

ENERGY REPORT

For the year ending

31st of December

2013

Prepared by:

Christian Maas

Technical Officer, Building Services

Dundalk Institute of Technology

Estates Office

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Energy Report for the year ending 31st of December 2013



This report is a short summary of the energy consumption/production of the DkIT campus. It is meant to provide an overview for management purposes.

Infrastructure:

The current electrical installation consists of a two electricity connection to the National Grid, one for the RDC and one for the Main Campus. The choice of energy provider has moved from DkIT to the National Procurement Service (NPS) who now appoints the suppliers.

The electrical metering and billing is managed by energia who are our current electricity provider. The electrical energy consumption is reduced by the production of electricity on site by means of a 850kW Vestas wind turbine. The wind turbine supplements the imported energy and on occasions produces more than needed which results in electricity being exported to the national grid, for which we receive payment (energia purchases the excess energy).

The provision of gas is managed three companies, Airtricity, Vayu and FLOGas, each responsible for certain meter points. There are seven meter points on site that connect to the Bord Gais Network. Most of the gas supplied is used for space heating purposes and small amounts for use in various laboratories and kitchens.

Summary:

- The total Energy consumption of the whole campus was **10,044 MWh**. Made up of:
5,802 MWh of Gas 4,242 MWh of Electricity.
- The total cost for Energy was **648 kEuro**,
316 kEuro for Gas 332 kEuro for Electricity.
- Of the total electrical consumption of the campus 70% (2,960 MWh) were imported and 30% (1,282 MWh) produced in house by the Wind Turbine.
- The Wind Turbine Produced 1,608 MWh of which 1,282 MWh was consumed in house and 327 MWh exported.
- The average price per kWh was 11.22 cent for Electricity and 5.45 cent for Gas.
- The total output of CO₂ was 2,358 tonnes.

Note: **All the above figures exclude VAT chargeable at 13.5%**

Benchmark Figures:

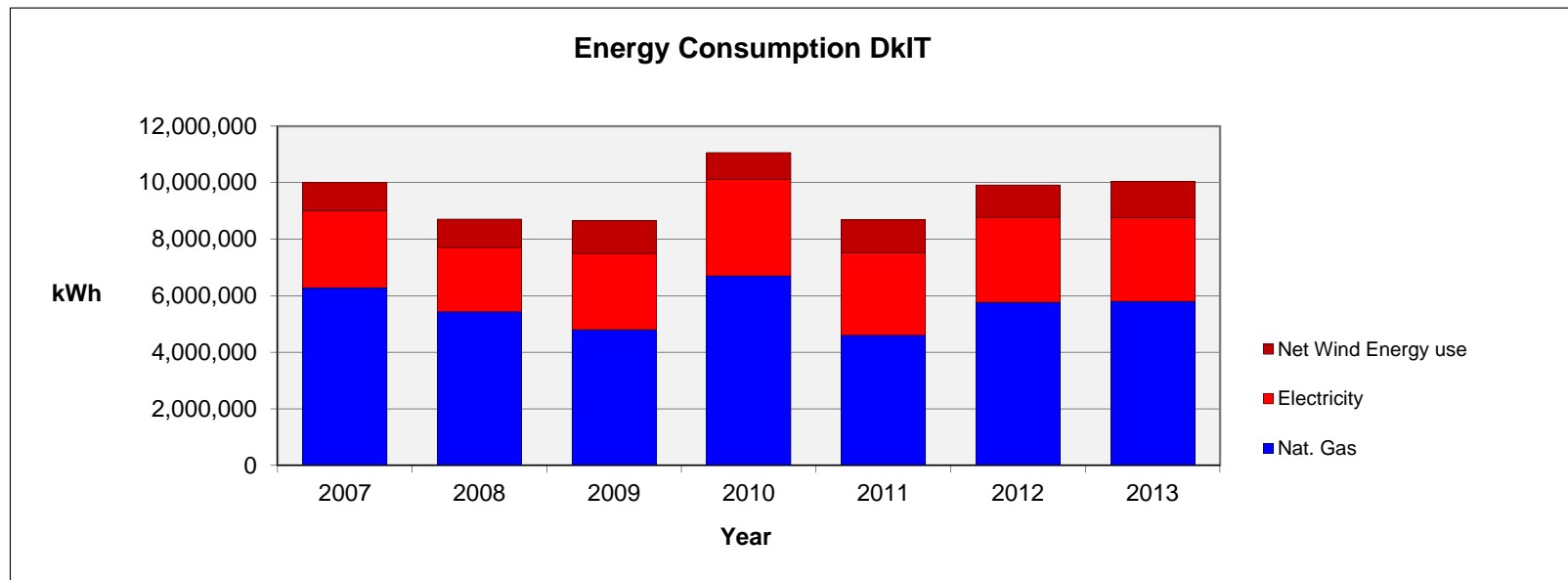
The Student Population for 2012/13 was 5,256 full time equivalent students
The useful floor area on which this calculation is based is 53,238 square metres.
With these figures we can get the following benchmark figures that can be compared on a year to year basis.

