



HOLCIM LANKA LIMITED

COMPANY DESCRIPTION

HOLCIM Lanka Limited (HOLCIM) operates the only Sri Lankan composite cement manufacturing plant in the Puttalam district and owns a cement grinding and packing facility located in Galle. The plant was established in 1967 as a government plant and in 1996 sold to the HOLCIM Group. The GERIAP project focused only on the composite cement plant. This plant has over 650 staff, has an installed capacity of 560,000 tons a year and produces approximately 520,000 tons a year.

Since its privatization, HOLCIM made several improvements to achieve higher production levels, such as the switching from furnace oil to coal, installation of a coal mill, replacement of ESP with bag filters and installation of a roller press at the cement grinding mill. As part of the company's Corporate Social Responsibility (CSR) activities, HOLCIM provides water from a remote stream to the local community and participates in several environmental programs in Sri Lanka. HOLCIM is certified to ISO14001 (environmental management), ISO9001 (quality) and OSHA 18000 (occupational safety and health).

The company participated in GERIAP because it was interested in identifying additional opportunities to reduce energy and GHG emissions to supplement existing projects to meet HOLCIM's GHG reduction targets.

PROCESS DESCRIPTION

Major steps involved in the HOLCIM process are as follows:

- **Lime quarrying:** HOLCIM lime quarry is located about 20 km way from the factory. Lime stones are quarried using blasting methods and heavy earth moving equipment, and broken into homogenous sizes.
- **Rail transport:** The company owns a dedicated rail line to transport lime stone from the quarry to the plant.
- **Jaw crushing and ball milling:** Lime stone is further crushed using jaw crushers and ball mills and processed into fine powder that is stored in silos. Bauxite and ferrite are crushed, mixed with lime stone as raw meal and stored in the feed silos.
- **Pre-calcination:** The raw meal passes through four-stage pre-calciner. Thermal energy for the pre-calcination is provided by waste heat from the calciner or rotary kiln process.
- **Calcination:** This involves pyrolysis of raw meal in a rotary kiln to form clinker. Pulverized coal is fed into the back end of the kiln to provide the necessary thermal energy. HOLCIM also use biomass, waste oil and used tyres as alternative fuels.
- **Grate cooling:** Red-hot clinker from the kiln is cooled on a grate cooler conveyor to and temporarily stored in heaps.
- **Clinker grinding:** Cooled clinker is ground to powder in a roller mill and mixed with gypsum to form cement that is stored in vertical silos. HOLCIM is in the process of installing a roller press to increase its clinker grinding capacity from 65,000 MT to 1,000,000 MT per annum.
- **Packing and distribution:** Finished cement is packed in paper bags and distributed to customers. In addition to the bag form, HOLCIM provides bulk loads in tankers to bulk users.



The following auxiliary steps are also included in the manufacturing process:

- Coal grinding
- Water pumping and distribution
- Dust extraction using an electrostatic precipitator (ESP) system

METHODOLOGY APPLICATION

The draft Company Energy Efficiency Methodology was used as a basis for the plant assessment to identify and implement options to reduce energy and other materials and wastes. Some of the interesting experiences are:

▪ ***Task 1a – Meeting with top management***

During the first meeting between the external facilitator, the company's Environment Manager and top management (task 1a), the CFO of this company indicated that focus areas should be selected based on:

- Projects already under investigation by the company's Process Team to reduce GHG emissions
- Areas where HOLCIM Lanka Ltd could use external input and expertise
- Areas where possible CP-EE options are likely to be low cost and/or with a short payback period, as the company had already committed significant funds to other GHG projects in the next years.

Lesson learnt: This showed how important the first meeting with top management was, because now top management's priorities could be considered in selecting focus areas. This way top management quickly approved the proposal for the detailed energy assessment and remained supportive of the project until the end.

▪ ***Task 2a – Staff training and meeting***

The company sent one process engineer, one accounts person and one administration person to a five-day technical training programme, given by the external facilitating organization, to learn about energy efficiency (technical knowledge) and Cleaner Production (the methodology). Especially the non-technical staff members benefited from this training and were now better prepared to work with the technical staff on the energy assessment (e.g. the accounts person now knew what the production, energy/resource and cost data that she would need to give would be used for).

Lesson learnt: It is useful to also include non-technical staff in the training programme so that they better understand how to assist the technical staff in the energy assessment.

▪ ***Task 2b – Prepare process flow charts for focus areas***

One of the focus areas selected for this company was "fans and motors". Because these are distributed throughout the plant it was not applicable to prepare a process flow chart for this focus area. Instead of this an inventory of fans and motors at the plant and their characteristics (location, capacity, energy use etc) was made.

Lesson learnt: The process flow chart is not always applicable to cover the main characteristics of a focus area.

