Carbon Footprint Report

2011

SLN TEKSTİL
VE MODA SAN.TİC.LTD ŞTİ

Carbon Footprint
assessed by systain

Hamburg, December 30th 2011

1 Executive Summary

In 2009 SLN has assigned Systain to evaluate the CO_2-emissions of the company. In summer 2011 Systain was assigned by SLN to evaluate the Carbon and Water Footprint of SLN Tekstil, a textile manufacturing company based in Istanbul / Turkey. The footprint calculation includes data from SLN Tekstil ve Konfeksiyon, SLN Efe (printing), SLN Boya (dyeing) and two sewing subcontractors (Hazar Ltd. and Caglar).

This report provides updated carbon and water footprint data and a comparison of data from the last report (2009).

SLN succeeded in reducing its absolute as well as its relative carbon footprint. The carbon footprint per piece of SLN Tekstil ve Konfeksiyon was reduced by 44% to a level of 87 grams CO_2e per piece in the past two years. The total emissions dropped slightly to the level of 281 tons CO_2e in 2010 even though production rate increased by 50%. The other units show a diverse picture with comparing the performance in 2010 and 2011. In total all, units caused 4,882 tons CO_2e-emissions in 2010 with the dyeing unit having the largest portion (86%).
Measures for energy reduction are suggested for lighting in all units, heating processes as well as compressed air. A technical consultancy also has suggested measures on heating-ventilation and air-conditioning. There are also low cost measures for reducing the water consumption at the garment units.

2 Introduction

The effects of global warming have become evident in the last few years. Natural disasters such as droughts, floods, and storms are becoming more frequent. Rising temperatures endanger ecosystems and cause irreversible damages to mankind and nature. The International Panel on Climate Change (IPCC), the nominated United Nations´ body for research on this issue, has revealed in its studies that the increasing level of carbon emissions (CO_2) by human activity is the major driver of climate change. Furthermore, the study states that greenhouse gas emissions caused by human activity have increased between 1970 and 2004 by 70 per cent[1].

With increasing population and economic growth the demand for fossil fuels has risen in the last decades, releasing more CO_2 emissions into the atmosphere. Rising temperatures caused by high CO_2 emissions cause glaciers and ice sheets to melt and ocean water to expand. This results in higher sea levels. The forth assessment report of the IPCC predicts a rise of the sea level in the 21st century between 18 to 59 cm depending on the worldwide level of CO_2-emissions in the next decades.

Surveys show an increasing interest among consumers in addressing this problem. Therefore, action from retailers and brands regarding CO_2 reduction in the supply chain

[1] IPCC Fourth Assessment Report (AR4), 2007 (http://www.de-ipcc.de/_media/AR4_SynRep_SPM.pdf)

is expected. Furthermore, investors and governments want companies to act in a more sustainable way. Therefore, it is necessary to increase transparency with respect to carbon emissions in the operations and supply chains.

It is important that innovative companies show their responsibility and take an active role in their leadership function. By taking energy saving actions, those producers also profit from reduced costs. Furthermore, they are at lower risk in terms of rising energy prices. They also become more attractive to conscious customers, who are increasingly demanding eco-friendly products.

3 Objectives of the Report and the Project

In 2009, Systain Consulting was assigned by SLN to evaluate the carbon footprint of the company. A report has been prepared and the results were included into the SLN Sustainability Report 2009. In 2011, the data are updated and the scope has been enlarged with including new units and also subcontractors. Also the water footprint has been assessed into the report. The evaluated data and results include the following units:

- SLN Tekstil ve Konfeksiyon,
- SLN Efe (printing),
- two sewing subcontractor companies (Hazar Ltd. and Caglar), and
- SLN Boya (dyeing).

The CO_2-emissions of SLN Tekstil ve Konfeksiyon will be compared to the data of 2009.

4 Scope, Data and Methodology

The Greenhouse Gas Protocol (GHG-Protocol) is one of the most established standards for accounting and quantifying the carbon emissions of companies. It is therefore used to calculate the Carbon Footprint in this report. The GHG-Protocol was developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) and is based on the ISO 14,040/44 norms.

The GHG-Protocol categorises Scope 1, 2 and 3 emissions. Scope 1 includes all direct emissions at the site of the company (e.g. boiler, generator) and cars. Scope 2 emissions contain indirect greenhouse gas emissions from consumption of purchased electricity, heat or steam. This Carbon Footprint evaluation covers all Scope 1 and Scope 2 emissions of SLN.

To include not only carbon emissions (CO_2) but also all relevant greenhouse gas emissions like methane, the unit of the carbon footprint is given in kilogram CO_2 equivalents (CO_2e).

The new evaluation covers two periods, the first one between January and December 2010 (12 months) and the second between January and September 2011 (9 months). For these two periods, the absolute carbon footprint (chap. 5.2), the output-related carbon footprint (chap. 5.3), energy costs (chap. 5.4) and the absolute and output-related water footprint as well as water costs (chap 5.5) will be calculated for each of the company divisions, respectively subcontractors.