Energy Consumption per student (based on FTe students):	1,911 kWh
Energy Consumption per square metre:	189 kWh

A more detailed comparison year on year is attached in the following pages.

Energy Consumption DkIT

Year	2007	2008	2009	2010	2011	2012	2013	
Nat. Gas	6,284,660	5,442,081	4,803,297	6,706,913	4,604,204	5,772,063	5,801,967	kWh
Electricity	2,731,937	2,270,675	2,702,368	3,403,401	2,927,124	3,007,121	2,960,470	kWh
Net Wind Energy use	1,000,000	1,000,000	1,156,116	957,568	1,148,923	1,141,460	1,281,910	kWh
Wind Energy production	estimated	estimated	1,497,671	1,117,718	1,510,316	1,440,406	1,608,429	kWh
Wind Energy Export			341,555	160,150	361,393	298,946	326,519	kWh

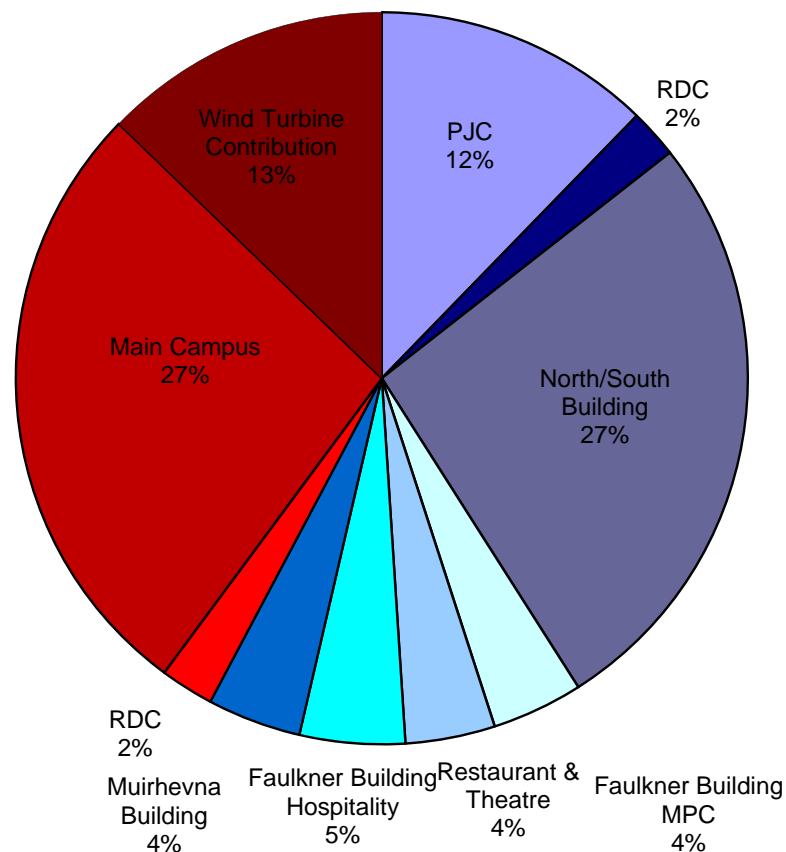


Breakdown of Energy used in 2013

Building	kWh
PJC	1,231,989
RDC	217,162
North/South Building	2,667,140
Faulkner Building MPC	404,445
Restaurant and Theatre	398,281
Faulkner Building Hospitality	466,567
Muirhevna Building	416,383
RDC	237,853
Main Campus	2,722,617
Wind Turbine Contribution	1,281,910
TOTAL	10,044,347

