

# **BALANCING TRADE AND ENVIRONMENTAL NEEDS – SINGAPORE’S EXPERIENCE**

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## **ABSTRACT**

As a small country, Singapore needs to pay attention to the quality of the environment, as the impact of a polluted environment will be very quickly felt by its people. This will affect the quality of life. However, environmental protection cannot be carried out at the expense of economic development, as both trade and environmental protection are mutually supportive. Several initiatives have been put in place to help our industries overcome difficulties in complying with legal and other environmentally related requirements and then to go beyond legislative compliance into waste minimisation. Singapore's approach in fulfilling our obligations under the Montreal Protocol, ISO 14000 promotion, Green Productivity Programmes and Environmental Labelling Scheme is described in this paper.

## **1. INTRODUCTION**

Singapore is an island nation of approximately 648 square kilometres. It is situated at the southern end of Peninsula Malaysia, approximately 140 km north of the equator. Its location at the crossroads of the trade routes in Southeast Asia contributes greatly to the development of Singapore as a regional centre for commerce, finance, transport and communications, and other services.

The main island of Singapore is about 42 kilometres from east to west, 23 kilometres from north to south with a coastline of 150.5 kilometres. Of the total land area, about 49.7% have been developed for residential, commercial and industrial usage and another 1.6 % used for agriculture. The rest consists of forest reserves, marsh and other non-built up areas. Singapore lacks natural resources and does not have any hinterland.

Over the past two decades, Singapore, like most countries in the region before the economic crisis, has achieved rapid economic growth. The Gross Domestic Product (GDP) reached S\$143.0 billion in 1997. Singapore's economy maintains a healthy balance between manufacturing, commerce and services. The manufacturing sector is a dynamic sector that has contributed greatly to Singapore's economic growth and employment. Nearly 23 % of the national GDP is contributed by manufacturing. Manufacturing also employs more people than any other sector; it contributes to 23 % of the employment. Within manufacturing, the sub-sectors electronics, chemicals and engineering industries contributes nearly 85 % of the manufacturing GDP.

ngapore's economy is dualistic; it has a large base of multinational companies supported by an even larger base of local Small and Medium-sized Enterprises (SMEs). SMEs play a very important supporting role, adding value to the economy and helping MNCs expand into the region. In 1993, they constituted about 92% of all establishments in Singapore and accounted for 48% of the total employment.

The SMEs in Singapore have developed and grown stronger over the years. For the manufacturing sector, their nominal value added grew from \$14 billion in 1990 to \$21 billion in 1993. Their productivity grew by 8.6%, from \$33,200 in 1990 to \$42,550 in 1993. The contribution of the local SMEs is therefore significant.

Singapore is heavily dependent on external trade. In 1997, the total external was \$383 billion. Our major trading partners are USA, Malaysia, Japan, Hong Kong, Thailand and Taiwan.

## **2. SINGAPORE'S ENVIRONMENTAL CONCERNS**

Singapore is a very small country with limited resources. Water and land are scarce and the population density (about 5,700 persons per sq km) is very high. The Singapore government realised that pollution, if not properly managed, will severely affect its people and the economy and that rapid industrialisation can be sustainable only if there is sufficient environmental protection. Therefore, Singapore has placed environmental protection high up in its agenda.

Since independence in 1965, Singapore showed concern over its polluted rivers, dirty streets, population growth and unsuitable disposal facilities. Environmental policies and strategies later appeared on the government's agenda, backed by newly established governmental institutions and a modern regime of environmental legislation. To rehabilitate polluted rivers, a ten-year Clean River campaign which started in 1977, brought back aquatic life and clean banks to the rivers. The once polluted Singapore River is now a hub of commercial activities. This is a demonstration that environmental

protection and economic growth are mutually supportive. In 1991, Singapore started an environmental labelling system to promote green consumerism and environmental friendly products.

### **3. MULTILATERAL ENVIRONMENTAL AGREEMENTS WHICH AFFECT SINGAPORE**

Singapore is a party to several Multi-lateral Environmental Agreements (MEAs). These include the International Convention on Civil Liability for Oil Pollution Damage, Convention on International Trade in Endangered Species of Wild Fauna and Flora, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and, the Montreal Protocol on Substances that Deplete the Ozone Layer. Of these, the Montreal Protocol is probably one of the MEAs that has the greatest impact on our industries. Our experience in using market-based instruments to support the implementation of the Montreal Protocol is here.

