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**Hoi An Eco-town Development Component
Policy Advice on Environment: Green Industry Development**



Green Industry

**Final Report on
Resource Efficiency and
Cleaner Production Programme**



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1. Introduction

Green industry (GI) is a two-pronged approach for sustainable industrial development contributing to the realization of a green economy, that is cleaner and resource efficient, in the manufacturing and related productive sectors. Firstly, GI, through the 'greening of industries' achieves on an ongoing basis reductions of use of natural resources and generation of waste and pollution in any business, including through such proven approaches as Resource Efficiency and Cleaner Production (RE-CP), industrial energy efficiency, and chemicals management. Secondly, through the 'creation of green industries', GI realizes the supply of high quality environmental goods and services in an effective and industrial manner, including for example for renewable energy, waste recycling and resource recovery, and environmental advisory services.

Three GI pilots were identified during the previous stage of the Environmental policy advice to Government of Vietnam, based on priorities set in the Ministry of Industry and Trade (MOIT) Climate Change Action Plan and building upon practical experiences of past and ongoing UNIDO technical assistance projects. These are:

1. Resource Efficiency benchmarking and GI road-mapping for steel sector;
2. Eco-Town development in Hoi An City; and
3. Sustainable crafts production and resource recovery in crafts' villages

In which the GI pilot 2 focuses on developing Eco-Town in Hoi An, is the first project in Viet Nam on Eco-city development.

The Eco-Town pilot for Hoi An is based on three main components, namely:

1. Pilot assessment of the GI potential for the craft sectors;
2. Pilot assessment of the GI potential in the accommodation sector (particularly hotels and related hospitality services, including restaurants)
3. Policy and planning support to enhance GI development of crafts and accommodation sectors and improve environmental amenity in Hoi An (through improvements in waste management, sanitation and energy)

The organisation selected to support UNIDO in carrying out Resource Efficiency - Cleaner Production and Corporate Social Responsibility (RE-CP/CSR) intervention implement of the GI Hoi An project is the Vietnam Cleaner Production Centre (VNCPC).

The objective of the RE-CP/CSR intervention project is to greenize accommodation enterprises and craft sectors, raise awareness and apply RE-CP/CSR in order to help restaurant and hotel services as well as craft sectors in reducing the usage of resources (materials, water, energy, chemical, and managing well the wastes), improve working conditions of the labors and minimize the negative effects of business activities on environment. After finishing the project, the enterprises are able to master all the skills and methodologies to assess RE-CP/CSR in their companies. At the same time, the project also established and trained RE-CP/CSR skills for the managers and technical staff under the departments, faculties and other related bodies in Hoi An city with a view to developing long time workforces after the project for local area. In addition, the project will search for financial support for the enterprises to implement some RE-CP solutions with big investment capital sources (if any).

2. Activities of the project

2.1. Training

2.1.1. Training for accommodation sector

The RE-CP/CSR training course was held on September 15 - 16 Sep 2011.

The objective of this training course is to provide participants with the basis understanding of RE-CP and CSR, as well as the RE-CP/CSR methodology to enhance managerial skills in their job in the accommodation sector.

Training content covers the following main subjects:

- Definition to Resource Efficiency and Cleaner Production (RECP) and Corporate Social Responsibility (CSR).
- RE-CP methodology.
- Introduction to 6 issues of CSR and the quick start tools of CSR.

There were 37 participants; of which 24 participants come from 16 hotels and 13 participants come from Hoi An People's Committee and organizations.