Electrical	4,242,380	42%
Thermal	5,801,967	58%

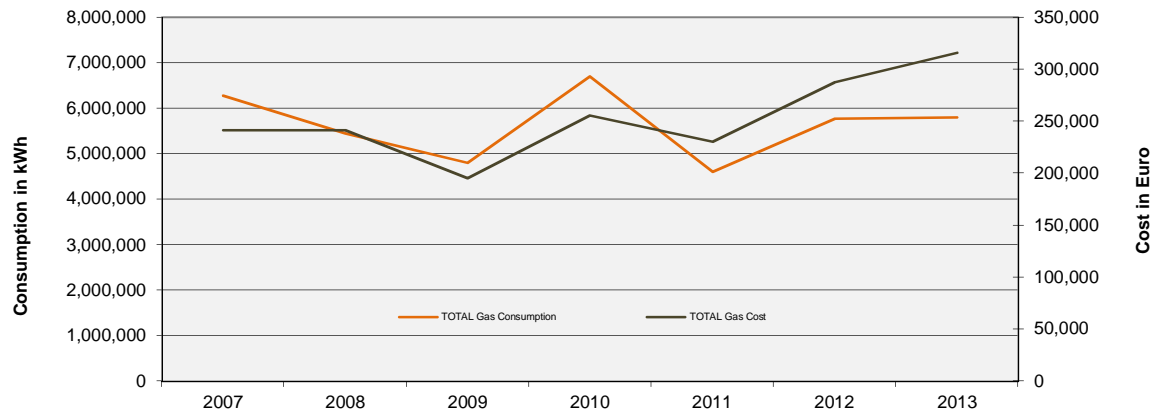
Energy use by Building DkIT 2013



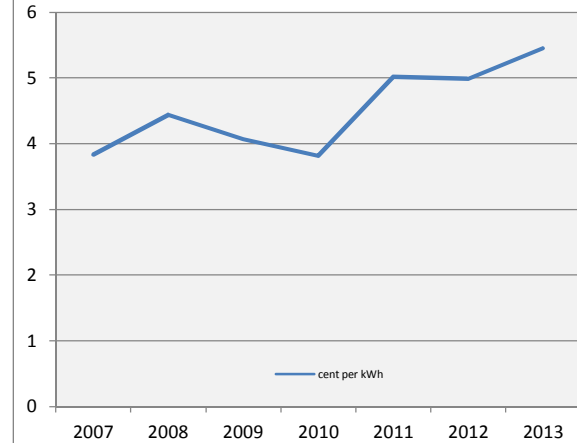
Imported Gas

Year	2007	2008	2009	2010	2011	2012	2013	
TOTAL Gas Cost	241,171	241,486	195,553	255,694	230,653	287,825	315,985	Euro
TOTAL Gas Consumption	6,284,660	5,442,081	4,803,297	6,706,913	4,604,204	5,772,063	5,801,967	kWh
Average Cost per kWh	3.8375	4.4374	4.0712	3.8124	5.0096	4.9865	5.4462	c/kWh

