



NUQUL GROUP

SINCE 1952

GO GREEN

Nuqul Tissue Jordan



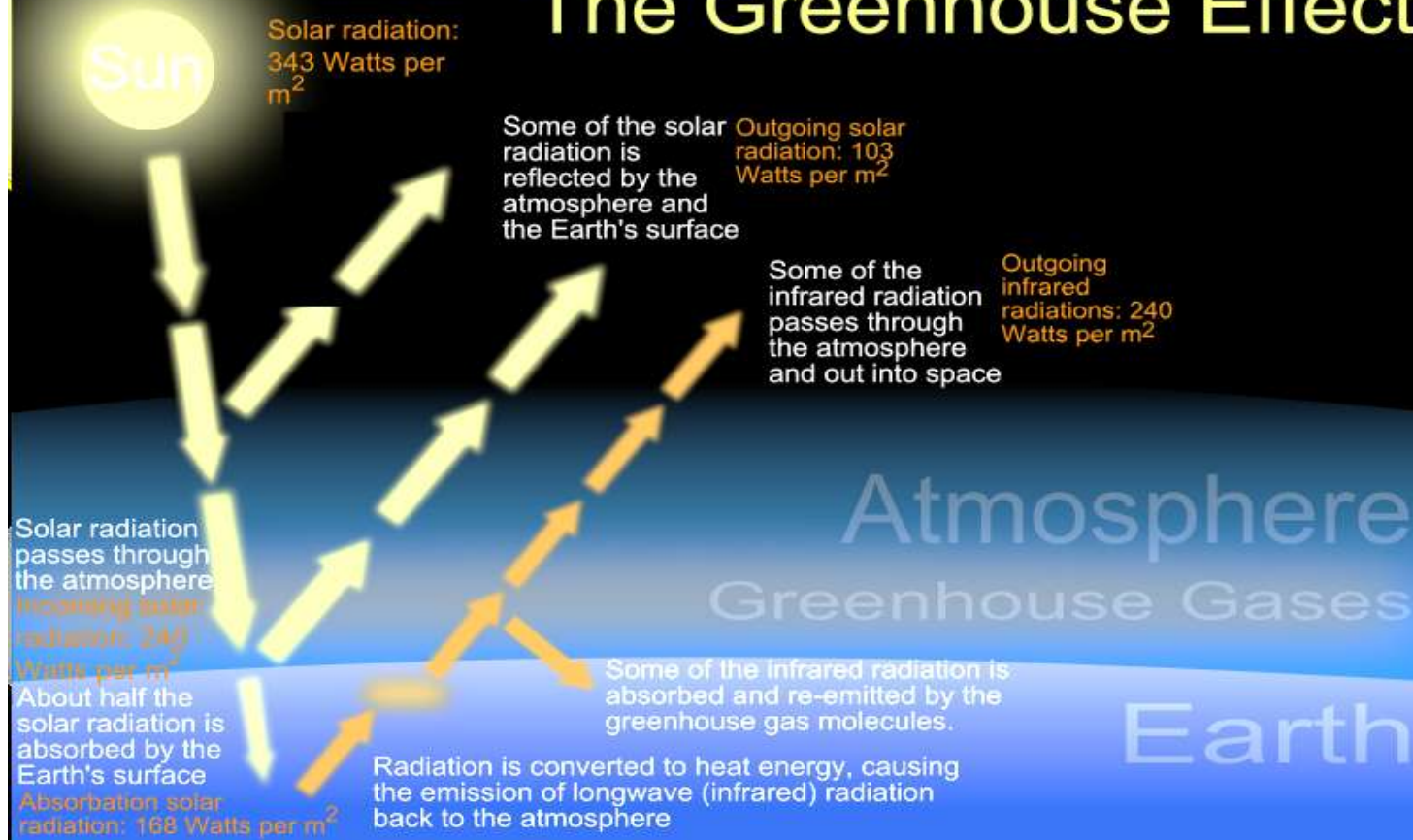
Energy Conservation Programs

Global Warming



NUQUL GROUP
[1990-1999]

The Greenhouse Effect



Together

Management Strategy



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[مستقبل]

- ❑ NT top management believes that natural resources are very valuable and it is not ethical to accept losses whenever you can prevent these losses even if you are making money.
- ❑ Our strategically think to stop bleeding of natural resources wherever, whenever you can.
- ❑ NT energy conservation program started in 2000.
- ❑ Saving natural resources meaning saving the planet and making money.

