scantago

Greenhouse Gas Inventory

Scantago ApS

2012/2013

20th December 2013

Contents

ABBREVIATIONS

GHG	Greenhouse gas
GHG Protocol	Report from the World Resource Institute http://www.ghgprotocol.org/
ICAO	International Civil Aviation Organization
Scope	Predefined set of boundaries for inclusion/excluding GHG emissions in the inventory.
UIC	International Union of Railways
WRI	World Resource Institute

INTRODUCTION

This report is the Greenhouse gas inventory for Scantago ApS, company registration number DK29174881 located on Skullebjerg 9, Gevninge DK-4000 Roskilde, DENMARK.

The inventory covers the company fiscal year 2012/2013 (2012.10.01 – 2013.09.30).

The applied methodology for the establishing the inventory of direct and indirect emissions related to Scantago ApS, is based on the World Resource document “GHG Protocol” as well as the international standard ISO 14064.

Since 2010, EXIMA has been appointed by Scantago ApS for setting up its annual CO2 emission inventory. As an independent service provider within climate change, we have received all information requested and necessary for establishing a consistent, transparent and accurate inventory of the GHG emissions including identification and quantification of relevant emission sources.

Copenhagen 2013.12.20

Authored by:

EXIMA ApS
Roberta De Palma

EXIMA

EXECUTIVE SUMMARY

Scantago ApS is a service provider to the pharmaceutical industry offering advisory services and technical services to manufacturing sites. The majority of the activities relate to operations within Denmark but the company has also some international activities, which have been included in this inventory under scope 3 reporting protocol.

On behalf of the organization, EXIMA ApS has established GHG accounting practices for the GHG inventory covering the fiscal year 2012/13 (2012.10.01 – 2013.09.30).

The inventory applies a materiality approach for identifying GHG emission sources and for the fiscal year 2012/13, Scantago was directly and indirectly responsible for the emission of **33.8 tons of $CO_{2\text{-eqv}}$**.

The largest emissions (62%) are within scope 1 (direct), followed by emissions within scope 3 (29% - other indirect) and scope 2 (9% - indirect emissions from electricity consumption).

Approximately 59% of the global GHG emissions within the fiscal year relate to business travels conducted by road transportation in company cars or in private cars on behalf of the organization, and by flight/train. The second most important source of GHG emissions is natural gas for heating, which represents 32% of the total.

Compared to the inventory of the previous fiscal year (2011/2012), the total GHG emissions of the organization have increased by approx. 58% (12.4 tons/year). There are three main sources of GHG emissions responsible for this increase: gas consumption for heating of premises (+300%), transportation by flight/train (+232%) and transportation by cars owned by employees and used on behalf of the company (+41%). The most significant of these sources in terms of contribution to the overall increase of GHG emission is the gas consumption, which accounts alone for 10.6 tons $CO_{2\text{-eqv}}$.

The increase in the emissions due to gas consumption is mostly due to the characteristics of the new company's premises where the company moved in the by February 2013. The new premises have 3 time higher footprint and lower energy efficiency performance compared to the previous ones. Part of the excessive gas consumption was due to some extraordinary factors, such as the need to maintain two offices during the heating season (December-January) to enable renovation works at the new premises, as well as a higher heating demand due to colder winter season compared to previous one.

The increase in emissions due to business travels appears largely justified by the 19% increase in the company's turnover compared to previous fiscal year and in the expansion of the company's activities outside Denmark, which justified higher incidence of international travels.

The company continued to demonstrate high level of corporate responsibility by identifying a series of energy efficiency opportunities to reduce GHG emission from gas consumption for heating, such as replacement of windows, replacement of existing boiler, sealing of the warehouse. These GHG emission reduction measures have replaced carbon offsetting initiatives, which were undertaken during the previous fiscal year.

The company's emissions from electricity have decreased due to the switching to a new energy service provider with lower carbon emission factor, to the increased usage of day-light for offices and to the elimination of a front-end server. In addition the company also plans to install a solar cooling unit for air-conditioning. Overall, the implementation of the identified energy savings projects are expected to lead to a reduction of the company's GHG emissions between 5-10% over the next reporting period.

The company has good performance measurement and tracking system for its CO2 emission sources, both direct and indirect, including monthly meter readings for electricity and gas consumption, records of travel and car fuel consumptions. It is important to continue with the current practices for monitoring performance to allow quantification of real savings related to the planned energy saving initiatives to ensure a positive impact on the development of the GHG emission profile.