Imported Gas from Utilities



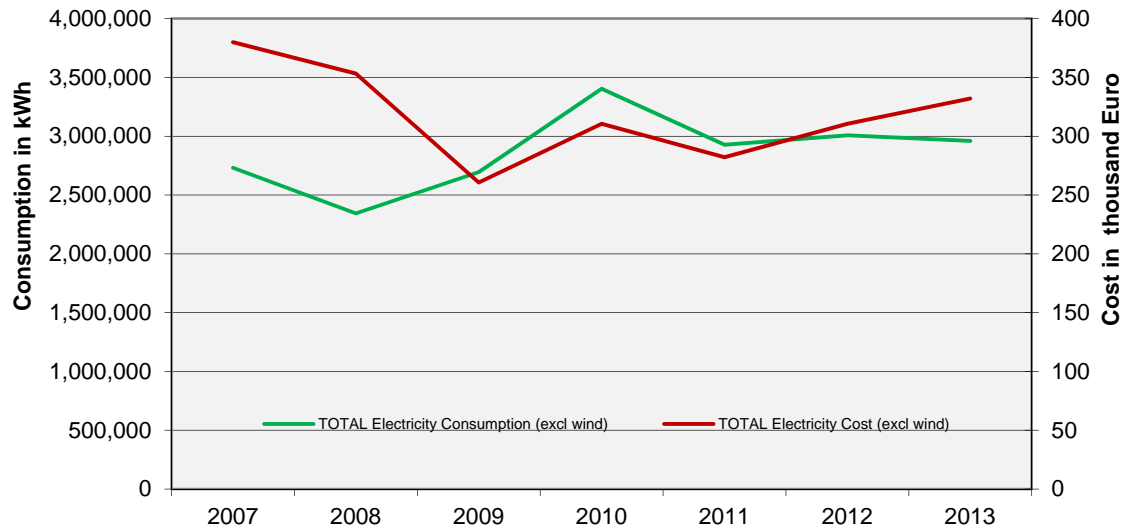
Average Gas Price per kWh



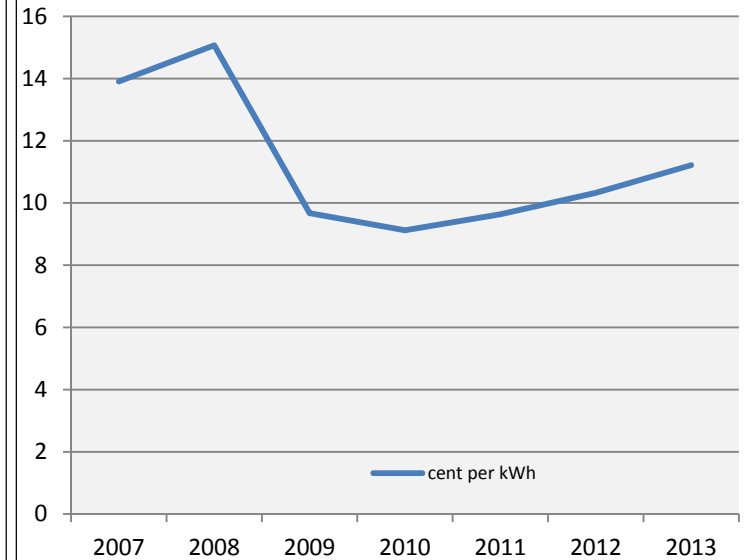
Imported Electricity

Year	2007	2008	2009	2010	2011	2012	2013	
TOTAL Electricity Cost (excl wind)	379,975	353,205	260,692	310,524	282,066	310,512	332,046	Euro
TOTAL Electricity Consumption (excl wind)	2,731,937	2,343,875	2,694,617	3,403,401	2,927,124	3,007,121	2,960,470	kWh
Average cost per kWh	13.909	15.069	9.675	9.124	9.636	10.326	11.216	kWh