Program



NUQUL GROUP
[1990-1991]

Cleaner production concept :

Energy conservation.

Water conservation.



GREEN BUSINESS.

Raw material conservation.

Programs:

- 1- Reduce thermal energy consumption (kwh/ton)
- 2- Reduce electrical energy consumption (kwh/ton)
- 3- Reduce water consumption m³/ton of paper

Growing Together

Six Sigma Methodology



We defined all inputs and outputs that can affect energy consumption positive or negative:

- 1- Sponsor.
- 2- Scope.
- 3- Time frame.
- 4- Objectives and targets.
- 5- Team leader and project team.

Project

Leader

objective

Time frame

Scope

Project team

Sponsor

| | | | |
|-----------------|--|--------------------------------------|----------------------|
| Project Title | Thermal Energy Consumption Reduction | | |
| Site | Sa. Masoud & Abed Al-Hadi | Site | Al-Snobar Paper Mill |
| Objective | Reduce thermal energy consumption from 2317Kwh/ton to 2200kwh/ton on the paper quality and productivity. | | |
| Start Date: | Target Completion Date | Team Members (State Core vs Support) | |
| Define Gateway | 01/02/2011 | Mahmoud Ghnam | First technician |
| Measure Gateway | 01/04/2011 | Morad Hassan | Chief M/C Operators |
| Analyse Gateway | 01/06/2011 | Mamoun Ramadan | Production Planner |
| Improve Gateway | 01/07/2011 | | |
| Control Gateway | 31/12/2011 | | |

Problem Description and Scope (Describe what is wrong with what and the scope of the problem)

Because of high energy cost it's reflect on the final product cost and to be more competitive in the market, the energy consumption should be as minimum as possible without affecting the paper specifications.

The scope of work is to increase boiler and hood efficiency and decrease thermal losses to be from 2317Kwh/ton to 2200Kwh/ton.

Customer Impact (State the metric as measurable and financial as it relates to customer)

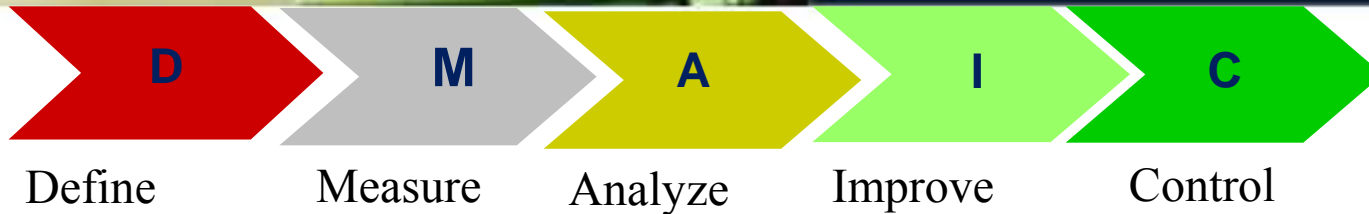
Increase the margin of competitive price(Price competitiveness)

Business Impact (State the metric as measurable and financial as it relates to business)