Participants's feedbacks are summarized in the below:

Evaluation form was designed in the score level from 1 to 4, "1" is the lowest score and "4" is the highest one. The participants were evaluated as below:

- | | |
|---|----------|
| • Participants' evaluation for the whole training course: | 3.59/4.0 |
| • Training materials (content, quality, print...): | 3.82/4.0 |
| • Training facilities: | 3.55 |
| • Training organization and management: | 3.82 |
| • Allocation and time among parts: | 3.77 |
| • Presentation of subject 1: Introduce to RECP/CSR | 3.68 |
| • Content and usefulness of subject 1: | 3.68 |
| • Presentation of subject 2: RECP methodology | 3.59 |
| • Content and usefulness of subject 2: | 3.55 |
| • Presentation of subject 3: 6 issues of CSR & quick start tools of CSR | 3.68 |
| • Content and usefulness of subject 3 | 3.50 |
| • Group working/ Exercises: | 2.86 |

From the feedbacks of participants, it can be concluded that the training course has met the project's training objectives.

2.1.2. Training for craft sectors

The RE-CP/D4S training course was held on September 15 - 16 Feb 2012.

The objective of this training course is to provide participants with the basis understanding of RE-CP and D4S, as well as the RE-CP/D4S methodology to enhance managerial skills in their job in the craft sectors.

Training content covers the following main subjects:

- Definition to Resource Efficiency and Cleaner Production (RECP).
- RE-CP methodology.
- D4S methodology.

There were 25 participants; of which 23 participants come from 07 craft sectors and 2 participants come from Hoi An organizations.

Participants's feedbacks are summarized in the below:

Evaluation form was designed in the score level from 1 to 4, "1" is the lowest score and "4" is the highest one. The participants were evaluated as below:

- Participants' evaluation for the whole training course: 3.65/4.0
- Training materials (content, quality, print...): 3.89/4.0
- Training facilities: 3.89
- Training organization and management: 3.78
- Allocation and time among parts: 3.83
- Introduce to RE-CP 3.72
- RE-CP methodology 3.56
- D4S methodology 3.44
- Group working/ Exercises: 2.89

From the feedbacks of participants, it can be concluded that the training course has met the project's training objectives.

2.2. Assessment activities

As project plan VNCPC carried out the full RE-CP/CSR assessment for 08 hotels and 01 laundry workshop; and RE-CP/D4S quick scan for 05 craft households (02 lantern and 03 rice vermicelli households).

2.2.1. RE-CP/CSR assessment at hotels

There are 08 hotels, of which there are 04 four star, 02 three star and 02 two star hotels, and 01 laundry workshop selected for RE-CP/CSR assessment are shown below

Table 1. The list of hotels selected for RE-CP/CSR assessment

| No | Name of hotel | Rank |
|----|--------------------------------------|--------|
| 1 | Victoria Hoi An Beach Resort and Spa | 4 star |
| 2 | Hoi An Beach Resort | 4 star |
| 3 | Hoi An Historic hotel | 4 star |
| 4 | Hoi An Pacific hotel | 4 star |
| 5 | Golf Hoi An hotel | 3 star |
| 6 | Indochine Hotel Hoi An | 3 star |
| 7 | Vinh Hung 3 hotel | 2 star |
| 8 | Thanh Van 1 hotel | 2 star |

| | | |
|---|-------------------------|--|
| 9 | Hoi An laundry workshop | |
|---|-------------------------|--|

A RE-CP/CSR team was set up in each participating hotel. The RE-CP/CSR team was consulted by VNCPC experts in RE-CP implementation in the focused areas following methodology steps. The object of this activity is to intergrate theoretical knowledge into practice, to improve the capacity of participating hotels.

The baseline data was identified basing on collected data from the book system and the actual monitored data. Energy, water, chemical and material losses were quantified. During the assessment, the waste streams were identified to be the base for the next analyses including cause analysis and suggested waste minimization options.