Imported Electricity from Utilities DkIT



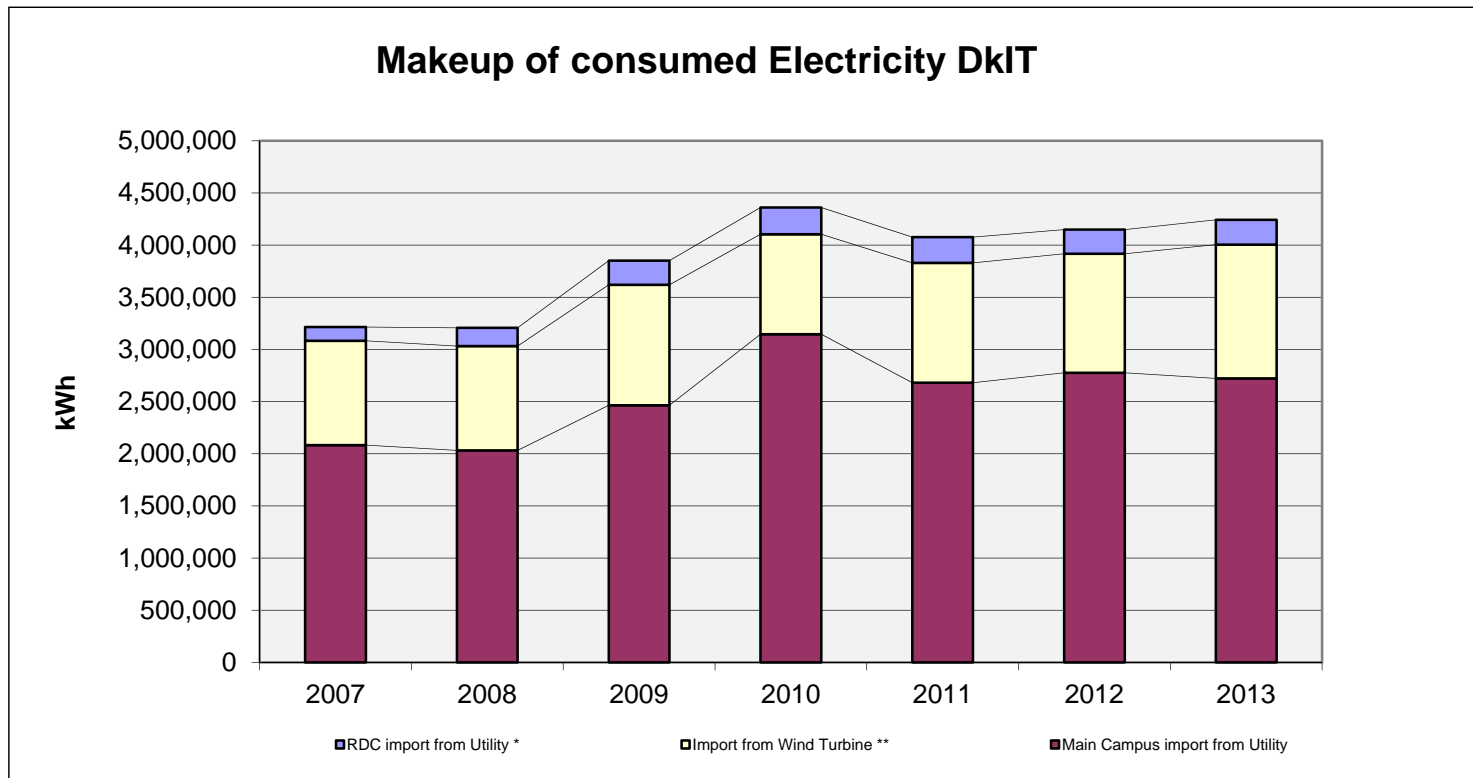
Average Electricity Price per kWh



Makeup of consumed electrical energy DkIT

Year	2007	2008	2009	2010	2011	2012	2013	
RDC import from Utility *	132,344	175,950	230,750	257,150	246,600	230,998	237,853	kWh
Main Campus import from Utility	2,082,320	2,031,643	2,463,867	3,146,251	2,680,524	2,776,123	2,722,617	kWh
Import from Wind Turbine **	1,000,000	1,000,000	1,156,116	957,568	1,148,923	1,141,460	1,281,910	kWh
TOTAL Consumption	3,214,664	3,207,593	3,850,733	4,360,969	4,076,047	4,148,581	4,242,380	kWh

Percentage of Wind Energy	32	33	32	23	30	29	32	%
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* RDC does not import from wind turbine