#### **3.1 The Montreal Protocol**

The electrical and electronics industry is a major industry sector in Singapore. In 1997, it contributed to 51% of the output of the manufacturing sector. Many MNCs in this sector are supported by SMEs, especially parts and components used in their manufacturing process. These parts and components have to be cleaned at some point during production and CFC-113 and 1,1,1-trichloroethane (TCA) are commonly used solvents.

Singapore, as a non-Article 5.1 party to the Montreal Protocol, was obliged to fulfil its pledge to phase out CFCs and methyl chloroform by the agreed deadlines. A series of innovative programmes was put in place to help companies achieve that objective. As a result, Singapore succeeded in phasing out CFCs and methyl chloroform in 1996. The approach adopted relied strongly on market-based and voluntary measures. It combined technical and economic incentives rather than the traditional command and control regulations.

The programmes were aimed at industries at large, irrespective of their size. However, it was the SMEs that needed the most help. Through their participation in the programmes, SMEs also managed to overcome difficulties in switching to non-ODS alternatives.

### **3.2 Programmes to encourage phasing out ODS**

Various agencies of the Singapore Government participated in a co-ordinated effort to meet the obligations under the Montreal Protocol. The Ministry of the Environment (ENV) had the overall responsibility for the legal framework and policies to curb the use of ODS. The other agencies including the Singapore Trade Development Board (TDB), the Singapore Productivity and Standards Board (PSB) and the Singapore Economic Development Board (EDB) implemented market-based and voluntary programmes to control the supply and demand for CFCs.

Non-regulatory strategies adopted are as follows:

- CFC tender and quota allocation system
- Technical Assistance and Information Dissemination
- ODS-Free Process Verification Scheme
- Financial incentives for SMEs.

#### **3.2.1 CFC tender and quota allocation system**

The tender and quota system set an amount of CFC that would be available for public tender and an amount that would be distributed based on historical use. In order to participate in the tender exercise, CFC end-users and ODS distributors were required to register and then submit bids for quantities needed. In the tender, quotas were given to the highest bidders, but the actual prices were pegged at the lowest successful tender price. This system enabled the maximum quantities of CFCs to be allocated to those users that paid the most, but at a price

that avoided unnecessary economic burden. Users who were unsuccessful in their tender bids were given a quantity based on a pro-rated share of their previous years' consumption or distribution.

This system achieved two highly desirable outcomes. Firstly, the limited supply of CFCs was only distributed to users with the highest replacement cost based on market supply and demand. Secondly, the tender created a strong market signal to encourage ODS users to switch to substitutes, conservation measures and recycling.

### **3.2.2 Technical assistance and information dissemination**

The high price for CFC brought about by the tender and quota allocation system forced CFC users to consider alternatives. To help companies in this transition, PSB provided technical consultancy services on a fee-paying basis to industries wanting to recycle CFCs or to switch to CFC substitutes.

An R&D government grant was given to PSB to set up a screening service, compatibility testing and inspection services and a recycled CFC-purity certification for the industry. PSB developed a CFC-113 recycling system that was able to regenerate CFC-113 to sufficiently high purity levels to meet the stringent requirements of disk drive manufacturers.

A reference collection containing technical information on CFC, non-CFC substitutes and alternative cleaning technologies was set up by PSB. SMEs were a major user of this reference collection. Seminars and workshops were held to disseminate alternative cleaning technologies.



### **3.2.3 ODS-free process verification scheme**

The scheme, which was modelled after the ISO 9000 scheme, was launched in 1993 by PSB. On hindsight, the ODS free process verification scheme can be looked upon as the precursor to the EMS (ISO 14001). The scheme is still in operation and continues to attract applicants.

Under the Scheme, companies and their manufacturing processes are required to undergo a rigorous ODS screening process. Firstly, companies participating in the Scheme must have an ODS free policy. The policy must be documented, understood, implemented and maintained at all levels in the organisation.

The organisation must have an effective quality system to ensure that regulated ODS are not used in the manufacturing process and that their ODS-free policy is maintained. The quality system must include a process flow chart for each specific product. Chemical used in the manufacturing process must be verified internally to ensure the ingredients do not contain regulated ODS. Declarations from the companies' suppliers are accepted. The procedures for verification must be documented. The company must also maintain a list of suppliers of chemicals, components and their ODS status. If there is a change of chemicals, components or materials used, it must be authorised by senior management and their ODS management representative.