Total Business Impact = $117 * 50000 * 0.45 = 263250$ JD/year

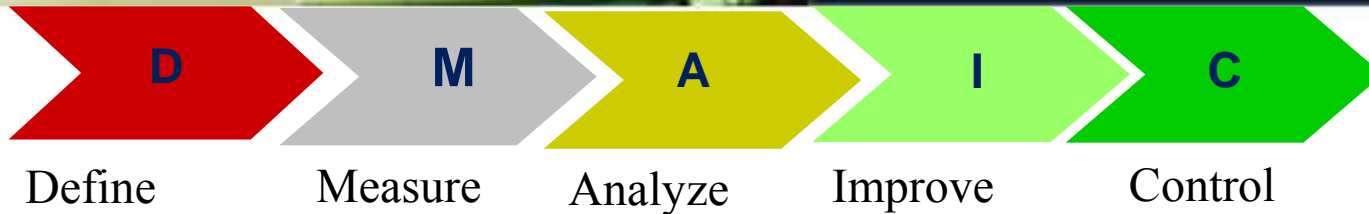
| Project Metrics | Current State (Baseline) | Objective and Stretch Target | Stakeholders | Signature | Dated |
|----------------------|---------------------------------------|---------------------------------------|---|-------------------------|-------|
| Primary: | 2317KWH/Ton | 2200KWH/Ton | Sponsor: Mr. Hani Nuqul Champion: Mr. Khamesti Elyyan | | |
| Secondary (Counter): | Without affecting on the productivity | Without affecting on the productivity | Team Leader: Mr.Samir Masoud Mr.Abed Al-hadi Hader Finance Rep.: Mr. Mohammad Salah | <i>Growing Together</i> | |

Six Sigma Methodology



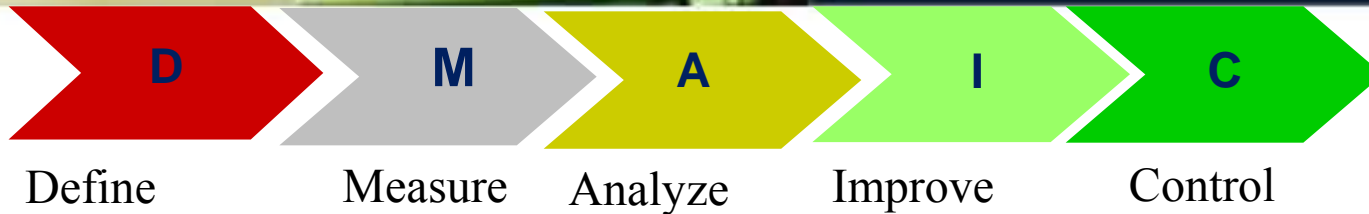
We measured all inputs and outputs and their effect on the energy consumption, according to data collection plan, recorded in data collection forms.

Six Sigma Methodology



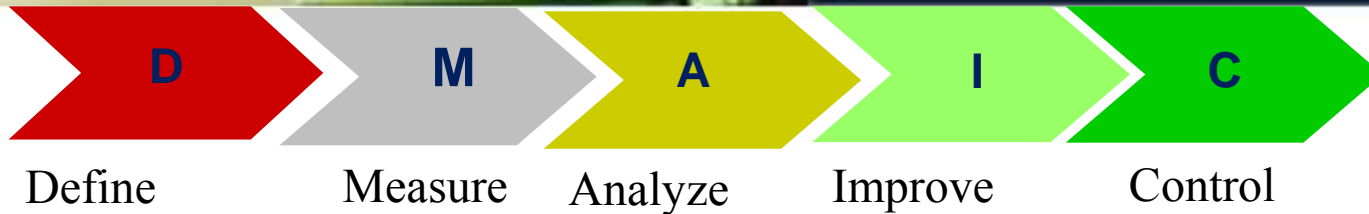
We analyzed all the collected data regarding the inputs and the outputs detecting the relation between the most effect.

Six Sigma Methodology



We improved processes that decrease the energy.
We improve processes that increase efficiency & productivity.