** data for 2007 & 2008 estimated

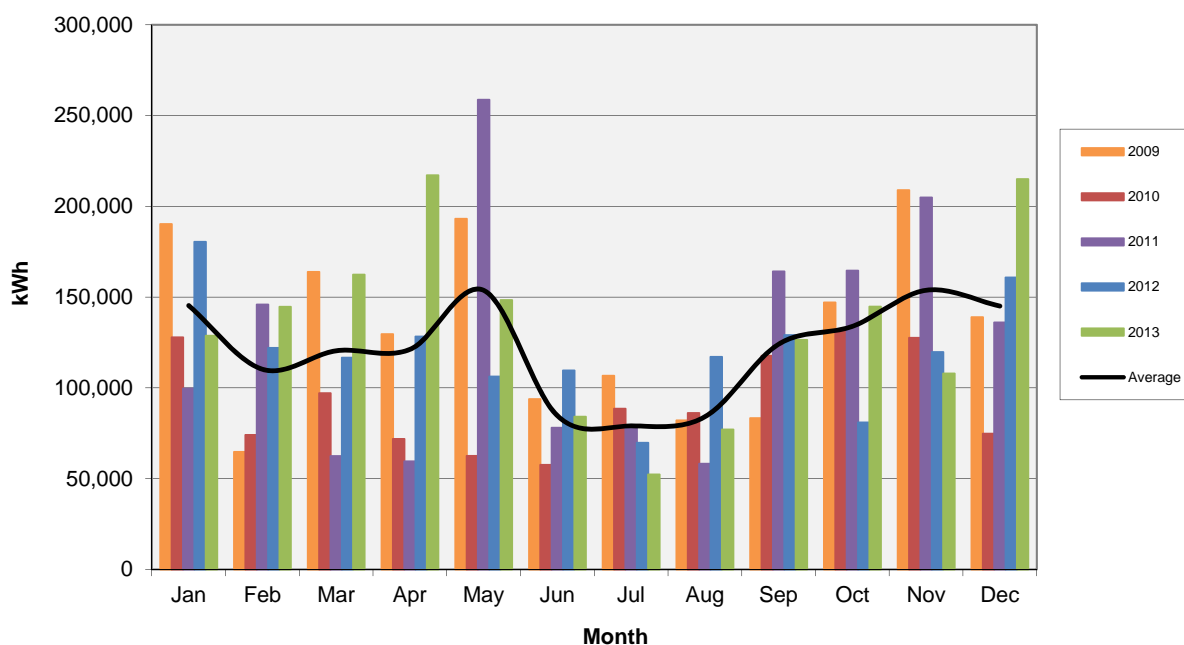
Wind Turbine Data

Year	2009	2010	2011	2012	2013
Production	1,497,671	1,117,718	1,510,316	1,440,406	1,608,429 kWh
Export	341,555	160,150	361,393	298,946	326,519 kWh
Consumption by DkIT	1,156,116	957,568	1,148,923	1,141,460	1,281,910 kWh
Maintenance Cost	20,798.24	14,235.93	22,417.01	24,069.27	17,313.00 Euro
Export Refund	5,926.83	6,401.17	17,723.08	14,964.13	21,939.54 Euro
Cost for Wind Energy	14,871.41	7,834.76	4,693.93	9,105.14	-4,626.54 Euro
Cost per unit produced	0.993	0.701	0.311	0.632	-0.288 c/kWh