To establish whether a company has maintained its ODS-free policy, audits on the process and materials / chemical used are conducted by PSB. Chemicals may be analysed for the presence of ODS. Following the award of the certificate, which is valid for three years, surveillance audits are conducted annually to ensure compliance with the requirements of the Scheme.

Companies, which participated in the Scheme, have found it useful. It is now easier for them to export products, especially to the USA, which has a requirement that mandates labelling of imports that were manufactured using

substances which are harmful to the ozone layer. Companies reported that the Scheme has helped them eliminate the need for multiple audits of their operations by different customers. This has resulted in time and cost savings.

### **3.2.4 Financial incentives**

The government provides financial incentives to companies seeking assistance in phasing out ODS. Under the Investment Allowance Scheme, up to 50% of the equipment cost can be offset against taxable income. In addition, the Local Enterprise Technical Assistance Scheme subsidised 50% of the consultancy cost when SME hired experts for phasing out CFCs.

## **4. INTERNATIONAL STANDARDS (ISO 14000) ON ENVIRONMENTAL MANAGEMENT**

### **4.1 Singapore's involvement in ISO / TC 207**

The ISO 14000 series of standards are being developed by a technical committee (TC 207) of the International Organization for Standardization (ISO). There are five areas of developments and these are:

- Environmental Management System
- Environmental Auditing
- Environmental Labelling
- Environmental Performance Evaluation and
- Life Cycle Assessment.

Some standards in the series have been published and many more documents are in their final stages of preparation.

The development of ISO standards is of interest to Singapore because we believe a good set of international standards on environmental management will assist our

industries improve their environmental performance. For example ISO 14000 certified companies have reported cost savings and improved environmental performance. Compliance with international standards will facilitate the export of our goods and services. The second reason for Singapore's interest is because we are mindful that these standards may become non-tariff barriers to trade. It is important that environmental management standards are developed based on sound science and engineering principles and that local environmental conditions are taken into account in the developments of such new standards.

Our interest in this area has been translated into active participation in the work of TC 207. Singapore is a participating ("P") member in all the sub-committee except the sub-committee on Environmental auditing, where we are an Observer ("O") member. Singapore experts participate actively in the working group meetings in Environmental Labelling and Lifecycle Assessment. In the 5<sup>th</sup> ISO/TC 207 meeting in San Francisco, Singapore chaired a taskforce to examine the "trade implications of ISO 14000 series of standards". Singapore also chaired a taskforce to examine the "trade impacts of a new type of environmental labelling standard which is being developed by ISO". That new environmental label is the Type III Environmental Label.

#### **4.2 Promoting ISO 14000 to Singapore Industries**

PSB launched its ISO 14000 certification scheme in 1996. To date there are more than 80 companies which are certified to ISO 14001. Of these more than 50 are certified by PSB.

The Singapore Confederation of Industries (SCI), an association of about 1,500 local industries, has been working closely with PSB in promoting ISO 14000-related activities to the industry. Various committees and groups from government and private sector were set up in the last three to five years. These included the

Environmental Management Technical Committee (EMTC) and the National Co-ordinating Committee on ISO 14000.

#### **4.3 Environmental Management Technical Committee**

Formed in 1994, the EMTC comprises members from the private sector, government and non-government organisations, with PSB as the secretariat. As the standards are being developed at ISO, EMTC tracks their progress and provides comments to ISO / TC 207 on draft standards developed by them.

#### **4.4 National Co-ordinating Committee on ISO 14000**

The National Co-ordinating Committee on ISO 14000 was formed in 1995, under the auspices of the Singapore Confederation of Industry (SCI). Its objective is to help companies in Singapore prepare for the ISO 14000 standards. To date, the committee has organised a series of ISO 14000 awareness talks and seminars for the industry. It has produced posters to encourage industry to implement EMS. A central agency has been appointed to compile a schedule of ISO 14000 related training course offered by consultants and government agencies.

### **5. GREEN PRODUCTIVITY**

The new approach is to emphasise on pollution prevention through adoption of “cleaner” methods of production, with wastes being viewed as potential resources. Cleaner production technologies promoted since mid 1980 have shifted the focus from *pollution control* to *pollution prevention*. This approach has proven to be more cost effective.

However, by considering pollution prevention separately from other manufacturing needs, such as quality improvements, pollution prevention efforts will not be sustainable. Recognising that a new balance is required to harmonise environmental protection and

economic activities, the Asian Productivity Organisation (of which PSB is a member) established a Green Productivity (GP) programme in 1994.