METHODOLOGY

EMISSION SOURCES

Identified CO2 emission sources for Scantago are available in the table below categorized by scope:

ID	Scope	Source	Method
	Scope 1		
1		Consumption of natural gas for heating of offices, warehouse and workshop.	m/c
2		Consumption of fuels related to business trips with cars owned by the organization.	m/c
	Scope 2		
3		Consumption of electricity for offices, warehouse and workshop.	m/c
	Scope 3		
4		Emissions related to business trips undertaken by air and trains.	m/c
5		Consumption of fuels related to business trips with cars not owned by the organization but used on behalf of the organization.	m/c

Table 1 - Emission sources for Scantago ApS. c=Calculated; m=Measured

Emission sources have been identified by applying a materiality approach and the table above lists the sources included in the scope three accounting when taking into consideration CO_2 emissions related to business travels only as scope 3 emission sources.

CALCULATION APPROACH

Scope 1

Emission sources relate to the consumption of natural gas purchased from the supplier OK. Based on meter readings for consumption of gas covering the accounting period, the actual demand for natural gas has been measured.

Emission factor for consumption of natural gas was not available from the gas supplier OK. Therefore an average data was extracted from the company Energy Net, a Danish energy distributor of gas and electricity (http://energinet.dk/DA/GAS/Gasdata-og-kvalitet/Gaskvalitet/Sider/Vis-gaskvalitet.aspx?Visning=maanedformaaned)

The gas emission factor for 2012 corresponding to 57,03 kgCo2/GJ (see annex I) was taken as reference for the calculation, considering that the variations of the monthly emission factors in 2013 is less than 1%. The GHG emission related to consumption of natural gas is a multiple of the consumption with the emission factor provided from the supplier of gas.

Scantago operates a fleet of service vehicles and this emission source is considered significant for the emission profile. The organization has a detailed log of the mileage for each vehicle within the period and the aggregated mileage of the fleet is measured.

Based on information about each vehicle, average emission factors have been identified, applying the Sustainable Energy Ireland Authority on-line carbon emission tool. For individual car emission factors, please refer to Annex 3 of this report.

The calculated GHG emission related to operation of the fleet of service vehicles is the aggregated multiple of the mileage of each vehicle with the specific emission factor per km.

Scope 2

Consumption of electricity is measured by a main electricity meter for the company. Based on information about the emission grid factor provided by the energy supplier OK in Annex 2, the GHG emissions have been calculated as the multiple of the consumption and the specific emission per kWh of consumed electricity. Compared to previous fiscal year 2011/2012, the emission grid factor of the electricity has dropped by 8%.

Scope 3

Scope 3 emission sources consist of two contributors:

- Business travels by air and train;
- Travel by road in cars not owned by the organization.

The organization logs all travel activities by destination and mean of transport for all employees and during the accounting period a total of thirteen travels by train or air planes have been conducted.

Emissions related to travels by air is based on emissions calculated for each travel by applying the carbon emission calculator developed by the International Civil Aviation Organisation ICAO (http://www2.icao.int/en/carbonoffset/Pages/default.aspx)

Carbon emissions related to travels by railroad is based on the carbon calculator developed by the International Union of Railways (UIC).

GHG INVENTORY FOR 2012/2013

The inventory covering the fiscal year 2012/13 provides a total emissions corresponding to 33.8 ton $CO_{2\text{-eqv}}$. The figure below illustrates the breakdown of the global emissions into the emission sources included in the GHG inventory.