For comparison purposes an additional step is added, in which the missing three months are extrapolated from the monthly average of 2011. As monthly rates of produced pieces and energy consumption partially vary, the comparison of relative carbon and water footprint data is more significant than that of the extrapolated absolute data.

5 Carbon Footprint

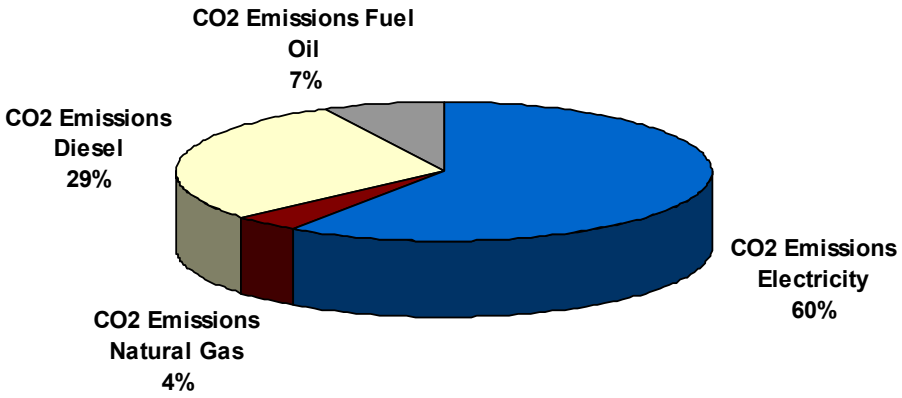
5.1 Data Collection and Quality of Data

Similar to the report of 2009, new data of all consumed fuels, energy sources and electricity as well as production and water data were collected. The data cover the year 2010 as well as the first 9 months of 2011 and are provided on a monthly base. To ensure data quality, the data were checked on plausibility and consistency by Systain. In general, data provided by SLN showed a good data quality.

5.2 Absolute Carbon Footprint

a) SLN Tekstil ve Konfeksiyon

In **2010**, the carbon footprint of SLN Tekstil ve Konfeksiyon amounted 280.6 tons CO_2e. The annual CO_2e-emissions of SLN Tekstil ve Konfeksiyon are equal to the per capita emissions of 78 Turkish citizens, or 29 German citizens. The consumption of electricity contributes with 167.2 tons CO_2e (60%) to the CO_2-Footprint, while emissions from natural gas account for 11.4 tons (4%), diesel 81.7 tons (29%) and fuel oil 20.4 tons (7%).



Share of CO_2e-emissions SLN Tekstil ve Konfeksiyon in 2010

Comparing the total emissions of 2010 with the total emissions of 2009, a slight reduction of 21.3 tons CO_2e (= minus 7%) can be observed. It has to be considered the produced number of pieces increased by 50%.

In the first nine months of the year 2011, SLN Tekstil ve Konfeksiyon emitted 218.3 tons of CO_2e. This is equal to the average annual per capita emissions of 61 Turkish citizens or 23 German citizens.

b) SLN Efe (printing unit)

In **2010**, the aggregated absolute carbon footprint of SLN Efe amounted to 150.5 tons CO_2e. This is equal to the average annual per capita emissions of 42 Turkish or 16 German citizens.

With 145.5 tons, the consumption of electricity contributes 97% to the carbon footprint, while diesel consumption for transportation amounted to 5 tons and therefore contributes with only 3% to the carbon footprint of SLN Efe in 2010.

For the nine months of **2011**, SLN Efe emitted 96.9 tons of CO_2e. This is equal to the average annual per capita emissions of 27 Turkish citizens or 10 German citizens.

c) Subcontractors (Hazar Ltd. and Caglar)

In the year 2010 **Hazar Ltd.** emitted 227.3 tons CO_2e, whereby 65% account for electricity, 34% for diesel and only 1% for natural gas consumption. This is equivalent to the per capita emissions of 64 Turkish citizens or 24 German citizens.

In the first nine months of 2011 the CO_2e-emissions add up to 277 tons. In 2011, the share of energy sources changed obviously in comparison to 2010. The share of CO_2e-

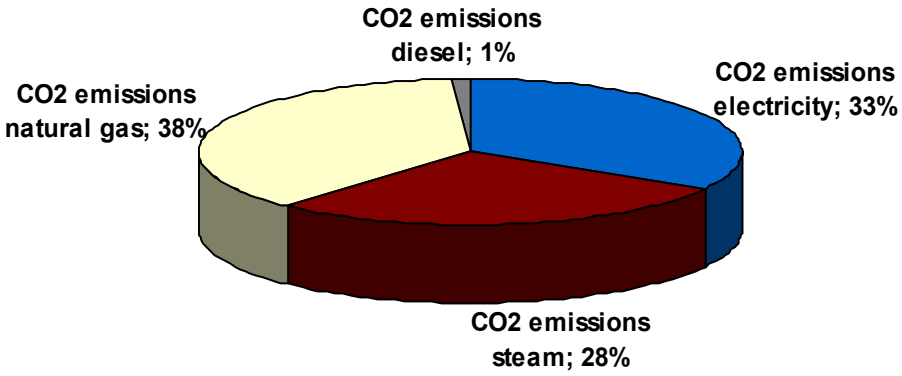
emissions resulting from electricity usage increased to 89%, whereas CO_2e-emissions from natural gas consumption dropped to 9% with Diesel being at the same level (2%).

