PUYAT VINYL PRODUCTS, Inc.

COMPANY DESCRIPTION

Puyat Vinyl Products Inc. (PVPI), one of the leading vinyl tile manufacturers in the Philippines is a fully owned subsidiary of Gonzalo Puyat and Sons. It was established in 1991 and is located in Mariveles, Bataan, near the Bataan Export Processing Zone (BEPZA) in the island of Luzon. The company produces vinyl tiles for flooring along with its accessories, including glue/adhesive and floor care/wax. The plant employs 113 staff and has an annual capacity of almost 5,000 metric tons vinyl tiles.

PVPI decided to participate in the GERIAP project because of its commitment to total customer satisfaction and environment-friendly mode of production.

PROCESS DESCRIPTION

PVPI's production process includes the following major steps:

- ***Pre-blending*** **–** This process is composed of polyvinyl chloride (PVC), inert filler (usually calcium carbonate, $CaCO_3$), and organic plasticizers, such as dioctylphthalate (DOP), which is pre-blended to produce a mixture of gel-like substance.
- ***Rolling*** - The mixture or gel-like substance is spread into a thin layer by a series of rolling mills (different sizes) prior to drying.
- ***Pre-heating/Drying*** **–** The mixture/substance is pre-heated and dried using steam and compressed air to produce a tough and durable vinyl sheet.
- ***Curing*** **–** Passing the vinyl sheet through the "ROTOCURE" , a machine that further heats up the sheet with a combination of steam and compressed air to increase its tear resistance and toughness.
- ***Embossing*** **–** Printing of designs/images as well as color rendering to create visual depth and additional coating to the sheet.
- ***Cooling*** **–** The sheet passes through a water bath and undergoes further cooling in a five-tier cooling stage prior to size reduction.
- ***Cutting*** **–** The sheet will be cut to proper size, usually in 6-, 9- or 12 in squares to create solid vinyl tiles. The trimmings will be sent to a granulating machine before being brought to the pre-blending stage for recycling.
- ***Packing/Storage*** **–** Vinyl sheets will be weighed and packed before being placed in the storage area prior to delivery.

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 1c – Pre-assessment to collect general information***

Management supports the environment work but there is no formal environmental policy or environmental management system in place. However, management considers environment to be implicitly covered under its quality management system that is certified to the ISO 9001:2000 standard

Lesson learnt: Some companies may cover environment and energy management as part of their quality management system.

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

Before the energy assessment started, the external facilitators gave a one-day in-house training to the staff of this company on the Cleaner Production concept and methodology and how to apply this to improve energy efficiency. After the assessment (step 2), external facilitators met again with the Team to facilitate the identification of causes of energy and material losses and the identification of possible options. The "Fish Bone Diagram" was used successfully as a tool, and this was a useful learning process for the Team.

Lesson learnt: An external facilitator can be useful at different steps in the methodology. He or she can provide training of staff as well as to assist the team in how to do the cause analysis and how to use the fish bone diagram.

- ***Task 2d – Quantify inputs and outputs and costs to establish a baseline***

The external facilitators found it difficult to obtain sufficient information to establish a baseline because many visits to the plant were required to do this and the plant is located about 200 km outside Metro Manila where the external facilitators were based.

Lesson learnt: External facilitators should consider distance to the plant in the planning of the energy assessment because it may not be possible to visit plants located far away often.

- ***Task 5a – Implement options and monitor results***

The external facilitator found out that some of the approved options were not implemented at this company. The reason appeared to be miscommunication: the boiler operator informed the external facilitator that the plant supervisor did not leave instructions on *how* to implement options at the boiler and monitor results.

Lesson learnt: It is essential that the "how to" implement options is correctly communicated down to the operator level. Otherwise, options may not be implemented as planned!

- ***Step 6 – Continuous improvement***

Since the GERIAP project the company is developing its vision to be energy-efficient and environment-friendly. Now that the company is familiar with the energy

assessment capability of the external facilitators, top management continuously requests assistance from them, especially with measuring electrical parameters of some equipment and the use of alternative fuel for their boilers.

Lesson learnt: External facilitators can also play a role in assisting companies to improve energy efficiency in the long term, for example by assisting with measurement.

