 3			Total
	Grexel	Outsourced functions	Category 1	Category 6	Category 7	
0.00	3980.00	12970.00	7605.14	4807.63	591.19	29953.96

When comparing GHG Protocol's 3 scopes we can see that in our case scope 2 is the dominant one. This is largely due to accounting for emissions from outsourced tasks in India. Although the resource management hosting our development center has purchased and installed a wind turbine to be able to produce some of its consumed electricity the share of emission-creating energy used is quite large. We can encourage companies in our value chain to increase the usage of renewable energy sources at the expense of fossils in order to cut their carbon footprint. Energy consumption in Finland is on a suitable level and is hard to clip since we are part of a large office complex. However we can encourage Helsingin Energia to strive toward cleaner, more sustainable solutions as they develop their products. Fortunately, signs of this kind of development can already be found.

Our scope 3 emissions are on a sustainable level. Accounting for all the furniture and office appliances has inflated our scope 3 category 1 slightly but allocating the emissions according to the product lifespans will smooth the future change toward yearly calculations. In the future we could consider less eco-violent means of transportation in cases of short hauls. However as an internationally functioning company we expect to use and report air travel in the future as well. In employee commuting we set an example for others by using eco-friendly, often emissions-free, means of transport.

6. GHG emissions compensation

To compensate our 30 tCO_2 emissions induced in 2012, we have retired 30 high quality Gold Standard Voluntary Emission Reductions (VERs). These VERs from a Wind Power project in Turkey will help Turkey to stimulate and commercialize the use of grid connected renewable energy technologies and markets.

The retirement certificate and the market entry for the retired credits are visible via below links.

Certificate:
Voluntary Emission Reduction (VER) units

Market entry:
Düzova Wind Power Project, Turkey

Appendix 1: Emission factor sources

Scope 2	
Electricity	http://www.nordicgreen.fi/
District heating	http://www.helen.fi/kaukolampo/index.html
District cooling	http://www.helen.fi/kaukojaahdytys/index.html
Electricity (India)	http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver6.pdf

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/