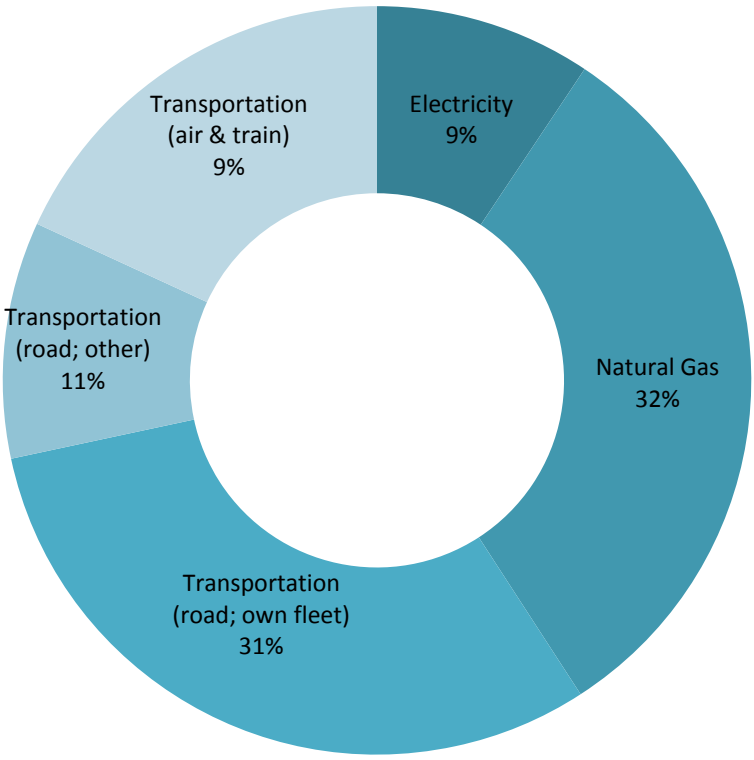


Figure 1 - Breakdown of GHG emissions 2012/13 by sources.

The two major emission sources are related to natural gas for heating of premises (32%) and to transports of employees with their own cars as part of the business activities (31%), which in total account for 63% of the global company's emissions. Total emissions related to business trips, including those undertaken with company cars as well as owned cars and flight/train represent 51% of the total. Indirect emissions from the consumption of electricity represent 9% of the total.

The figure below provides a breakdown of the global GHG

emissions by scope and indicates that scope one emissions are representing 62% of the total emissions in total volumes, while scope 3 and 2 represent respectively 29% and 9% of totals.

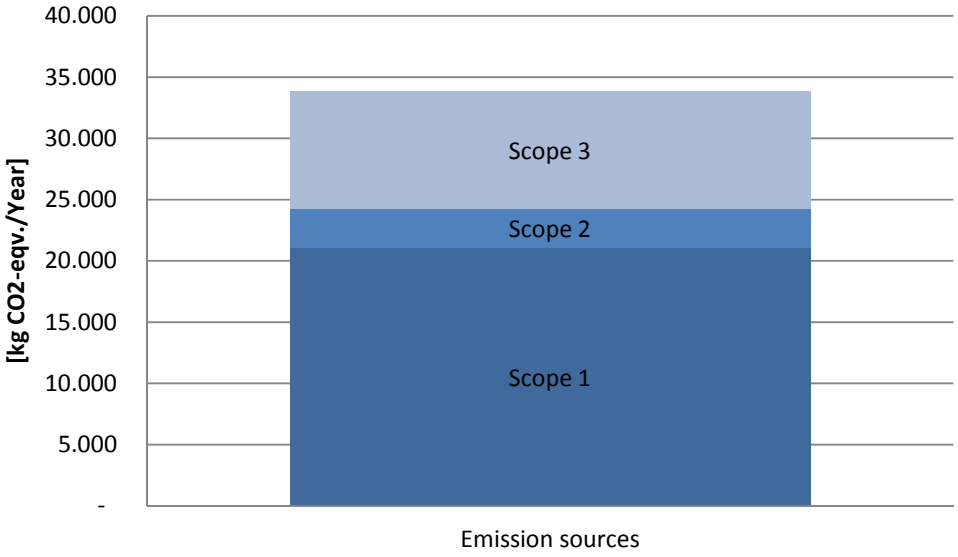


Figure 2 - Breakdown of GHG emission by scope 2012/2013.

GHG INVENTORY MANAGEMENT AND PERFORMANCE

The GHG emissions of Scantago Aps have increased by 57.7% within the fiscal year 2012/2013 compared to the previous reporting period. The trend in GHG emissions by reporting scope and by source over the past 3 fiscal years is illustrated in the charts below.

The overall GHG emissions associated to scope 1 have been subject to a substantial increase by 53%, mostly due to the increase in gas consumption for heating that has tripled compared to last year, while emission due to transportation with company owned cars has decreased by 6% compared to last year. An analysis of the gas consumption is detailed in the next chapter.

