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RECP Experiences at National Cleaner production Center

The efficient and environmentally sound use of materials, energy and water - coupled with the minimization of waste and emissions - makes good business sense. Resource Efficient and Cleaner Production (RECP) is a way to achieve this in a holistic and systematic manner. RECP covers the application of preventive management strategies that increase the productive use of natural resources, minimize generation of waste and emissions, and foster safe and responsible production. Benefits are eminent in many enterprises, regardless of sector, location or size, as demonstrated by the experiences of National Cleaner Production Centre in Pakistan.

Achievements at a Glance

NCPC is working on the principles of Cleaner Production; through continuous application of integrated, preventive and proactive strategies. Using its internal technical experts, NCPC implemented RECP approaches in installation of Anti Solar Roofs at Attock Refinery Limited (0ne of Oil Refinery in Pakistan) for energy conservation.

This achievement is a reflection of activities in all of the expertise offered by NCPC. RECP implementation in the installation of Anti Solar Roofs led to annual savings of US$ 105 by investing US$ 100 per roof and improved energy saving method. NCPC has demonstrated that applying the cleaner production at source led to taking care of materials, energy, water and waste makes good business sense. RECP covers the application of preventive management strategies that increase the productive use of natural resources, minimize generation of waste and emissions.

Overview

NCPC is working as a non-profit organization with the ultimate aim to improve the environmental conditions which in turn contributes to the welfare of community. NCPC is carrying out the broad categories of environmental services, energy conservation services, and analytical services to meet National Environmental Quality Standards (NEQS), waste management services to dispose off hazardous waste and multi discipline trainings to build organizational capacity.

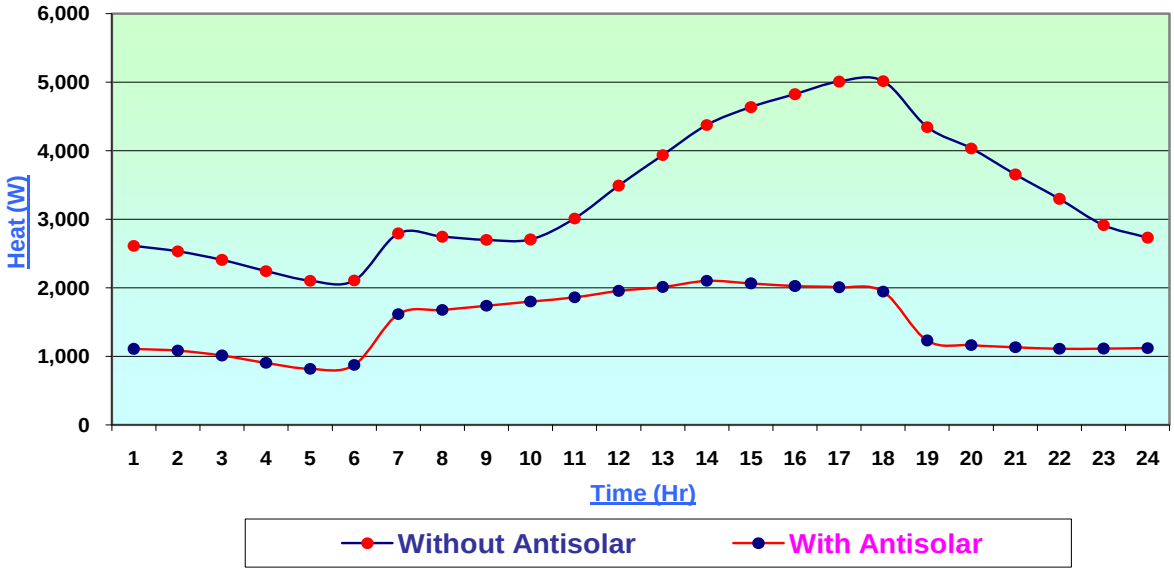
Benefits

The RECP programme was mainly focused on minimizing the use of energy in the form electricity by cutting down the use of Air Conditioning units and gas heating without affecting the quality and quantity of the production. By undergoing this programme NCPC was able to understand the specific requirements to eliminate thermal bridges formed between the edges of the tiles.