Generation

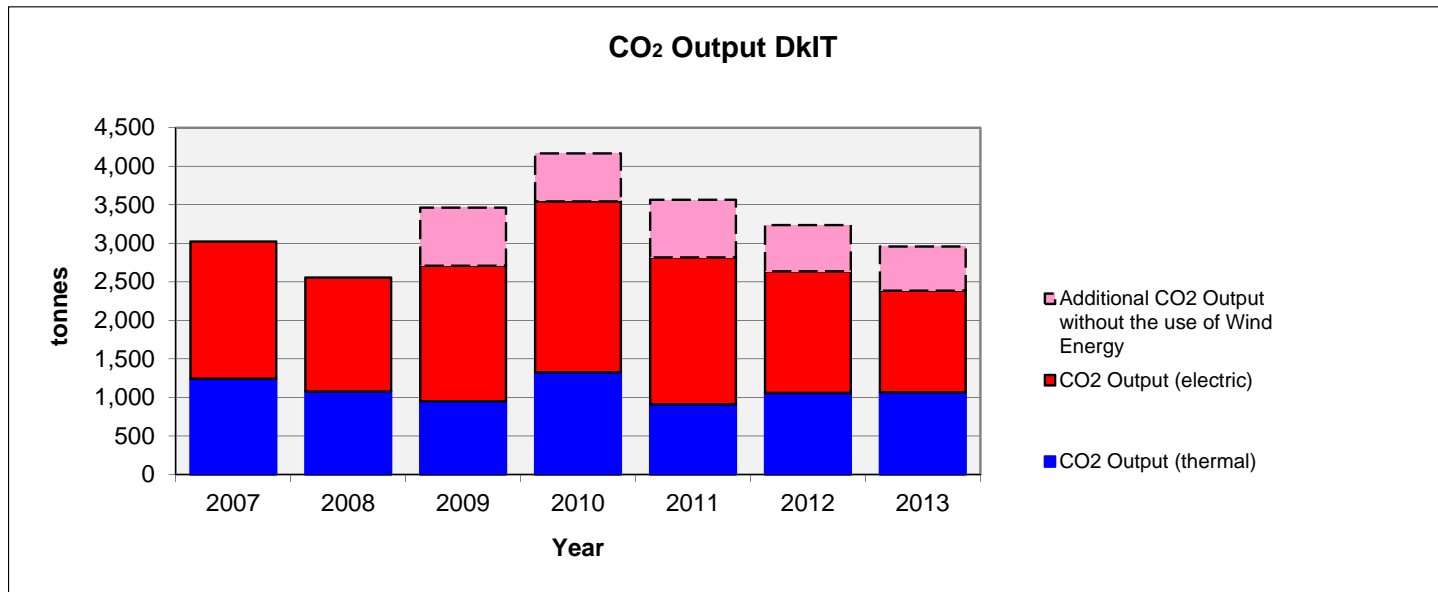
Month	2009	2010	2011	2012	2013
Jan	190,230	127,848	99,616	180,442	128,673 kWh
Feb	64,685	74,059	145,901	121,982	144,687 kWh
Mar	163,882	97,017	62,436	116,658	162,326 kWh
Apr	129,586	71,817	59,484	128,282	217,050 kWh
May	193,117	62,509	258,650	106,182	148,309 kWh
Jun	93,820	57,599	78,064	109,582	84,107 kWh
Jul	106,676	88,525	78,402	69,712	52,248 kWh
Aug	82,109	86,147	58,165	117,037	77,027 kWh
Sep	83,341	117,637	164,145	129,020	126,411 kWh
Oct	147,050	132,240	164,569	80,964	144,729 kWh
Nov	208,901	127,580	204,846	119,735	107,920 kWh
Dec	138,930	74,740	136,038	160,810	214,942 kWh
Total	1,602,327	1,117,718	1,510,316	1,440,406	1,608,429 kWh
<i>average per month</i>	<i>133,527</i>	<i>93,143</i>	<i>125,860</i>	<i>120,034</i>	<i>134,036 kWh</i>

Wind Energy Production



CO₂ Output DkIT

Year	2007	2008	2009	2010	2011	2012	2013	
CO ₂ Output (electric)	1,778	1,478	1,759	2,216	1,906	1,578	1,319	tonnes
CO ₂ Output (thermal)	1,244	1,078	951	1,328	912	1,060	1,068	tonnes
TOTAL	3,023	2,556	2,710	3,544	2,817	2,637	2,387	tonnes
Additional CO ₂ Output without the use of Wind Energy			753	623	748	599	571	tonnes



Benchmark Energy Consumption DkIT

Year	2007	2008	2009	2010	2011	2012	2013
kWh per Student*	2,505	1,917	1,702	2,246	1,658	1,869	1,667
kWh per Student			1,964	2,460	1,910	2,112	1,911
kWh per square metre*	199	170	150	202	150	164	164
kWh per square metre			173	221	174	186	189

* these figures do not take into account the energy produced by DkIT by the means of the Wind Turbine and only count Energy supplied by Utilities.