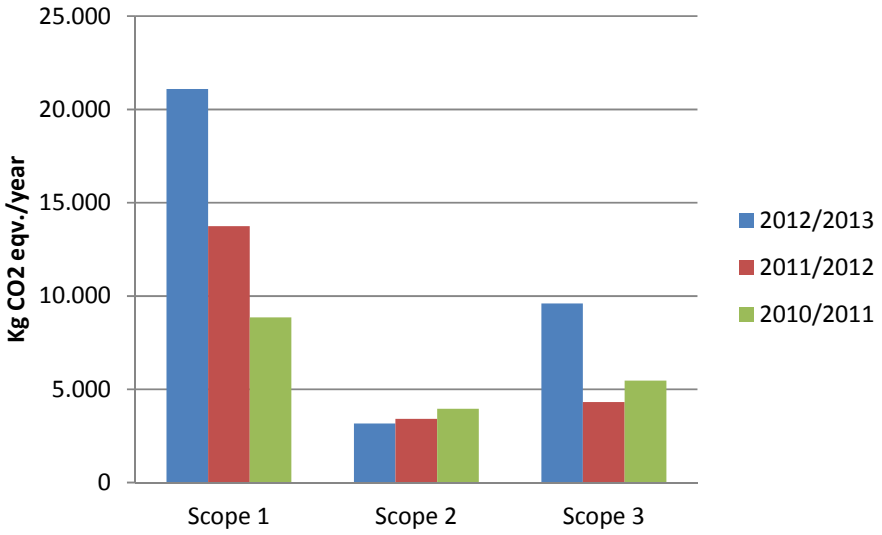


Figure 3 – Trend of GHG emissions by reporting scope over past three fiscal years.

The emissions within scope 2 (electricity consumption) have been decreasing by 7% in line with the trend from the previous reporting period. This is mostly related to the electricity CO2 emission factor, which has dropped by 8% due to change in the electricity service provider offering a supply of lower emission grid factor.

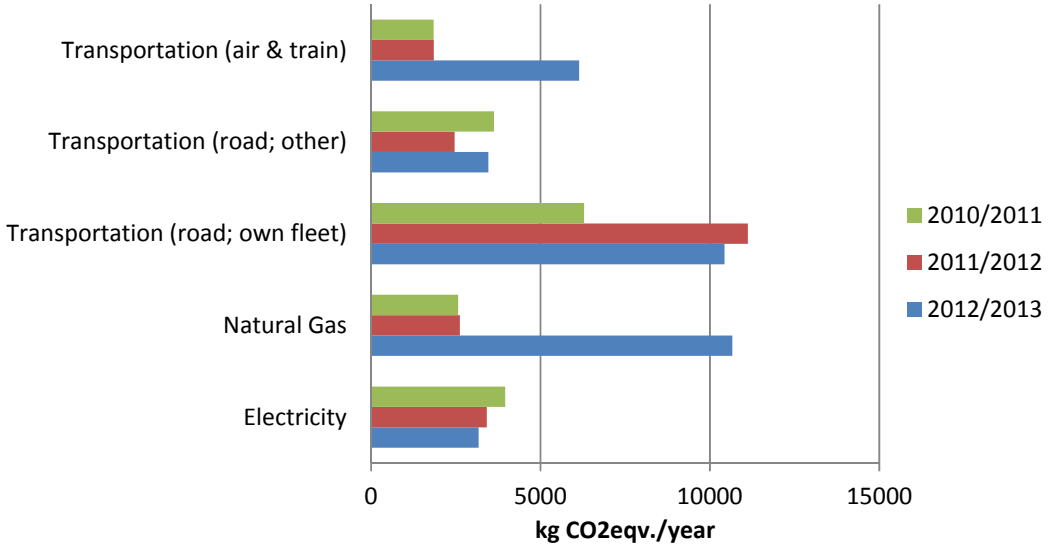


Figure 4 –GHG emissions by source over the three past fiscal years.

The emissions within scope 3 have increased by 123%, due to an increase in the use of employees owned cars for business trips (40% CO2 emission increase compared to last fiscal year) and to a substantive increase of business trips by flight/train (232% CO2 emission increase).

The overall increase of emissions related to business travels are linked to the volume of company activities and the nature of the business, which predominantly consists of on-site service's delivery to clients. During the fiscal year 2012/2013 the company activities have intensified with a turnover increase by 19% compared to 2011/2012. This partly justifies the overall increase of CO2 car's transportations emissions. In addition, the company activities sales of equipment has expanded, which explains further the higher incidence of CO2 emissions due to business travels by flights/train compared to previous years.

The trend of the carbon intensity of the company's activities, measured as CO2 emissions per unit of generated turnover is represented in the following chart. The carbon intensity index for the fiscal year 2012/2013 has increased due to higher gas consumption and international travels related emissions per unit of turnover generated.