Green Productivity, as defined by APO, is a strategy for enhancing productivity and environmental performance for overall socio-economic development. It is the application of appropriate and well-established productivity and environmental management techniques and technologies to reduce the environmental impact of an organisation's activities, goods and services.

### **5.1 GP Methodology**

The basic concept of Green Productivity is built around *prevention of wastes and emissions at the point of generation*. Only the residue wastes that cannot be prevented need to be treated. The highest priorities are first given to source reduction, reuse and recycling activities, before 'end-of-pipe' treatment is considered. This applies to both materials as well as energy wastes. An Environmental Management System (e.g. ISO 14001) is used to sustain waste reduction initiatives.

During the implementation of GP, proven productivity and management tools such as the cause-and-effect analysis (also known as Ishikawa diagrams or "Fish Bone Diagram"), run charts for waste generation, Pareto diagrams, quality circle activities, and the Japanese 5-S method for improving shop floor productivity are employed. GP is therefore not a new set of skills to be learned; rather it is the application of well-known tools and skills to a new set of priorities.

### **5.2 Benefits of Green Productivity and its link to Environmental Management System**

The GP approach is an effective resource management tool. It can be used in the framework of an Environmental Management System (e.g. ISO 14000) by delivering the continual improvement as required by the standard. GP is also applicable for companies working toward ISO 14000 certification. Using the GP approach,

companies can put in place waste minimisation programmes first and thereafter build a formal management system to support those programmes.

By implementing GP, companies can enjoy many cost savings. Other benefits include:

- A better working environment
- Better employee participation and teamwork
- Greater job satisfaction
- Improved corporate image & responsible citizenship of organisation

The intended spillover effect is a noticeable improvement in the social environment. The goal of Green Productivity is to attain higher levels of productivity without compromising the quality of environment that serves the sustained needs of society.

### **5.3 PSB's Green Productivity Programme**

The Green Productivity Programme in PSB is managed by the Environmental Technology Centre (ETC). The programme aims to improve the productivity of industry by encouraging efficient use of energy and material resources. Activities organised under this programme include training courses, seminars, workshops, publication of best practices and demonstration projects.

## **6. THE SINGAPORE GREENLABELLING SCHEME**

Singapore's eco-labelling scheme, the Green Labelling Scheme was launched in May 1992. The objective is to raise the environmental consciousness of consumers and to promote "green" consumerism. It also encourages manufacturers to design and supply environmentally friendly products.

The Ministry of Environment administers the scheme. Criteria for the award of the right to display the Green Label on a product are set by an Advisory Committee, comprising representatives from private organisations, academic institutions and statutory boards.

Once criteria are set for a particular category of products, manufacturers, importers and retailers of that product may apply for the Green Label by submitting applications, backed by the necessary scientific and technical confirmation. The scheme is entirely voluntary.

In 1997, 125 companies were awarded the GreenLabel, bringing the total number of GreenLabel products to 653. These include paper products, batteries, detergents, washing machines, personal computers and personal care products. Details are shown in Table 1.



Logo for Green Label, Singapore's eco-labelling scheme.

## **CONCLUSION**

It is our belief that trade and environmental protection are mutually supportive and are needed to achieve sustainable development. In Singapore, we have taken several initiatives to encourage our industries to go beyond compliance to environmental legislation to source reduction of waste. These initiatives include the use of market-based instruments, provision of technical support, ISO 14000 and Green Productivity promotion, and Environmental Labelling.

**TABLE 1 : List of product categories under the Green Labelling Scheme**

Product Categories	Cumulative No. of Products Awarded GreenLabel		
	1995	1996	1997
Stationary paper	82	157	155
Hygiene Paper	69	68	65
Printing Paper	82	121	120
Office Automation Paper	87	110	111
Carbon-Zinc Battery	65	47	47
Alkaline Battery	16	29	27
Integral Compact Fluorescent Lamp	7	7	5
Modular Compact Fluorescent Lamp	14	14	0
Standard Laundry Powder Detergent	9	11	12
Concentrated Laundry Powder Detergent	3	3	3
Laundry Liquid Detergent	7	8	7
Dishwashing Detergent	13	12	11
Floor Cleaner	4	8	8
Washing Machine	38	46	18
Correction Fluid / Tape	23	24	27
Computer System Unit	23	32	32
Computer Monitor	3	5	5
<b>Total</b>	<b>545</b>	<b>702</b>	<b>653</b>



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