Caglar emitted 116.5 tons CO_2e in 2010, with a share of 45% of emissions from electricity, 28% from natural gas, 22% from diesel and 2% from the use of fuel oil. The total amount of CO_2e emissions is equal to the annual per capita emissions of 32 Turkish citizens or 12 German citizens. In the first nine months of 2011, the company had a total carbon footprint of 93 tons CO_2e.

d) SLN Boya (dyeing unit)

SLN Boya consumes electricity from public grid net. Process heat and steam is provided by a gas-fired power station nearby with using combined heat and power (CHP). Also heat is produced onsite by a natural gas boiler. The company also owns vehicles, which are included into the Carbon Footprint evaluation.

Regarding SLN Boya, only data from 2011 were considered due to the fact that the dye house belonged to another company in 2010, before SLN purchased the factory. In the first nine months of 2011, the absolute carbon emissions of SLN Boya amounted to 4,197 tons CO_2e. This is equal to the average annual per capita emissions of 1,166 Turkish citizens (3.6 tons per capital and year) or 433 German citizens (9.7 tons per year). The consumption of electricity contributes with 1,403 tons CO_2e (33%) to the carbon footprint, while emissions from external steam amounted to 1,192 tons CO_2e (28%)[2], from natural gas consumption 1,577 tons CO_2e (38%) and from diesel 24.5 tons CO_2e (1%).

