APO 3rd World Conference on Green Productivity APO Center of Excellence on Green Productivity: Milestone of APO movement



Urban Mining: Resource Recycling

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2013-2015 The Technical Services of APO COE GP

APO established the Center of Excellence on Green Productivity (APO COE GP) in R.O.C. in 2013. 2013 APO COE GP hosted the *Workshop on Development of Model project for Green productivity and Research on Needs Assessment of Member Countries* in Taipei

- Assess and document the extent of implementation and adoption of GP in member countries and identify emerging areas where GP needs to be focused to support member countries' needs.
- Help the COE GP and the APO in designing and implementing GP activities that are relevant and attuned to the needs of member countries, focusing on the following 4 models to provide technical services:

Center of Excellence on Green Productivity Asian Productivity Organization



Untreated e-wastes cause a serious polluted environment



- Thousands of Asia workers have been dismantling electronic trash with chisels and cutting torches since the 1980s, many cities in Asia have turned into favorite dumping grounds for e-waste from the West.
- Acid baths and open burning are commonly used to separate precious metals from circuit boards causing the serious air pollution and wasted water problems.

USA CONSUMER ELECTRONICS MATERIAL FLOWS (2009)



E-WASTE IS A HIGHLY CONCENTRATED SOURCE OF METALS



PCBs CONTAIN SIGNIFICANTLY GREATER VALUE THAN COMMERCIAL ORES



Critical, precious metals, and rare earths in electronic wastes



RARE EARTHS ARE ESSENTIAL TO HIGH-TECH AND CLEAN-TECH



- Pr 鐠: Praseodymium 鐠氧化物用於探照燈
- Tb 鋱: Terbium用於雷射
- Sm 釤: Samarium 磷光體,永久磁體
- Yb 鐿: Yttrium用於牙科,不鏽鋼
- Eu 銪: Europium 用於螢光燈

Urban Mining

- High-tech and clean-tech. are needed to improve the recycling of rare earths, and precious metals.
- **Resource Recycling = Operating an Urban Mine**
- Urban Mining/Resource recycling is the key to make our environment friendly.

Definitions and Background

- The definition of WEEE Subject to Taiwan's EPR Law.
- RRW e-waste in charge by RFMB, EPAT.



- RRW: Regulated Recycling Waste that regulated by Waste Disposal Act
- Hazardous Waste: Produced by industry that is toxic or dangerous and the concentration or volume of which is sufficient to influence human health or pollute the environment
- Under current framework, WEEE from industry is categorized as hazardous waste in disposal and import/export stages

回收基金功能與運作

Green Productivity for Green, Inclusive Development: A Commitment Todayfor a Greener Tomorrow

Recycling Management Fund Function & Operation





Due Recycled Waste Mandatory Recycling Items



Resource Recycling in Taiwan a Greener Tomorrow

Current Status of Waste Generated in Taiwan

- MSW generation per inhabitant is decreasing
- Industrial waste generation per output value is decreasing



Resource Recycling in Taiwan a Greener Tomorrow

Current Status of MSW Generated

- 1997 Four-in-one Resource Recycling Plan
- 2000 Pay-by-Bag Collection Fee System
- 2003 Zero Waste Policy
- 2005 Mandatory Garbage Sorting



Recycling Rate ↑ Waste Decrease



Resource Recycling in TaiWan

General Waste Treatment Process



1. General Waste

2. Garbage Bag Fee

3. Municipal Collection Team



4. Incinerator

5. Energy Recycle

6. Bottom Ash Recycling

Resource Recycling in TaiWan

Recyclable Waste Treatment Process



1. Recyclable Waste

2. Community Recycling Spot

3. Municipal Collection Team



4. Collector

5. Recycler

6. Recovery Material 16

Resource Recycling in TaiWan

Effectiveness of Industrial Waste Recycling



Source: IDB, MOEA, R.O.C, 2012

Resource Recycling in Taiwan a Greener Tomorrow

Resource Recycling Promoting Measures



Workshop Development of Model Project for Green Productivity

Technical Manual

Experts' Database





No.	Company	Name	Title	professional specialty
1	National Taiwan University	Hsiao-Kan Ma	Professor	E-waste
2	Nation Taipei Uni. of Technology	Tien-Chin Chang	Dean	E-waste
3	National Taiwan University	Kung-Cheh Li	Professor	Waste Recycling Policy
4	National Sun Yat-sen University	Gordon C. C. Yang	Professor	Waste Recycling Policy
5	DA.AI TECHNOLOGY Co.,Ltd	Chou-Ting Hung	Assistant General Manager	Plastic Recycling
6	Far Eastern New Century Corporation	Mr. Chun-Tien Chang	Vice President	Plastic Recycling
7	Chung Tai Resource Technology Corp.	Chun-Hsien Yeh	General Manager	Lighting eq. Recycling
8	Super Dragon Technology Co., Ltd	Guo-Tsuen Ding	Chief Technical Officer, R &D	E-waste Recycling
9	E & E Recycling, Inc.	Mr. William Sui	General Manager	E-waste Recycling
10	Wistron Corporation	Mr. Magic S C Liu	Sr. Director	E-waste Recycling
11	Solar Applied Materials Technology Corp.	Mr. Yekang Chuang	Manager	E-waste Recycling
12	AMIA CO., LTD	Mr. George Chen	Manager	E-waste Recycling
13	Sing-Way Technology Corp.	Mr. James Chang	Director	E-waste Recycling
14	KD Holding Corporation	Mr. F. H. Lee	Vice President	Investor of Recycling Construction
15	ENRESTEC Co., Ltd			Recycling System & Equipment