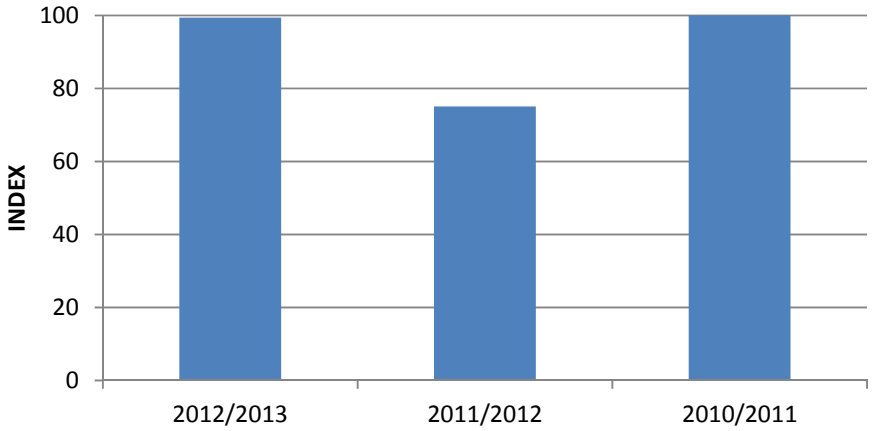


Figure 5 – Trend of carbon intensity index [CO2 emissions/turnover].

SPECIFIC CONSUMPTIONS

The chart below compares the specific energy consumptions for electricity, gas and CO2 from car fuel over the past 3 fiscal years. These benchmarks are measured per m² of office space in the case of electricity and gas and per km for business trips by cars (both company cars and cars of employees used on behalf of the company). The positive reduction trend for specific electricity consumptions is confirmed also for this year. Conversely the gas specific consumption has significantly increased.

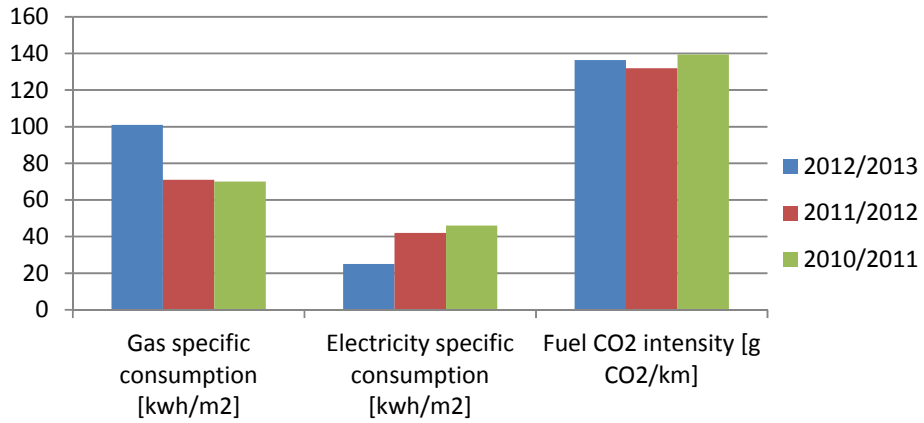


Figure 6 – Benchmarking of specific within the three past fiscal years.

It is to be mentioned that during the course of the fiscal year 2012/2013, the company has moved its premises from Holbaek to a new building located in Gevninge. The actual surface of the office space, warehouse and workshops increased from 180 m² of the old premises to 538 m². The latter was acquired by end of November 2012, though the company moved in only in February 2013 when renovation works had been completed.

As far is concerning the specific electricity consumptions, the value dropped from 42 to 25 KWh/m², with a reduction of 40%. This was achievable due to the better day-light exposure of the new premises compared to the old one, which instead required electric light on the all day. In addition the after moving to the new premises, one front-end server was turned off, and replaced with a firewall - this generated some reduction in electricity consumption.

The company thermal energy consumption profiles per square meter, has actually increased by 43% compared to previous fiscal years, as illustrated in the cart below.

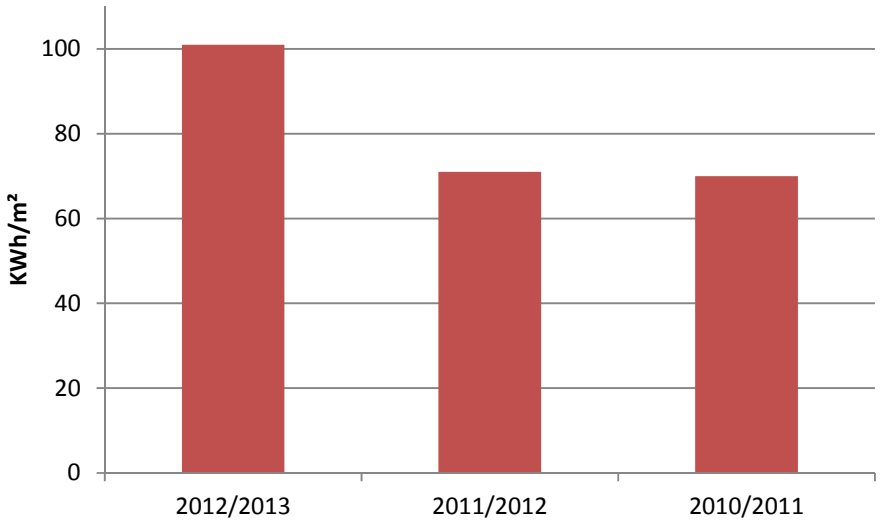


Figure 7 – Thermal energy consumption (heating premises) per square meter over 3 past fiscal years.