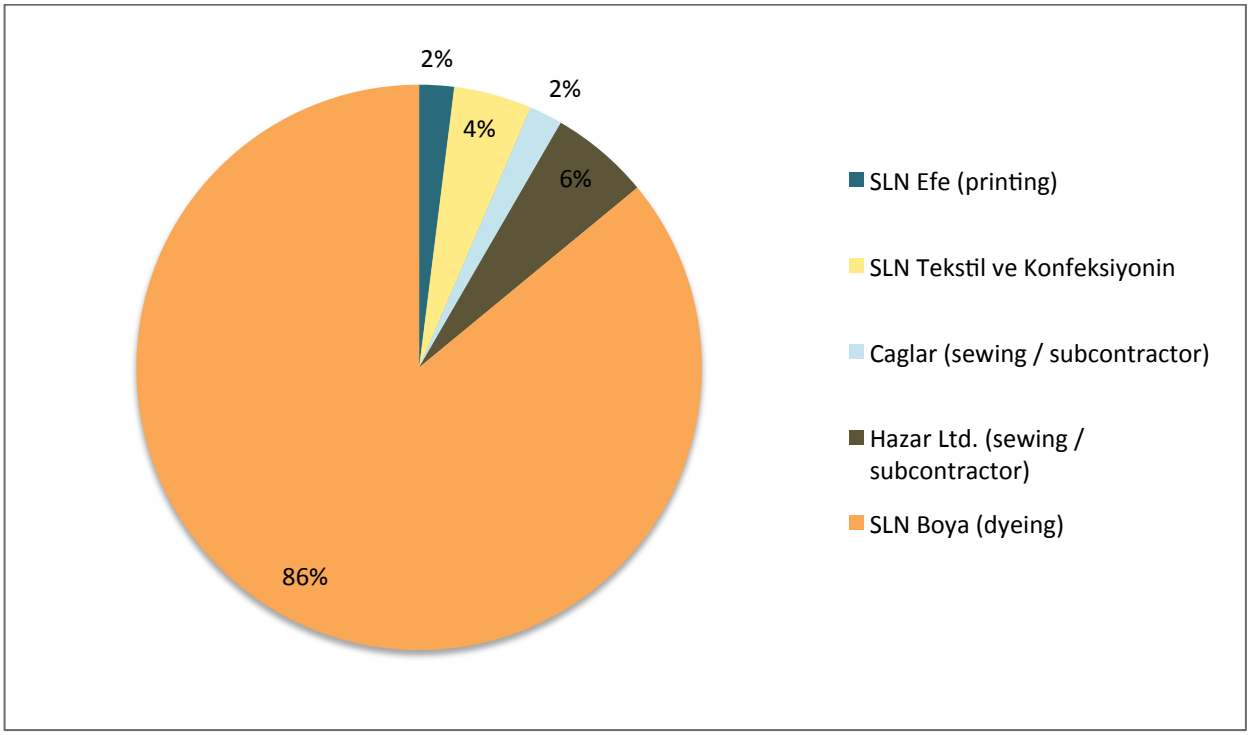


Share of CO_2e-missions SLN Boya in 2011

[2] Data from the energy provider could be used for the Carbon Footprint evaluation. The data and result are plausible. For proof-check, alternative scenarios have been calculated which includes assuming emission data for Combined Heat Power Plants (using natural gas) from inventories (PROBAS - Gas-BHKW-Kat-110-DE-2005-th/el-mix). As result, **4,650 tons CO_2e** (for the 9 months of 2011) were calculated. This divergence is reasonable, which shows that the result above is reasonable.

e) Total Emissions of all Units

The total emissions of all units accumulate to 4,882 tons CO_2e-emissions. Most of the emissions are linked to the dyeing unit (SLN Boya). The charts below show the share of CO_2e emissions of each unit for the year 2011.

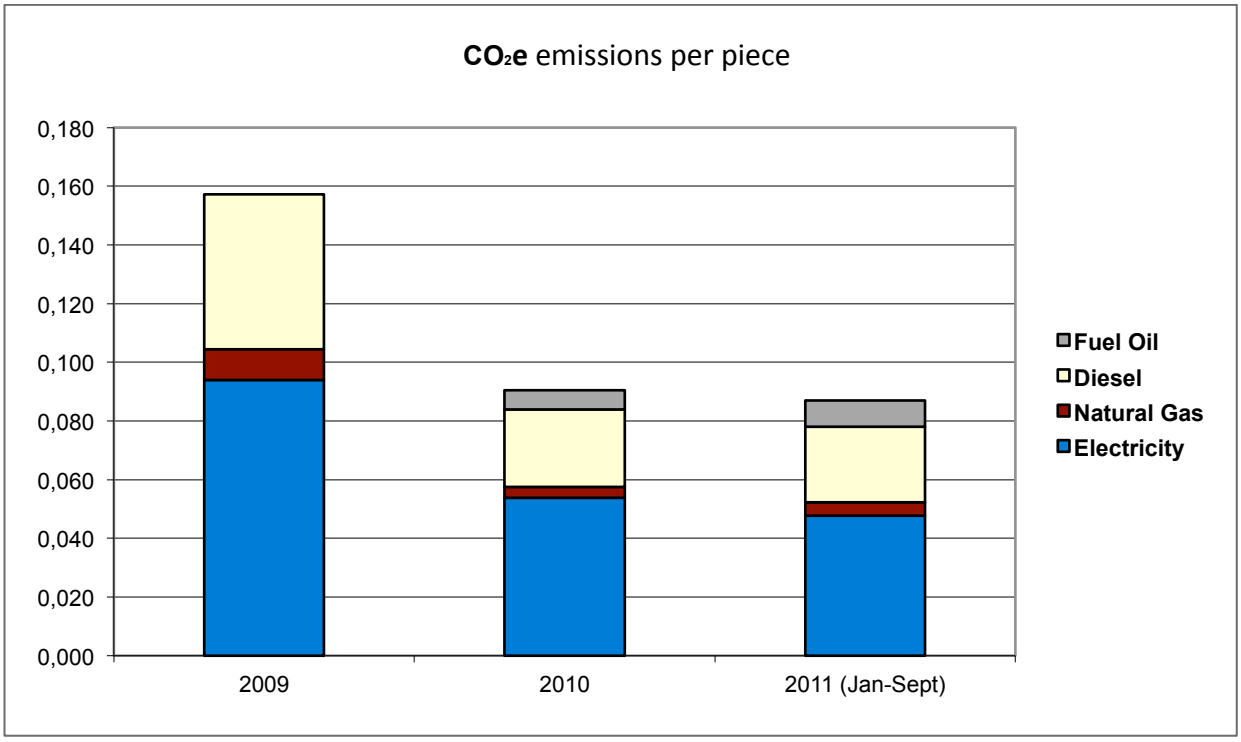


Share of total CO_2e-emissions according to the units

5.3 Carbon Footprint per Piece

a) SLN Tekstil ve Konfeksiyon

In 2009, SLN Tekstil ve Konfeksiyon had an output-related carbon footprint of 0.157 kg CO_2e per piece. In **2010**, this value **decreased by 42%** to 0.090 kg CO_2e per piece. In the first nine months of 2011, the emissions decreased to 0.087 kg CO_2e per piece (see graph below). **This means a reduction of 44% of output-related CO_2e-emissions within two years,** which is quite remarkable. Emissions from electricity could be reduced by 43%, those from natural gas by 65% and those from diesel (vehicles) by 50%. Production increased by 50% in this time.