Six Sigma Methodology

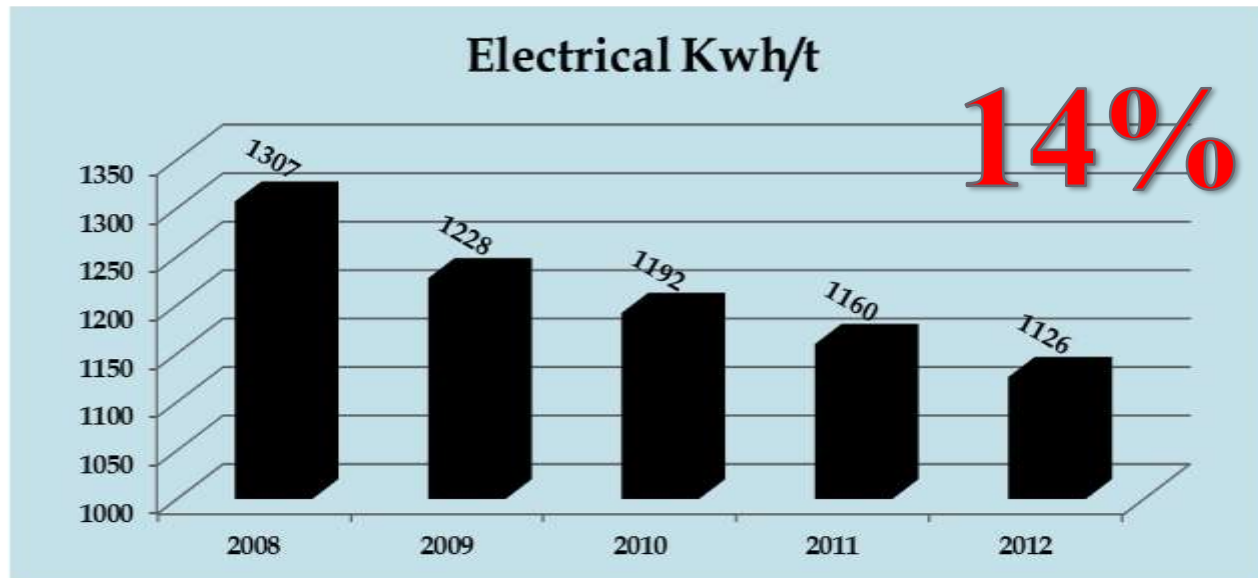
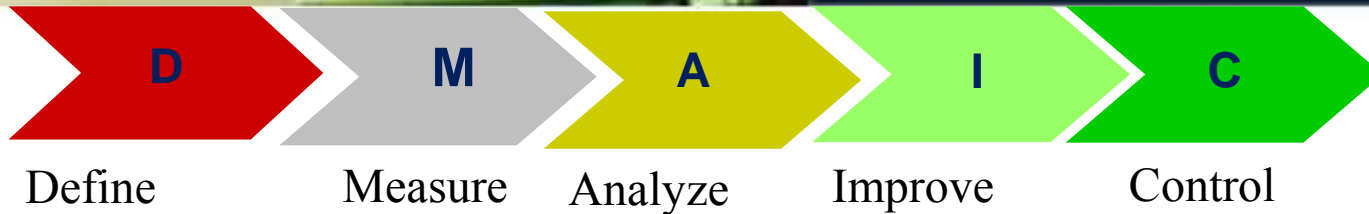


We implemented all necessary actions that sustain the achieved results; initiating procedures, measures, follow up sheet, auditing.