Technical Services of APO COE

Resource Recycling goal- Zero Waste, Total Recycle

- Municipal solid waste generated per inhabitant is 317 kg in 2012 (EU-28 499 kg in 2011), recycling rate is 55 %.
- Waste electrical and electronic equipment (WEEE) collected per inhabitant is 5.8 kg (EU 4 kg), recovery rate is more than 80%.
- Industrial waste recycling rate is more than 80%, creating USD 2.86 billion output value.
- Remanufactured products are used worldwide.



Polo Shirt of FIFA



ECO Sponge made by recycle café & plastic



Precious Metal



Glass Art

DA.AI visit





- DA.AI recommends a lot of ways to solve problems what representatives point out.
- In order to complete the life cycle of products, the company develop some recycling technology to manage the waste.

Chung Tai corp. visit



Manager of Chung Tai corp. interacts with participants and provides useful suggestions, like the recycling methods of hazardous waste.

ISSUE

Resource Recycling Scheme Promotion & Technology exporting

Plan

- Preparatory Meeting (8 days, during 6/2-6/9)
- Technical Service Exchange Activity (5 days, during 9/30-10/4)

Project Expectations

Build a platform to promote Taiwan – Vietnam cooperation and sign MOU, assist to solve waste problems in Vietnam through resource recycling scheme introduction/promotion and recycling technologies cooperation/exporting



Project Collaboration Partners

- APO & APO Agency in Taiwan and Vietnam (China Productivity Center, CPC & Vietnam Productivity Centre, VPC)
- TW Central Government: Industrial Development Bureau (IDB), MOEA, R.O.C & Environmental Protection Administration (EPA), Executive Yuan, R.O.C
- Executive Team: Taiwan Green Productivity Foundation (TGPF) & SMEs Development Support Centre 2 (SMEDEC 2)

Executive Team	Taiwan Green Productivity Foundation, TGPF		
Main Service	Green house gas reduction / Conserve energy / Recycling / Environment and energy management / Low-carbon urban community planning /Energy resources technology development		
Leader	Ms. Lan-Ping Liu, Director, E-mail : liu@tgpf.org.tw		
Contact Person	Ms. Yi-Fan Liao, Engineer, E-mail : yili0330@tgpf.org.tw		

WORKSHOP ON BUILDING AN ECO – FRIENDLY RECYCLING SOCIETY

Time	Agenda
08:00~8:30	Registration (broadcasting the documentary "Waste War"-15 min)
08:30~09:10	Opening address and remarks
09:10~09:30	MOU signature (SMEDEC 2 and TGPF)
09:30~09:40	Group photo
09:40~09:55	Coffee break (broadcasting the documentary "Waste War"-15 min)
09:55~10:15	Keynote Speech 1: Resource Recycling System of Municipal Solid Waste in Taiwan
10:15~10:35	Keynote Speech 2: New Processing Technology of Recycled Plastics in Taiwan
10:35~10:55	Keynote Speech 3: E-waste treatment technologies and achievement in Taiwan
10:55~11:30	Discussion
11:30~13:00	Lunch
13:00~	B2B



Dr. Ngo Quy Viet, Director of APO VietNam and General Director of STAMEQ



Mr. Le Ngoc Trung, Deputy Director General of MOIT for Southern Affairs



Mr. Pham Le Cuong, Director/CEO of SMEDEC 2

Green Productivity for Green, Inclusive Development: APO COE GP Resource Recycling -2014 outcome



MEMORANDUM OF UNDERSTANDING

BETWEEN

SMALL AND MEDIUM ENTERPRISES DEVELOPMENT SUPPORT CENTRE 2

AND

TAIWAN GREEN PRODUCTIVITY FUNDATION

FOR THE IMPLEMENTATION OF TECHNICAL COOPERATION ACTIVITIES

IN THE FIELD OF GREEN PRODUCTIVITY

The Small and Medium Enterprises Development Support Centre 2 (SMEDEC 2) and The Taiwan Green

Viet Nam and Republic of China (ROC) are members in Asian Productivity Organization (APO). APO is a

non-profit, non-political international partnership of Asian countries established by its member

countries to provide technical and management service to industrial, agricultural and service sectors

in order to promote economic prosperity and improve the living standards of people living in those

Whereas it is in the interest, SMEDEC 2 and TGPF shall define more details for their amicable

relationship in the light of the future framework for the purpose of contributing to the development

of productivity movement in Viet Nam, ROC and other countries in Asian and Pacific region, attached