Comparison of average CO_2e-emissions per piece, on annual basis

b) SLN Efe (printing unit)

In 2010 the average CO_2e-emissions per piece produced by SLN Efe amounted to 0.047 kg. This value increased slightly by 5% in 2011 to 0.050 kg CO_2e per piece.

c) Subcontractors (Hazar Ltd. and Caglar)

Hazar Ltd. had in 2010 an output-related carbon-footprint of 0.130 kg CO_2e per piece, which increased in 2011 (by 36%) to 0.206 kg CO_2e per piece. This increase is mainly caused by a rise of CO_2e-emissions from increased electricity consumption per piece:

0.086 kg CO_2e per piece in 2010, and 0.184 kg CO_2e per piece in 2011 related to electricity consumption. Furthermore, emissions from gas consumption doubled, while emissions from diesel consumption decreased from 0.045 to 0.019 kg CO_2e per piece in 2011. Another reason lies in the lower production rate, which was 20% lower in 2011 (average production per month), however this does not explain the total increase.

The output-related carbon footprint of **Caglar** in 2010 amounted to 0.08 kg CO_2e per piece and increased very slightly in 2011 to 0.09 kg CO_2e per piece.

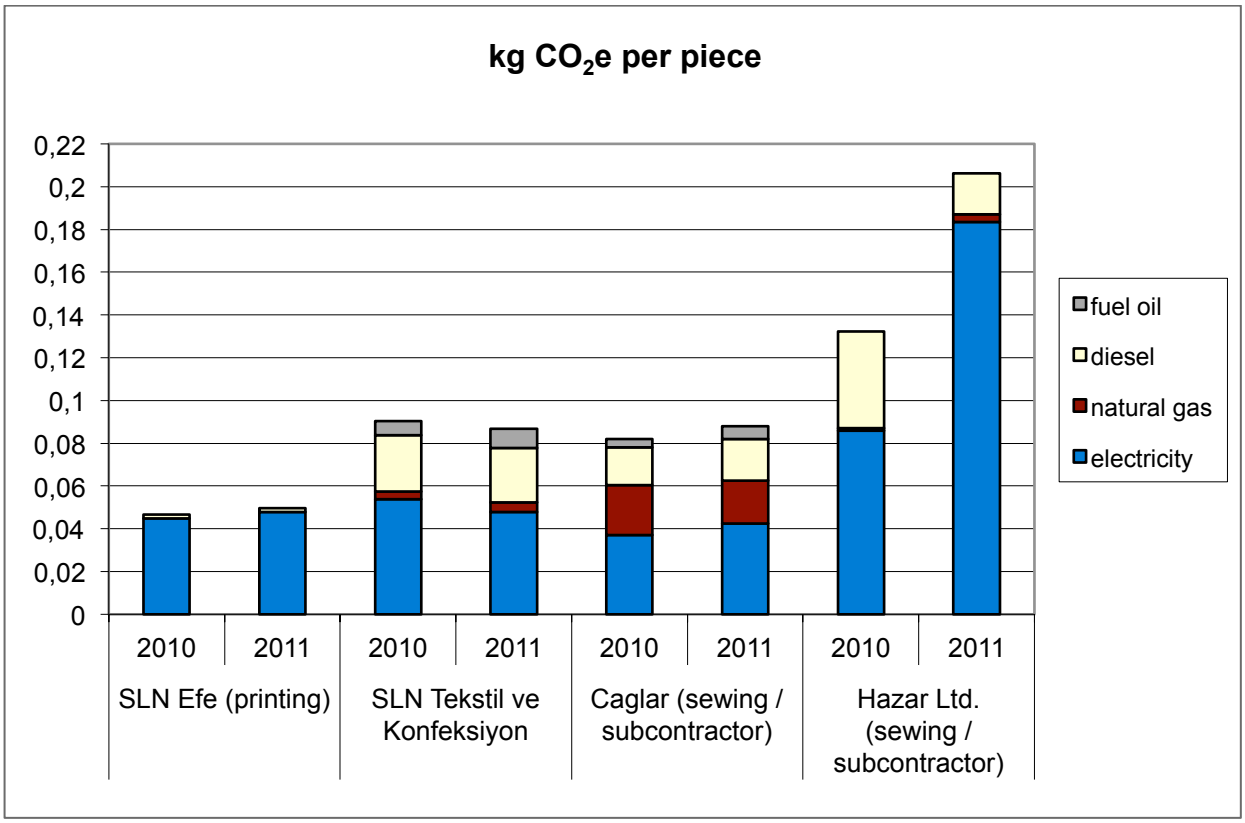
d) SLN Boya (dyeing unit)

In 2011, the average CO_2e-emissions per kg dyed dyed fabric, are 1.96 kg CO_2e.[3] This result is very low compared to other dyeing units and therefore means a very good performance.

e) Comparison

The following diagram provides an comparison for each unit on the CO_2e-emissions per piece. SLN Boya (dyeing unit) is excluded. Due to the particular processing, the printing unit has the lowest emissions per piece.