Before Installation Experimental Roof showing cracks

After installation of view of the Antisolar Coated Roof

Total Heat Gain Profile With & Without Antisolar System



Absolute Indicator	Change (%) Year 1	Relative Indicator	Change (%) Year 1
Resource Use		**Resource Productivity**	
Energy Use	-45 Kwh/d	Energy Productivity	-
Materials Use	-	Materials Productivity	-
Water Use	-	Water Productivity	-
Pollution Generated		**Pollution Intensity**	
Air emissions (global warming, CO_2 equivalent)	-47.97 lbs CO_2 / kwh	Carbon Intensity	-
Waste-water	-	Waste-water Intensity	-
Waste	-	Waste Intensity	-
Production Output			-

Note: The absolute indicators provide a measurement of how much resource use has changed in absolute terms e.g. units of energy used or tons of waste generated. A negative percentage indicates a decrease and a positive percentage indicates an increase. The relative indicators provide a measurement of changes in resource use in relation to a specific process.

Resource Efficient and Cleaner Production (RECP)

Resource Efficient and Cleaner Production (RECP) entails the continuous application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment.

RECP addresses three sustainability dimensions individually and synergistically:
- *Production efficiency*
  > Through improved productive use of natural resources by enterprises

- *Environmental management*
  > Through minimization of the impact on nature by enterprises

Human development
  > Through reduction of risks to people and communities from enterprises and supporting their development

Success Areas

The experiment has demonstrated that an anti solar roofing system does improve the indoor thermal comfort. The thermal analysis of the building while confirming the results of the experiment, show that:

- Anti-solar system reduces energy required for both summer cooling as well as winter heating.
- Cost of installing the anti solar system is paid back in less than a year.
- Avoids the addition of 150kg of CO_2 for each square meter of the floor area covered with anti solar system.
- Roof does not undergo differential thermal contraction and expansion cycles and thus does not crack or leak.
- The low temperature of the roofs prolongs the useful life of the thermopore insulation as well as that of the building structure. Strategically allowing nighttime ventilation and preventing daytime infiltration and adjusting floor carpets may further improve the performance of the anti solar system.

Principal Options Implemented	Benefits			
	Economic		Resource Use	Pollution generated
	Investment [USD]	Cost Saving [USD/yr]	Reductions in energy use, water use and/or materials use (per annum)	Reductions in waste water, air emissions and/or waste generation (per annum)
Anti Solar Roof System Installation	100	105	Electricity Consumption Reduced by 463 Kw per hour per year	3-4 tons of CO_2

Approach taken

A complete thermal analysis of the room was conducted by the project team for deriving the key indicators for the process. Subsequently these indicators were used to calculate the amount of electricity used with and without anti solar system. The specific indicators showed us the critical areas where the resource use can be minimized without affecting the quality and quantity of production and thereby increasing the profitability of the company.

Business case

Although the RECP programme was mainly focused on reduction of resource use, but also decreases pollution to the environment, which benefits the surrounding community and builds the credibility of the industry.

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English Abstract (where applicable)
Rooms with concrete slab roofs directly exposed to the sun become unbearably hot during summer and very cold during winter. Huge amounts of energy are required to keep them comfortable. Applying thermal insulation on roofs significantly reduce energy required for heating and cooling. The effectiveness of roof insulations may be further enhanced if a layer of anti-solar coating is applied on top of the insulation. The anti-solar coating reflects most of the incident sunlight and prevents the roof from heating up. Thus avoiding the daily cycles of thermal expansion and contraction which cause cracks in the roof slabs for the rainwater to leak through. The anti-solar coating prolongs the useful life of the building structure as well as the life of the insulation that evaporates with heat. The method of application of the anti-solar coating has been specially developed to eliminate thermal bridges formed between the edges of the tiles. Through its implementation 45 Kwh of energy consumption is reduced by the end of the year and 3-4 tons of CO_2 emissions was also reduced.

ABOUT *RECP EXPERIENCES*

Through the joint Resource Efficient and Cleaner Production (RECP) Programme, the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP) cooperate to improve the resource productivity and environmental performance of businesses and other organizations in developing and transition countries. The Programme is implemented in partnership with the Global Network for Resource Efficient and Cleaner Production (RECP*net*). This series of enterprise success stories documents the resource productivity, environmental and other benefits achieved by enterprises in developing and transition countries through the implementation of RECP methods and practices.

These successes were achieved with the assistance of the National Cleaner Production Centres, which are part of RECP*net* established with support of the UNIDO and UNEP. The success stories employ the indicator set described in *Enterprise Level Indicators for Resource Productivity and Pollution Intensity*, UNIDO/UNEP, 2010. The primer with accompanying calculator tool and further case studies are available at www.recpnet.org, as well as on www.unido.org/cp and www.unep.fr/scp/cp.