OPTIONS

- Identified focus areas during the in-plant assessment step included utilities, comprised of boiler, compressor, cooling tower and chillers, and all electric motors associated with the operation of utilities.
- The Team identified five energy minimization options, of which two options were implemented.
- For the two options implemented, the total investment/operating cost was US$ 3,524, total savings were at least US$ 3,198 (only quantified for one option) and the overall payback was less than one year.
- For the two options implemented, the average reduction on fuel consumption was at least 6,515 liters of diesel oil per year and GHG reductions was 18 tons of CO_2 per year.
- As a result of the options implemented, the plant's GHG emissions were reduced by an average of 18 tons of CO_2 per year between the start of the project in 2003 and at the end of the project in 2005.
- The implemented and considered options are summarized in the tables below:

Table 1: EXAMPLES OF OPTIONS IMPLEMENTED

FOCUS AREA/ OPTION	CP TECH - NIQUE	FINANCIAL FEASIBILITY	ENVIRON MENTAL BENEFITS	COMMENTS
Focus Area/ Steam leak survey, leak repair and replacement of worn-out gaskets *(see case study)*	Good house keeping	▪ Investment: US$ 100 ▪ Cost savings: US$ 3,198 /yr ▪ Payback period: less than a month	▪ Fuel savings: 6,515 l/yr ▪ GHG emission reduction: 18 t/yr ▪ Water savings: 73 m^3/yr	
Cooling tower/ Improvement of cooling tower efficiency through cleaning of tower fins and chemical treatment of cooling water *(see case study)*	Good house keeping	▪ Investment: none ▪ Annual operating costs: US$ 3,424 ▪ Annual savings: not determined ▪ Payback period: not determined	▪ Fuel savings due to 20% increase cooling tower effectiveness ▪ GHG emission reduction ▪ Water savings	▪ Chemicals used: RLX 062403, 062503, 062303 ▪ Reduced maintenance cost, production loss and service interruption

Table 2: EXAMPLES OF OPTIONS UNDER CONSIDERATION

FOCUS AREA/ OPTION	CP TECHNIQUE	FINANCIAL FEASIBILITY	ENVIRONMENT AL BENEFITS	COMMENTS
Lighting System/ Replacement of 40 W fluorescent lamps with 36 W or 32 W fluorescent lamps	Production Process/ Equipment Modification	▪ Investment: 36 W: US$ 251 32 W: US$ 2,957 ▪ Annual cost savings: 36 W: US$ 291 32 W: US$ 1,309 ▪ Payback period: 36 W: 1 yr 32 W: 2 yrs	▪ Annual energy savings: 36 W: 5,335 kWh 32 W: 24,006 kWh ▪ Annual GHG reduction: 36 W: 1t CO2/yr 32 W: 5 tCO2/yr	▪ Company will consider this option and will conduct spot replacement in areas with optimum impact.
Boiler/ Reduction of excess air of the boiler	Production Process/ Equipment Modification	▪ Investment: Nil ▪ Annual cost savings: US$ 730	▪ Annual diesel fuel savings: 1, 487 liters ▪ Annual GHG reduction: 4 tons/yr	▪ Was not strictly enforced
Boiler/Addition of 1-in thick ceramics fiber as insulation material for the boiler shell to reduce the surface wall losses (after boiler combustion air was optimized)	Good Housekeeping	▪ Investment: US$ 616 ▪ Annual cost savings: US$1,322 ▪ Payback period: less than 0.5 yr	▪ Annual GHG reduction: 7 tons/y	▪ Company will consider this option

FOR MORE INFORMATION

GERIAP National Focal Point for the Philippines
Dr. Alice B. Herrera
Officer-in-Charge, Fuels and Energy Division
Industrial Technology Development Institute
Gen. Santos Ave., Bicutan, Taguig City, Metro Manila Philippines 1631
Tel: +632 837 2071 ext 2190
Tel fax: +632 837 2071 ext 2204
E-mail: aherrera@dost.gov.ph, abherrera@pacific.net.ph

GERIAP Company in the Philippines
Mr. Daniel T. Dumaraos
VP/Assistant General Manager
Puyat Vinyl Products Incorporated
2F Enzo Bldg., 399 Gil Puyat Ave., Makati City
Metro Manila Philippines 1205
Tel: +632 897 3879
Tel fax: +632 897 6262
E-mail: daniel_dumaraos@yahoo.com