[3] An alternative calculation with a second generic emission value has been calculated, resulting in **2.17 kg CO_2e per kg dyed fabrics** (for the 9 months of 2011). See above (5.2).



CO_2e-emissions per piece for the different units.

In general the emissions per piece are generally very low compared to other garment units. This reflects the professional management approach at SLN for continuous improvement.

5.4 Energy Costs

a) SLN Tekstil ve Konfeksiyon

In 2010, SLN Tekstil ve Konfeksiyonhad total energy costs accumulated to an amount of 196,134 YTL, and in the period of Jan-Sept 2011 to 176,166 YTL. This means output-related energy costs of 0.06 YTL per piece in 2011 and 0.07 YTL per piece in 2011. The increase even though energy consumption per piece was lower has to do with the increasing price level of energy in general, especially the one of diesel. This also concerns the other units.

b) SLN Efe (printing unit)

The total energy costs of SLN Efe amounted to 65,318 YTL in 2010 and 44,865 YTL in the first nine months of 2011. Energy related costs per piece add up to 0.02 YTL/piece in 2010 and increased slightly in 2011 to 0.03 YTL/piece.

c) Subcontractors (Hazar Ltd. and Caglar)

In 2010, **Hazar Ltd**. spent 99,559 YTL for energy consumption and in the first nine months of 2011 energy costs add up to 90,863 YTL. Output-related energy costs amounted to 0.06 YTL per piece in 2010 and rose slightly to 0.07 in the first nine months of 2011.

Caglar spent 85,727 YTL for energy in 2010 and 75,701 YTL in the first nine months of 2011. Costs per piece are the same as at Hazar Ltd., with 0.06 YTL per piece in 2010 and 0.07 YTL per piece in the nine months period of 2011.

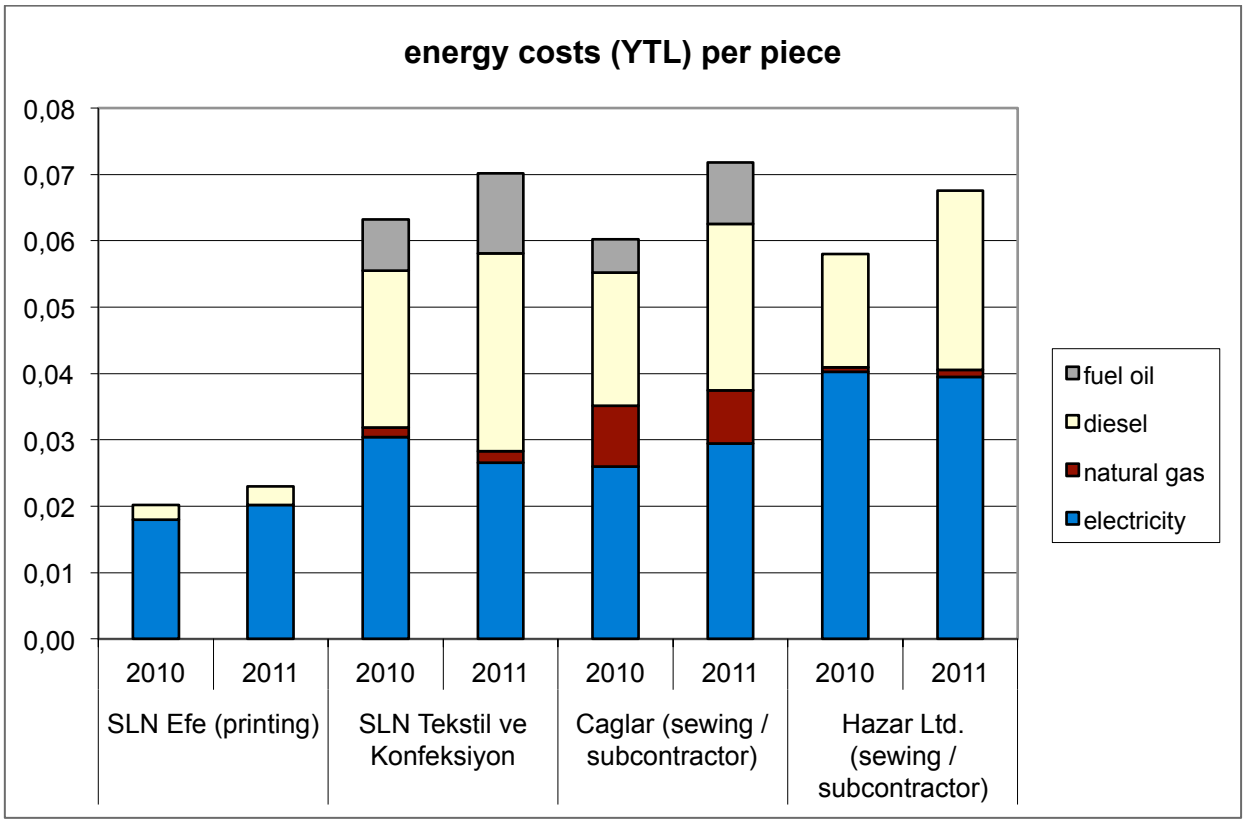
d) SLN Boya (dyeing unit)