An in depth analysis of the thermal consumption profiles (see annex 4) highlights that a number of factors have influenced this lower performance:

a) During December 2012 and January 2013, which are high intensive heating demand months, the company has been running two offices, though only one was affectively used for business purposes. This double expense corresponds to approximately 10% of the thermal energy consumption increase per m2.

b) The analysis of the degree days for the past fiscal years shows that an additional 10% of the thermal energy consumption increase per m2 was due to a colder season and subsequent higher heating demand for 2012/2013 compared to previous fiscal year 2011/2012.

c) The remaining 23% increase of the thermal energy consumption is due to the low energy efficiency performance of the new building related to its construction features and thermal insulation characteristics, such as the old and un-properly sealed windows, and to the existing boiler system.

Based on the above, approx. 50% of the increase in thermal energy consumption per m2 is due to extraordinary factors, while the remaining 50% is within reach for improvements.

ENERGY EFFICIENCY INITIATIVES

The company has identified as a priority area of intervention the reduction of the heating and cooling demand of the new office, to minimize the associated CO2 emissions. A reduction target of 20% of the specific thermal energy consumption appears to be feasible considering the high potential for improvements of the existing building. The organization has planned a number of saving projects:

- The replacement of existing old windows with new ones more energy efficient (see annex 5 for details on this initiative),

- Separation of the warehouse from the workshop: currently the workshop and the warehouse are one single ambient that is equally heated. The warehouse, which represents

approximately 1/3 of the premises foot print, shall be kept at lower temperature set points compared to office space, reducing overall heating demand of the premises.

- The efficiency of the boiler system is low. This can be increased by replacing existing boiler with a condensing type. The company has already received an offer for replacing the boiler with an estimated gas saving reduction potential in the magnitude of 35%. Alternatively the company is also considering replacing existing boiler with a pellet fuelled type.

- Finally, the company has decided to purchase and install in 2014 an innovative and energy saving air conditioning unit manufactured by Purix and based on solar energy. This initiative will reduce electricity consumption for cooling and will improve the indoor comfort level during summer.

ANNEX 1 – EMISSION FACTOR GAS

Average 2012 values for composition and emission of greenhouse gases by consumption of $1m_N^3$ of natural gas in Denmark.

Source of information: http://energinet.dk/DA/GAS/Gasdata-og-kvalitet/Gaskvalitet/Sider/Vis-gaskvalitet.aspx?Visning=aarsgennemsnit

2012		Gns.	Min	Max
Metan	mol - %	88,84	85,46	91,77
Ethan	mol - %	6,11	4,97	8,35
Propan	mol - %	2,44	1,52	3,55
I-butan	mol - %	0,37	0,24	0,44
N-butan	mol - %	0,54	0,32	0,66
I-pentan	mol - %	0,13	0,07	0,20
N-pentan	mol - %	0,08	0,05	0,12
Hexan+	mol - %	0,06	0,03	0,11
Nitrogen	mol - %	0,36	0,26	1,30
Kuldioxid	mol - %	1,06	0,23	1,80
Øvre brændværdi	kWh/m_n^3	12,146	11,700	12,415
Øvre brændværdi	MJ/m_n^3	43,725	42,120	44,694
Nedre brændværdi	kWh/m_n^3	10,985	10,572	11,238
Nedre brændværdi	MJ/m_n^3	39,548	38,059	40,457
Wobbe index	kWh/m_n^3	15,190	14,824	15,349
Wobbe index	MJ/m_n^3	54,684	53,366	55,256
Norm. Dens.	kg/m_n^3	0,8266	0,7974	0,8560
Rel. Dens.	[-]	0,6393	0,6168	0,6621
Metantal	[-]	72,1	69,4	77,4
H_2O-dugpunkt	°C	-22,6	-43,8	-9,7
HC-dugpunkt	°C	-11,9	-18,3	-4,0
Svovlbrinte	mg/m_n^3	3,2	0,2	6,8
Svovl-total	mg/m_n^3	2,4	-	-
CO_2 emissionsfaktor	kg/GJ	57,03		