Table 2. Time and in-plant RE-CP/CSR assessment content

| No | Time | Content |
|----|--|--|
| 1 | 17 Sep 2011 | Hotel selection for RE-CP/CSR DEMO |
| 2 | 10 - 15/10/2011 1 st detailed assessment | Detailed assessment at the companies: - Discussion of baseline information and identification of focal area for RE-CP assessment; - Material & energy balances; Identification of importance of waste streams. |
| 3 | 5 -9/1/2012 2 nd detailed assessment | Development of CP action plan: - Cause analysis and Development of RE-CP options - Screening RE-CP options; - Feasibility studies and selection of CP measures for implementation; Development of RE-CP implementation plan. |
| 4 | 10/1/2012 | Mid-term workshop |
| 5 | 5 - 10/3/2012 Monitoring | Evaluation & sustaining CP implementation: - Monitor and evaluate changes in terms of inputs consumption and wastes generation; - Maintaining RE-CP; - Select new area or target for next RE-CP. |
| 6 | 10/7/2012 | Final workshop. |

Results of In-plant RE-CP/CSR Assessment Programme.

After the in-plant RE-CP/CSR assessment programme, participating hotels had a list of RE-CP/CSR options to implement. The respective RE-CP/CSR teams elaborated a plan, assigning key staffs of company's workshops to monitor the RE-CP/CSR option implementation and to monitor the change of resources consumption as well as generated waste to evaluate the option's efficiency.

During the implementation, hotels' RE-CP/CSR team frequently contacted with VNCPC for detailed consultancy, reference documents as well as VNCPC's specific equipment for on-site analyses and measurements.

Monthly, RE-CP/CSR team announces the consumed amount of material, electricity and water to the concerning workshops for information exchange through which the company's management board could assess the efficiency of its RE-CP/CSR programme.

A discussion was held between VNPC and the companies after the RE-CP/CSR assessment consultancy to identify implementation progress and RE-CP/CSR programme results.

The monitoring results show that participating companies have implemented most of suggested options; however some RE-CP/CSR options are now under implementation because the more fund and time are needed. The hotels have monitoring plan and they will maintain the RE-CP/CSR programme as their daily management activities.

After in-hotel assessment, it is possible to assess the water and electricity consumption in the hotel only, because some hotels do not have laundry unit, it is impossible to monitor the use of chemicals and detergents. Furthermore, some of them use underground water to serve their business which makes the data on water consumption not accurate.

Following is the data about rated consumption for the hotels :

| Hotel name | Electricity(kWh/night.room) | Water (m ³ /night room) |
|--|-----------------------------|--|
| 1.Golf Hoi An 3* hotel | 12-24 | 1.90 – 1.91 (underground water) |
| 2.Victoria Hoi An 4* hotel | No data | 1.5-5 |
| 3.Hoi An 4* beach resort | 8-15 (for 1 guest) | 0.11-0.24 (for 1 guest) (underground water) |
| 4.Indochina 3* hotel | 12-15 (for 1 guest) | 0.41-0.49 |
| 5.Pacific Hoi An 4* hotel | 7.8-15 | 0.11-0.24 (underground water) |
| 6.Vinh Hung_3 2* hotel | 7-17 | 0.35-0.42 |
| 7.Hoi An 4* hotel | 3-14 | 0.17-0.25 (underground water) |
| 8.Thanh Van 2* hotel | 3.5-5.2 | No data |
| 9.Hoi An laundry workshop | 548/ton of products | 10.93/ton of products |
| <i>Note: Rated consumption kWh/night.room ~ 1.5-2 times of rated consumption kWh/night.guest</i> | | |

Through the above – mentioned data, it is possible to see that the amount of water consumption in the hotels is considerably different because most of the data on water consumption from the hotel is not accurate. The amount of water/electricity consumption in the hotels depends much on the luxury level, the services, the number of stars, and the room area of each hotel. Regarding 4 star hotel, the amount of electricity consumption ranges popularly from 8-30 (kWh/night.guest), regarding 3 star hotel, the popular consumption amount is from 15-30 (kWh/night.guest), regarding 2 star hotel, electricity consumption popularly ranges from 5-10 (kWh/night.guest). In term of 4 star hotel, the services are very abundant, the room area is large, electricity-consuming devices are much more than 3 star hotel. However, in 2 star and 3 star hotels, the housekeeping is still very weak, there are a lot of wastes and inefficient resource consumption. There is a notable feature in 4 star hotels that most of them have good housekeeping, the facilities are modern and consume less electricity, therefore, although the room area and the amenities are larger and better than 2-3 star hotels, the amount of electricity consumption is not much different. Especially, most of the hotels in Hoi An use underground water; the water use status is very wasteful. In fact, the big difference in water and electricity consumption among the hotels is because of typical weather in Hoi An, there is two separate seasons with two different types of customers. In hot summer, the customers are almost cosmetic, in cold winter, most of them are foreigners. This typical feature explains why the amount of water/electricity consumption in the summer is much higher than in the winter.