The total energy costs of SLN Boya amounted to 1.78 Mio YTL in 2011. This means energy costs of 832.33 YTL per ton dyed fabric. Most of the costs result from electricity (39%) and from the external steam (33%). Another 26% of the energy costs are linked to natural gas consumption, 2% to Diesel consumption for transportation vehicles.

e) Comparison

The diagram below gives an overview of each unit and its energy costs per piece for comparison purposes. SLN Boya (dyeing unit) is excluded.

The diagram shows that all companies have a slight increase in energy-related costs from 2010 to 2011, even when emissions dropped. This has to do with the increasing level of energy prices in general.



Comparison of Energy Costs per piece for each unit on annual basis

6 Water Footprint

Concerning environmental protection, water consumption is another major issue. For that reason, the so-called Water Footprint has been evaluated.

a) SLN Tekstil ve Konfeksiyon

The water consumption of SLN Tekstil ve Konfeksiyon amounted to 2,430 m^3 in 2010 and 2,112 m^3 in the first nine months of 2011. The output related water footprint increased slightly by 7% with 0.78 l per piece in 2010 and 0.84 l per piece in 2011. The total water costs add up to 13,352 YTL in 2010 and 14,792 YTL in the period Jan-Sept of 2011.

b) SLN Efe (printing)

In 2010, SLN Efe had a total water footprint of 1,236 m^3, and in 2011 of 877 m^3. Water use per piece amounted in 2010 0.38 l per piece, which rose in 2011 to 0.45 l per piece – an increase of 15% in water use per piece.

Water costs amounted in 2010 16,632 YTL and in the first nine months of 2011 13,579 YTL.

d) Subcontractors (Hazar Ltd. and Caglar)

In 2010, **Hazar Ltd.** had a water footprint of 2,230 m^3. In the first nine months of 2011 the company consumed 1,769 m^3 water. The output-related water usage amounted 1.30 l per piece in 2010 and stayed very constant with 1.31 l per piece in 2011. The total water costs account for 8,920 YTL in 2010 and 7,121 YTL in 2011.

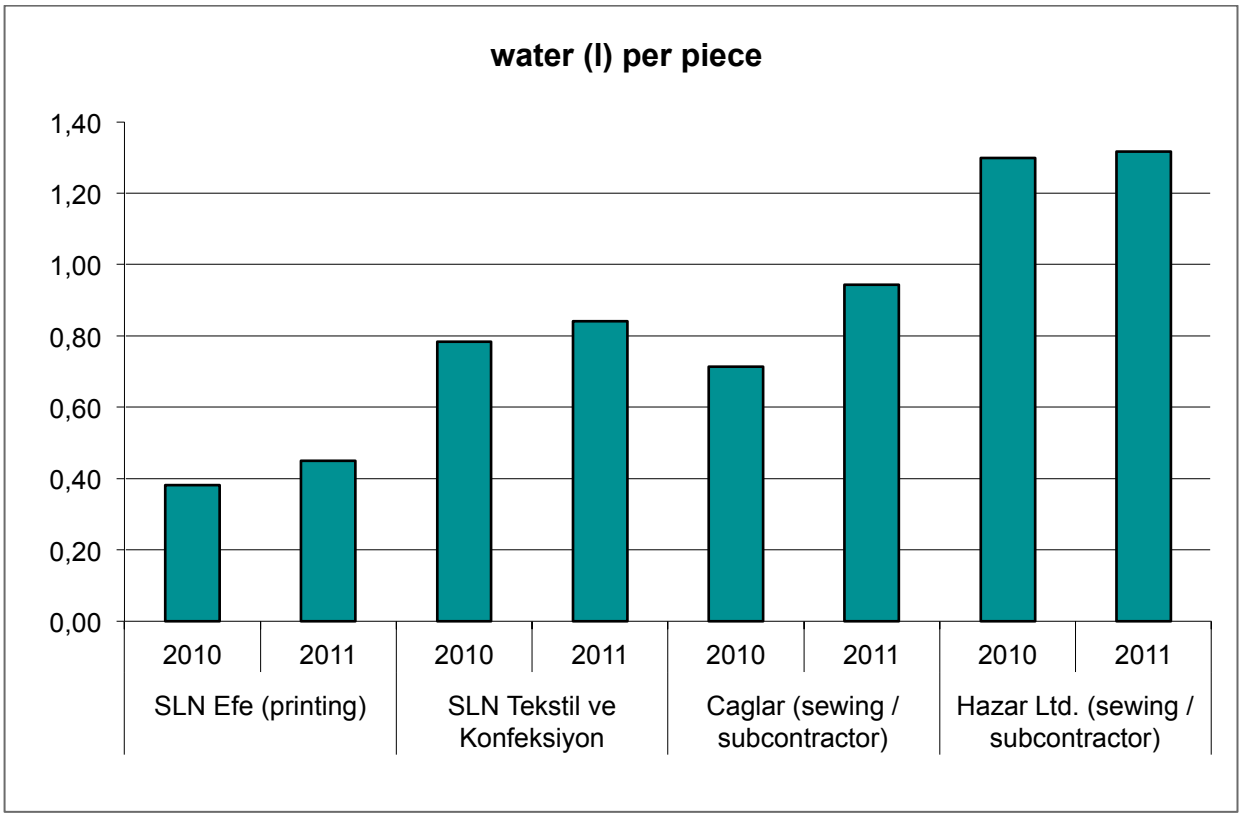
Caglar consumed 1,016 m^3 water in 2010 and 994 m^3 in the period Jan-Sept 2011. The output-related water consumption amounts to 0.71 l per piece in 2010 and increased in 2011 to 0.94 l per piece. The total costs of water consumption amounted to 6,157 YTL in 2010 and 7,247 YTL in 2011.