Electrical improvement

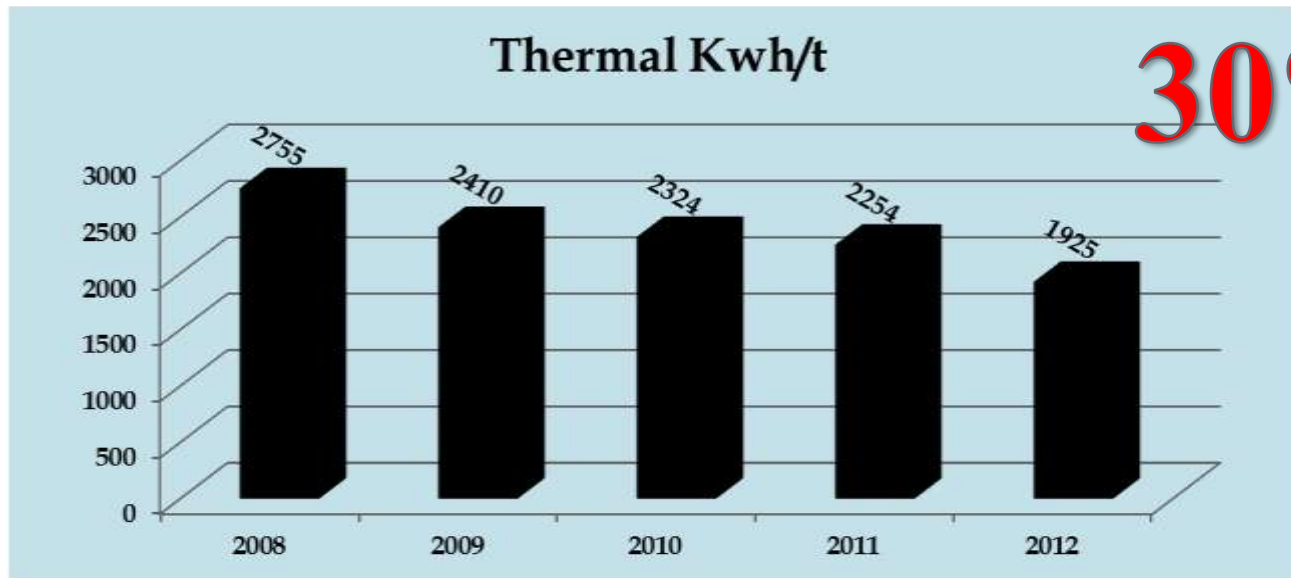
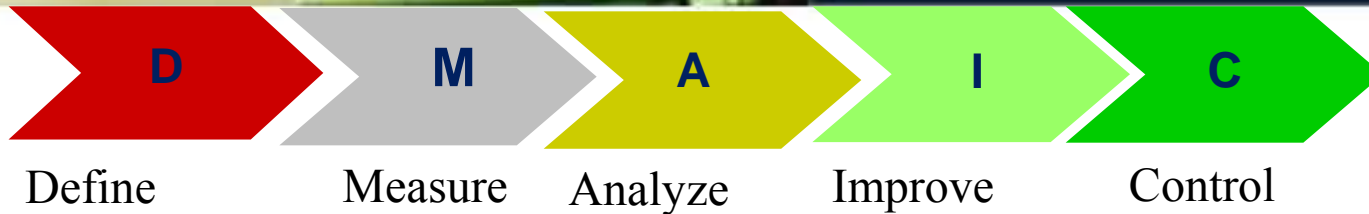


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[1990-1351]