Economic benefit

Participating hotels have gained economic benefits thanks to reduced resource consumption as well as considerably reduced waste emitted to the environment. Beside the quantifiable benefit, they also benefited from other improvements such as better service quality, better working attitude, sense of saving, sense of responsibility to the environment, etc. The important thing is, by joining the programme; hotels have changed their awareness of management and improved their technical process, service quality to achieve a higher efficient service.

Below are briefs on project's result.

Economic benefits: Participating hotels have saved 175,6 million VND due to reduced resource consumption as below (per one year):

- Water consumption: 1145 m³
- Electricity consumption: 110930 kWh
- Compact lamp: 450 blow-out lamps

Environmental Benefit

Beside economic benefits, participating hotels have also gained environmental benefits thanks to reduced waste generation to the environment. Especially, several RE-CP options are also occupational health and safety ones (OHS): to prevent the staff being exposed to high risk of death accident due to electric leakage.

Participating hotels have reduced waste discharged to the environment. The reduction for one production year is detailed as:

- Waste water: 1145 m³
- Solid waste (hazardous waste): 450 blow-out compact lamps
- Emission: 80 tons of CO₂.

In most of cases, the implemented options gave economic and environmental benefits (and sometimes OHS benefits) thus they are "WIN-WIN" options.

2.2.2. RE-CP/D4S quick assessment at craft sectors

There are 05 households, of which there are 03 rice vermicelli and 02 latern households selected for RE-CP/D4S quick assessment are shown below.

Table 3. The list of households selected for RE-CP/D4S quick assessment.

| No | Name of production household | Sector |
|----|---|-----------------|
| 1 | Nguyen Van Sang vermicelli production household | Rice vermicelli |
| 2 | Cao Van Dinh vermicelli production household | Rice vermicelli |
| 3 | Nguyen Thi An vermicelli production household | Rice vermicelli |
| 4 | Hau Ba latern production household | Latern |
| 5 | Ha Linh latern production household | Latern |

VNCPC carried out RE-CP/D4S quick assessment at 05 households from 12-16 Dec 2011.

During quick assessment, VNCPC experts interviewed and discussed with the household owner about the simple RE-CP options as well as D4S opportunities that can apply in household.

After assessment, households have basic knowledge on the concept of Resource Efficiency – Cleaner Production and some relevant issues of Design for Sustainability. 3/5 households have agreed to implement immediately simple options to save energy (electricity, coal and fuel), water and the options that improve working conditions for workers.

The application of simple RE-CP/D4S options help households to reduce energy consumption, save production cost and reduce working environmental pollution. Moreover, it also helps reduce pollution to the surrounding environment.

3. Conclusion

After more than half year joining RE-CP/CSR/D4S assessment programme, the participating hotels/craft households have achieved good results of economic benefit due to considerably reduced resource consumption and reduced waste emitted to the environment. It is concluded that RE-CP can be applied to all industries, whether they are big or small. RE-CP is the “win-win” strategy for both enterprise and environment. The continuous RE-CP implementation helps enterprise to increase its competitiveness in the market and avoid production negative affects in the environment.

RE-CP assessment is an effective tool for environmental management. Thanks to the at resource saving, the waste streams, especially hazardous waste, are minimized. As a result, it is easier to manage and to treat them.