ANNEX 2 – EMISSION FACTOR ELECTRICITY

Supplier: OK 2012

OK a.m.ba.
Åhave Parkvej 11, 8260 Viby J
Telefon 70 10 20 33
www.ok.dk

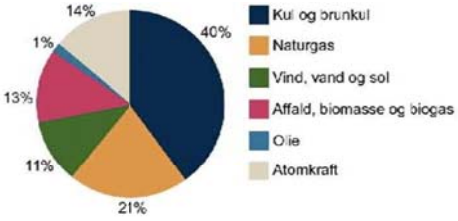
Generel deklaration 2012

Deklarationen viser brændselsfordelingen samt de tilhørende miljøpåvirkninger ved almindeligt salg af elektricitet i Danmark. Den generelle deklaration er beregnet ud fra elproduktionen i Danmark og er korrigeret for udvekslingen af el med nabolandene samt el-salget til de elkunder, der har købt individuelt deklareret elektricitet, fx vindmøllestrøm.

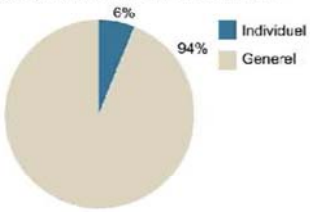
Figuren nedenfor til højre viser hvor stor en del af elforbruget i Danmark i 2012, der er købt som individuelt deklareret elektricitet. Det resterende elsalg er deklareret ved hjælp af den generelle deklaration.

Brændselsfordeling og el-salg ifølge individuelle deklarationer

Brændselsfordeling 2012



El-salg ifølge individuelle deklarationer 2012



Miljøforhold ved forbrug af 1 kWh

Elproduktion fra vedvarende energikilder, der omfatter el produceret fra vind, vand, sol, biogas, biomasse og den bionedbrydelige andel af affald, er kendetegnet ved ikke at medføre CO_2-emission.

Elproduktion fra vind, vand og sol er helt emissionsfri, mens der ved brug af biogas, biomasse, affald og fossile brændsler (kul, olie og naturgas) dannes en række emissioner til luften og restprodukter.

Emissioner til luften sker bl.a. som drivhusgasser (kuldioxid, metan og lattergas) og som forsurende gasser (svovldioxid og kvælstofilter).

Restprodukter kan ofte anvendes, fx afsvovlingsproduktet gips til byggematerialer og kulasker til cementindustrien. Bioasker bruges ofte til gødskning.

Ved forbrug af 1 kWh fremkommer	Deklaration 2012	Deklaration 2011
Emissioner til luften	**g/kWh**	
CO_2 (Kuldioxid - drivhusgas)	410	446
CH_4 (Metan - drivhusgas)	0,21	0,24
N_2O (Lattergas - drivhusgas)	0,005	0,005
Drivhusgasser (CO_2-ækv.)	416	452
SO_2 (Svovldioxid)	0,08	0,07
NO_x (Kvælstofilte)	0,30	0,32
CO (Kulilte)	0,15	0,15
NMVOC (Uforbrændte kulbrinter)	0,04	0,05
Partikler	0,01	0,01
Restprodukter	**g/kWh**	
Kulflyveaske	12,9	15,6
Kulslagge	1,7	1,6
Afsvovlingsprodukter (Gips m.v.)	5,7	6,1
Slagge (affaldsforbrænding)	6,3	7,4
RGA (røggasaffald)	1,0	1,3
Bioaske	1,0	1,2
Radioaktivt affald (mg)	0,5	0,3