▪ ***Step 6 – Continuous improvement***

At the start of the project HOLCIM Lanka was still developing its environmental management system, but this has since been certified to ISO 14001. This will assist in improving energy efficiency on a continuous basis. In addition, energy efficiency will continue as part of Manufacturing Performance Review (MPR) that is carried out across HOLCIM's plants worldwide (see case study of HOLCIM Bulacan in the Philippines)



Lesson learnt: an environmental management system can assist in cementing energy efficiency in daily company business processes.

OPTIONS

Several energy waste sources were identified and some of them were selected for implementation. The majority of these options (including the totally implemented options below) were identified by HOLCIM technical improvement group and later GERIAP team has commended them as potential options for their group performance improvement as well as GHG reduction. At this point it is highly appreciative on the efforts taken by the HOLCIM in improving energy efficiency and hence reducing environmental impacts, even prior to the initiatives of GERIAP and further strengthens after the introduction GERIAP inputs.

As some of these options involve high investments, only few of the projects were selected for implementation and the rest were kept pending for later time implementation. Out of the seven options proposed, four were fully implemented, two were in progress and one was pending implementation:

- *Selected and completely implemented options are:*
 1. Kiln: Efficiency improvement in Kiln ID fans by impeller replacement
 2. Replacement of Electrostatic Precipitator (ESP) fan for dust extraction with bag filter system (*Project Blue Sky*)
 3. Substitution of coal for kiln with alternative fuels
 4. Raw mill fan efficiency improvement by impeller replacement
- *Options implementation in progress:*
 5. Reduction of water consumption in the plant
 6. Clinker grinding efficiency improvement (*Project “Express”*)
- *Option pending implementation:*
 7. Drying of wet sawdust / paddy husk using waste heat (this option is a special area to be considered under the HOLCIM Group policy under the “substitution of alternative fuels”)

Additional options were also proposed and will be considered at a later stage. The table below gives details of fully implemented options.

Table: EXAMPLES OF OPTIONS IMPLEMENTED

FOCUS AREA/ OPTION	CP TECHNIQUE	FINANCIAL FEASIBILITY	ENVIRONMENTAL BENEFITS	COMMENTS
Raw meal fan: Efficiency improvement by replacement of impeller	Production process / equipment modification	<ul style="list-style-type: none"> ▪ Investment: US\$ 4,000 ▪ Expected efficiency improvement: 58% to 74.8% ▪ Annual savings: not provided ▪ Payback period: 15 months 	<ul style="list-style-type: none"> ▪ Electricity savings: 683 MW/yr (1.3 kWh / ton of raw meal, X 60 ton / hr, X 24 hrs X 365 days) ▪ GHG emission reduction: 140 tCO₂/yr ▪ SO₂ emissions reduction 	Actual performance monitoring was still in progress at time of writing for these options



FOCUS AREA/ OPTION	CP TECHNIQUE	FINANCIAL FEASIBILITY	ENVIRONMENTAL BENEFITS	COMMENTS
Replacement of ESP fan for dust extraction with bag filters (<i>see case study</i>)	Production process / equipment modification	<ul style="list-style-type: none"> ▪ Investment: US\$ 2.3 million ▪ Electricity savings: US\$ 45,000 ▪ Product / raw material savings: not determined 	<ul style="list-style-type: none"> ▪ Raw material savings due to reuse dust emissions ▪ Electricity savings: 1051 MW per year (2 kWh per ton of raw meal X 60 tons/hr X 24 hrs X 365 days X 0.001) ▪ GHG emission reduction: 215 tCO₂/yr ▪ Minimized dust emissions 	
Substitution of coal for kiln with alternative fuels (<i>see case study</i>)	Input material substitution	<ul style="list-style-type: none"> ▪ Investment: no specific investments ▪ TSR 8% expected ▪ Energy savings: 7% of total coal costs 	<ul style="list-style-type: none"> ▪ Coal savings: 7% ▪ GHG, SO₂ emission reduction ▪ Providing a solution to solid waste streams 	
Kiln ID fan efficiency improvement	Production process / equipment modification	<ul style="list-style-type: none"> ▪ Investment: US\$ 4,150 ▪ Expected efficiency improvement: 70 – 80% 	<ul style="list-style-type: none"> ▪ Electricity savings ▪ GHG emission reduction ▪ SO₂ emission reduction 	

FOR MORE INFORMATION

GERIAP National Focal Point (NFP) of Sri Lanka

Mr. Nihal Cooray
 Manager, Small and Medium Enterprise Developers (SMED)
 Level 4, No. 53, Vauxhall Lane, Colombo 02, Sri Lanka
 Tel: +94 1 304287 / Fax: +94 1 304291
 E-mail: projsmed@slt.lk; geriapsl@sltnet.lk



GERIAP Company Sri Lanka

Mr. Ananda Rajakaruna
 Plant Manager
 HOLCIM Lanka Limited
 Puttlam, Sri Lanka

Disclaimer:

This case study was prepared as part of the project "Greenhouse Gas Emission Reduction from Industry in Asia and the Pacific" (GERIAP). While reasonable efforts have been made to ensure that the contents of this publication are factually correct, UNEP does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.