d) SLN Boya (dyehouse)

SLN Boya consumed 364,500 m^3 water in the first nine months of 2011. The output-related water consumption amounts to 170 l water per kg dyed fabric. This result lies in the middle field compared to other dyeing factories.

e) Comparison

The diagram below shows the water footprint for the various units. SLN Efe has the lowest water consumption per piece, but on the same time has to pay the highest water costs per piece. Beside Hazar Ltd., all units show a slight increase in water usage per piece compared to 2010.



Comparison of Water Consumption per piece for each unit on annual basis

7 Recommendations

The several units show already a good performance of CO_2e-emissions. During the visit several measures have been discussed for saving energy consumption. The following list includes measures for the various units of SLN and the subcontractors:

Area	Measure	Saving (in %)	Pay-back
Manage ment	Advice all persons for energy saving, especially switching off lights and close valves when not in use. Some lights were not switched off.	-/-	immediately
Heating	Insulate also the return steam pipes. Some of those return pipes did not have insulation at all.	ca. 1-2%, also improving room temperature in the ironing section which means less energy for ventilation needed and improved	within 0.5 years

		working conditions, also avoiding risk of burning injuries	
Heating / Water	Reuse of steam for pre-heating the inlet water to the boiler where possible	ca. 20% also saving of water consumption	ca. 2 years
Heating	Use ironing tables with blowing / fan system instead of a resistance heat system (see picture)  Example of such an efficient ironing table	ca. 50% Additional savings by less temperature in the ironing section, also improved working conditions	3-4 years
Lighting	Install motion controls for areas that are not used permanently such as floors, washing rooms, the warehouse etc.	ca. 5%	within 0.5 years
Lighting	Install additional light switches for areas	-/-	within 0.5 years
Lighting	Replace existing T8-tubes and magnetic ballasts by efficient T5-tubes with electronic ballasts and mirror reflectors. Place the lighting above the workplace for optimal lighting. Make a light check for assuring the proper lighting conditions at workplaces	30-40% and improved working conditions	1 year

Lighting	Use an automatic dimming system for adapting the light to the sunlight conditions	ca. 10%	2 years
Motors	Replace motors of sewing machines by efficient servo-motors. Make a plan for systematic replacement.	ca. 30-40%	3-4 years
Motors (dyeing unit)	Check systematically the installation of frequency inverters for motors. It also could be evaluated to combine the inverters with energy recovery system for motors with brake choppers.	ca. 10-40%	2-5 years
Compressed Air (dyeing unit)	Avoid exposure of the air-intake for the compressor to direct sun. The air for the compressor shall be clean and cool. Also clean the air-intake filter of the compressors	ca. 5%	immediate
Compressed Air (dyeing unit)	Install additional valves for locking areas when there is not any use of compressed air at a line or in an area. Automatic valves can be considered. Instruct people to close the valves when compressed air is not used (zoning of the compressed air net)	ca. 5%	within 0.5 years
Compressed Air (dyeing unit)	Set-up regular leakage detection for the whole compressed air system (by noise control, foam, soap water or even ultrasonic sound detection, also by measuring the pressure drop on various places within the pipe system), especially check hoses, fittings, valves. Note that compressed air is a very expensive energy use. Any opportunity for saving is worthwhile to consider	ca. 15-20% of electricity for compressed air	within 0.5 years
Water	Check all water seals and pipes for leakages and fix them, include all sanitary facilities	-/-	immediate

Water	Install aerators for water-taps	-/-	immediate

Hamburg, December 30th 2011, Norbert Jungmichel, Serpil Gürci, Franziska Dittmer