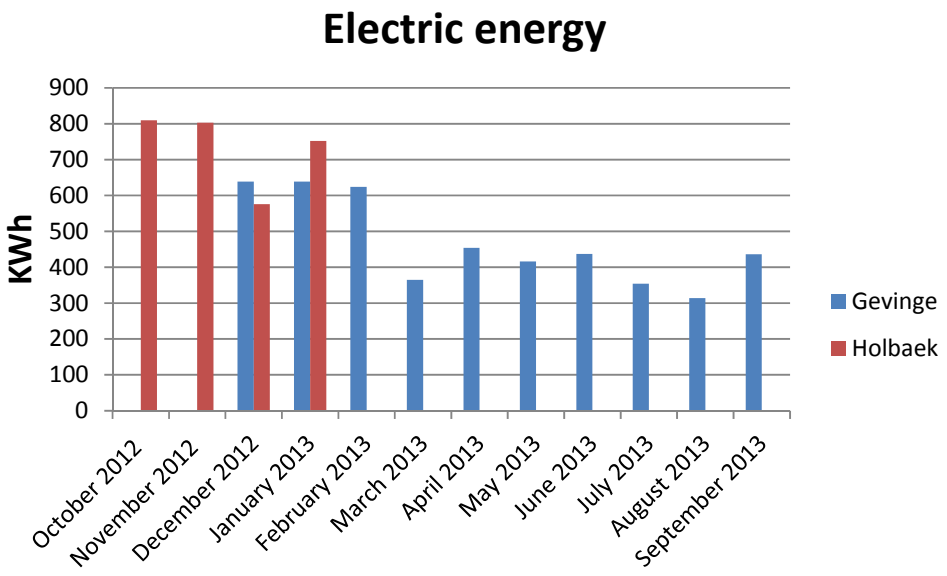
Beregning af miljøforhold og brændselsfordeling er baseret på retningslinjer fra Energinet.dk.
Besøg www.energinet.dk/eldeklaration og læs mere om forudsætningerne.

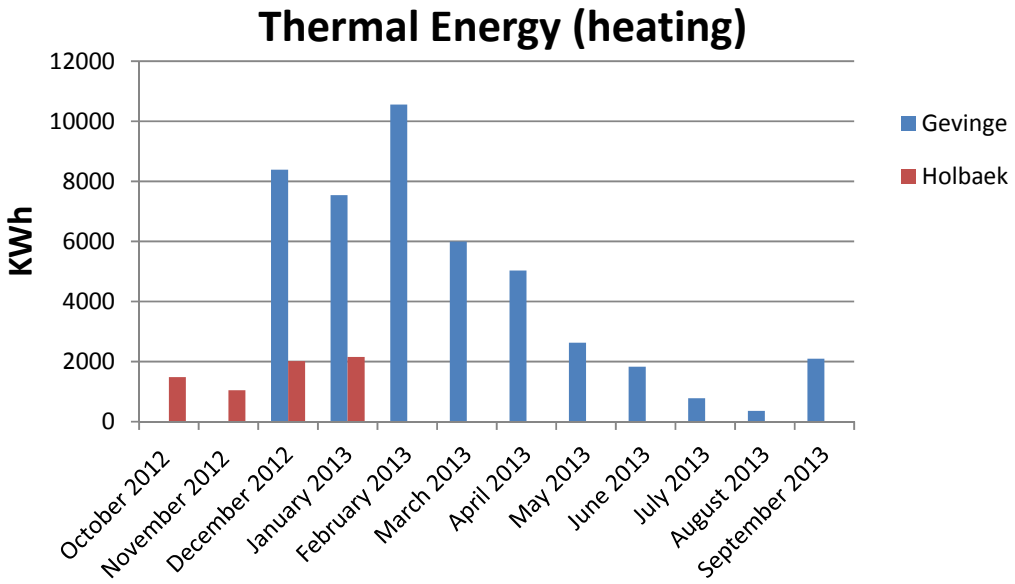
ANNEX 3 – FLEET EMISSION FACTORS

Vehicle Number	Registered	Producer	Model	Fuel	kg CO2/km
3	2010	FIAT	Doblo Cargo 1.6	Diesel	0,138
4	2011	FIAT	Doblo Cargo 1.6	Diesel	0,133
5	2011	FIAT	Doblo Cargo 1.6	Diesel	0,133

Source of information:
http://www.seai.ie/Power_of_One/Getting_Around/HCIYC/

ANNEX 4 – ENERGY CONSUMPTION PROFILES





ANNEX 5 – ENERGY SAVING INITIATIVE

The key data and assumptions for the calculation of the energy savings initiative related to the replacement of the windows at the new premises are summarized in the table below.

This project has already been implemented and is expected to generate 438 kg CO2 savings corresponding to approx. 4% of the total annual CO2 emissions due to gas consumption for heating of premises. The real saving is expected to be higher as the calculation only considers the improvement in the transmittance of the windows systems, without accounting for improvements due to elimination of existing cold air flows through un-properly sealed old windows.

Total windows surface replaced [m2]	**U [W/m2K]**		**η** Efficiency of the building/boiler	**Degree days**	**Heating days**	**Building usage factor**
	Before	**After**				
35,09	2,7	1,7	0,85	3631	3069	0,70

∆Qa=	**1809,2**	**Kwh/yr**	
Qpr=	**2128,49**	**Kwh/yr**	Energy saving
	438,1	**kg CO2/yr**	CO2 emission savings