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Thermal improvement



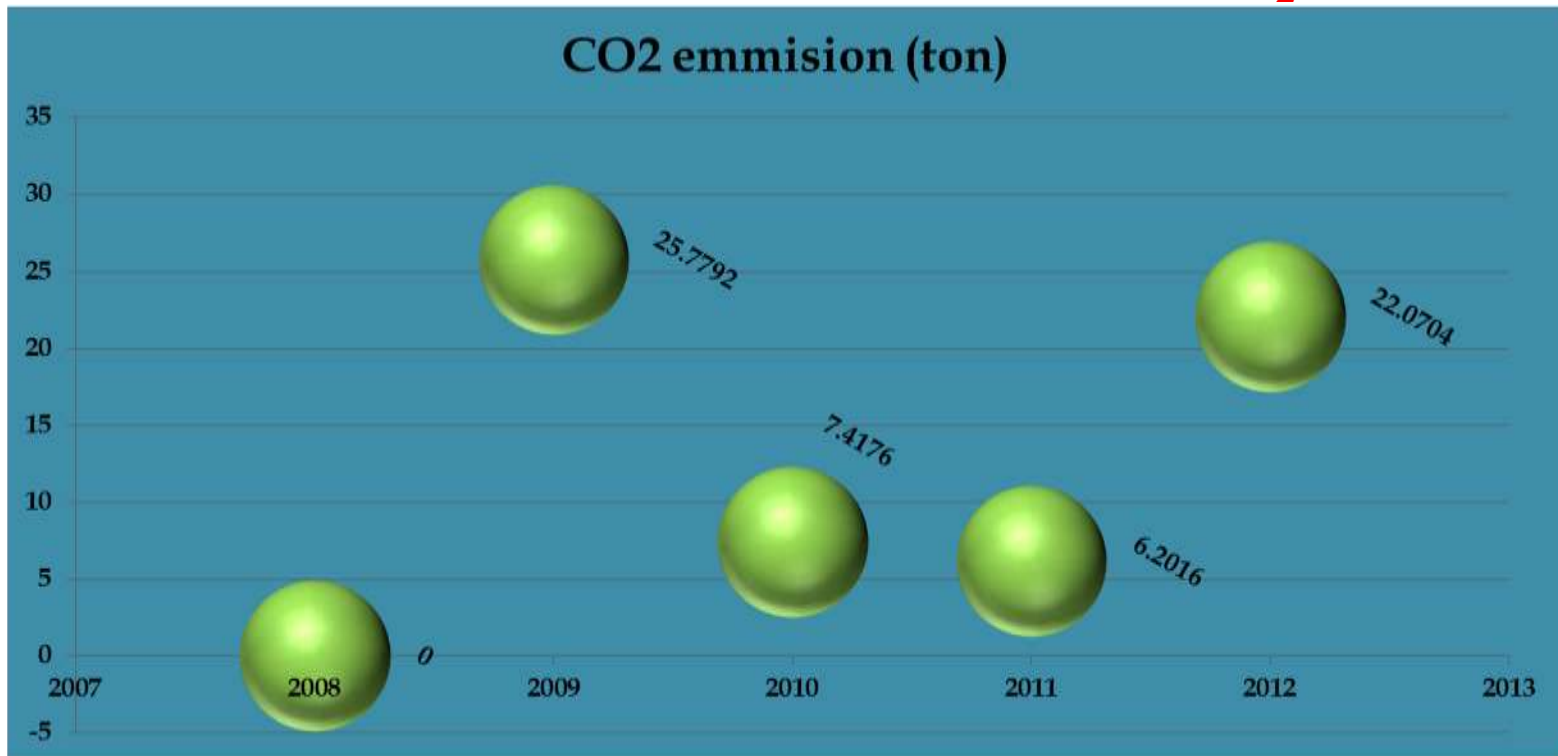
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Carbon Foot print



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[مجموعة نوقول]

61.5 K Tons CO₂ Reduced



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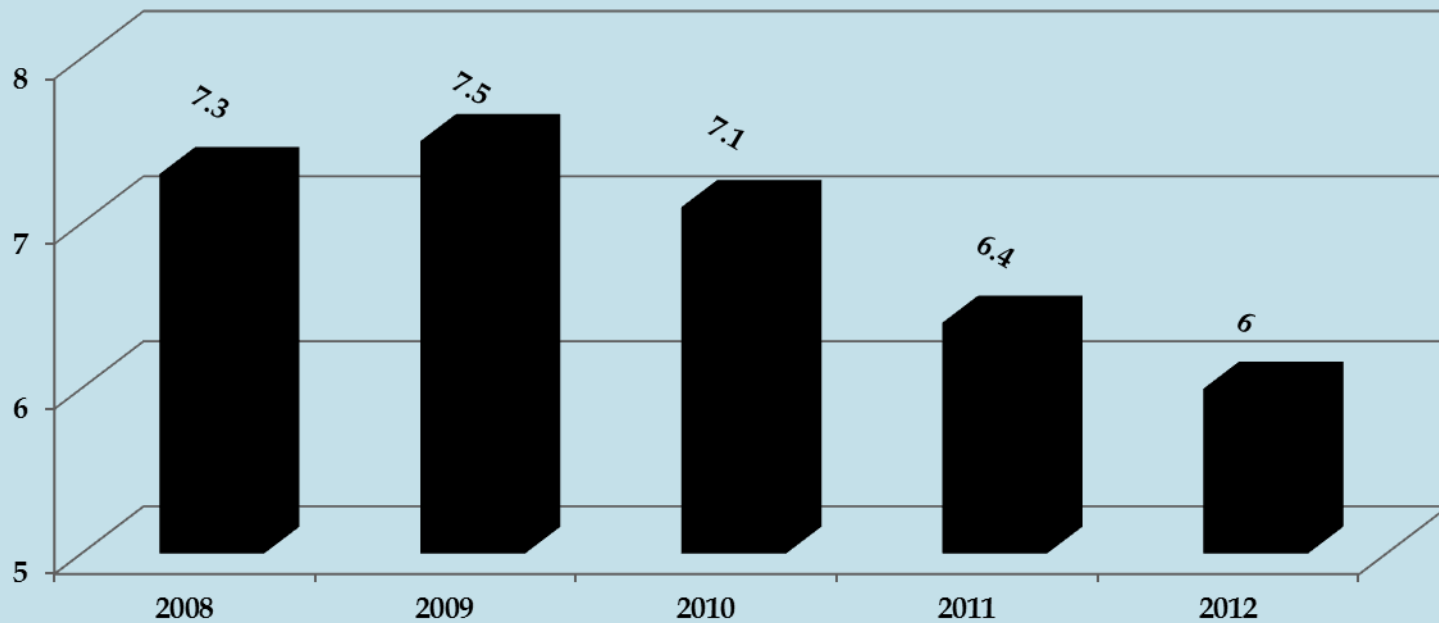
Water improvement



NUQUL GROUP
[مستقبل]

Water consumption m³/ton

18%



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Electrical Energy Measures



- ✓ Turn off some motors during no load operation
- ✓ Using VFD where applicable
- ✓ Apply high efficiency oil for GB and Bearings
- ✓ Reduce lighting energy consumption using occupancy sensors, timers, photocells
- ✓ Install transparent sheets
- ✓ Install High Efficiency Belts on Electric Motors
- ✓ Turn Off Waste Water Treatment Unit Loads During Peak Demand Period

Electrical Energy Measures



- ✓ Reducing Factory Compressed Air Leaks
- ✓ Buy new high efficiency electrical motors.
- ✓ Modify compressors operating mode and pressure settings
- ✓ Buy VFD compressor
- ✓ Install solar system for administration building.
- ✓ Insulate chilled water line
- ✓ Replace lighting fixture by efficient lighting fixture

Thermal Energy Measures



- ✓ Install new heat exchanger for exhaust hot air to increase the combustion & make up temperature to reach 200C instead normal ambient temperature.
- ✓ Insulate YK dryer
- ✓ Reduce heat loss(replace S&C traps, type of insulation..)
- ✓ Improve heat transfer rate at Heat Exchanger
- ✓ Improve burners efficiency

Thermal Energy Measures



- ✓ Automatic Control of Hot Air Exhaust Fan Using Variable Frequency Drive Instead of Motorized Damper and humidity sensor
- ✓ Continues monitoring on combustion efficiency for burners by using flue gas analyzer.

Water Measures



NUOUL GROUP
[1990-1991]

- ✓ Increase machine efficiency
- ✓ Use process water instead of fresh water for flooded nip shower
- ✓ Recirculate sealing water
- ✓ Decrease nozzles sizes.
- ✓ Eliminate pumps leakage

Are we missing out an opportunity



- ▣ Nuqul Group mandate is to be dependent on clean sustainable energy resources
- ▣ That's why we are currently studying several energy projects covering:
 - solar energy system
 - wind power generation.
 - Animal waste
 - Reuse industrial water from waste treatment unit in the process
 - Use natural cooling for MCC rooms.

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Are we missing out an opportunity



NUQUL GROUP
[1990/1991]

- Implementation 50001 ISO system
- Boiler economizer (HRSG)
- Fuels tanks insulation

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COST

**GO
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Business\$**

THANK YOU



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