Article I – Purpose The purpose of this Memorandum of Understanding (MOU) is to enhance collaborative partnership between SMEDEC2 and TGPF, with particular reference to encourage and promote cooperation in the field of Green Productivity development among the APO member countries, pertaining to industrial technology, technology strategy, R&D management, and technical information and training. Article II - Activities

(2) To exchange technical information and expertise in the research and development of Green

(3) To facilitate technical upgrade of scientists and engineers through exchanges of personnel on a

(4) To explore opportunities for cooperation in any other areas of mutual interests

Productivity Foundation (TGPF), hereinafter referred to as "the Parties

Considering that

to this Memorandum of Understanding;

SMEDEC 2and TGPF have agreed as follows:

(1) To carry out joint projects identified in areas of mutual interests.

countries

Productivity

mutually beneficial basis.

MOU





methods of funding on a project-by-project basis will be decided by the Parties and consistent with each Party's internal procedures. Each Party should assist implementation of the projects pursuant to its domestic laws, international laws, and to the extent that they are not inconsistent with the, foregoing, the laws of the recipient nation.

Article IV - Duration and terminatio

This MOU shall enter into effect upon signature of the Parties and remain in effect until terminated by mutual consent or by either Party giving to the other Party six months advance written-notice of termination.

Article V - Amendment

This MOU may be amended by mutual written agreement of SMEDEC 2 and TGPF. Signed in Ho Chi Minh city, Viet Nam on 01 October, 2014 in two originals in English

FOR SMALL AND MEDIUM ENTERPRISES DEVELOPMENT SUPPORT CENTRE 2



Mr. Chi Ta Chang



FOR TAIWAN GREEN PRODUCTIVITY

FOUNDATION

Deputy CEO of TGPF





SMEDEC 2 Mr. Pham Le Cuong

CEO/Director of SMEDEC 2





WORKSHOP ON BUILDING AN ECO – FRIENDLY RECYCLING SOCIETY



Mr. Tsu-Shou Cheng, Deputy Executive Secretary, EPA, R.O.C



Discussion Section



Mr. Chi-Ching Lin, General Manager of Plastic Industry Development Center



Dr. Hsiao-Kang Ma, Professor of National Taiwan University

WORKSHOP ON BUILDING AN ECO – FRIENDLY RECYCLING SOCIETY



WORKSHOP ON BUILDING AN ECO – FRIENDLY RECYCLING SOCIETY



The Exhibition Table showed expertise of Taiwan Businesses





B2B Discussion

news media



The workshop was reported on more than 15 media in Chinese, Vietnamese, or English



APO COE GP Resource Recycling -2014 outcome



Met with Deputy Director Ms. Nguyen Thi Thanh My in the Department of Natural Resources and Environmental of HCMC

Met with Deputy Director General Mr. Le Ngoc Trung in the MOIT for Southern Affairs





Technical consulting in Vietstar a Lemna Company

Technical consulting in Anh Vu Aluminum Facility

Mutual Benefits

For the ROC

- It's an opportunity for Taiwan to integrate our recycling technologies and system service abilities, and to promote our successful experience to APO members with needs through the Resource Recycling Technical Service Corps.
- Build a demonstration plant in Vietnam in a near future.

For Vietnam

- Promote resource recycling scheme be built to implement waste recycling and to increase the volume of wastes recycled in Vietnam.
- Through exporting recycling technologies to Vietnam, establishing Vietnam's ability of waste treatment, and reducing the rapid increasing waste produced by economic & population growth.

APO COE GP Resource Recycling -2014 in India

Date	Activity	Venue (city)
<u>Day1(11/17)</u>	 13:55 TAIPEI- – 16:45 BANGKOK (China Airline) 21:35 BANGKOK - JET AIRWAYS(9W 67) 	
Day2(11/18) (TUE)	 00:30 MUMBAI MUMBAI CHHATRAPATI 0935 MUMBAI -10:40 VADODARA Preparatory Meeting : APO GP Expert Mr. Bhatt/India Productivity Center, Mr. Paliwal Welcome Dinner 	MUMBAI airport Hotel VADODARA City The Gateway Hotel, Akota Gardens, Vadodara-390020
Day 3(11/19) (WED)	 Visit to Government Agencies/ Industry Sectors- PET Presentation on selected GP models: Resource Recycling, Green Energy, Green Factory, Eco-agriculture for ROC Policy and Industries Best Practices Visit to Local Resource Recycling Establishments and Institutions 	VADODARA City The Gateway Hotel, Akota Gardens, Vadodara-390020
Day 4(11/20) (THUR)	 Visit to Government Agencies/ Industry sectors -e Waste/PET recycling fabrics Industries Secretariat and GPCB(Gujarat Pollution Control Board) Seminar on COE GP Best Practice Sharing: Enhancing the Competitive Edge through Cooperation Seminar on ROC Resource Recycling Industry and Technology Sharing: Collaboration for New Business Creation on GP 4 models 11:00 Departure to GANDHINAGAR City, GUJARAT State 13:00 Arrival at GANDHINAGAR City/ Cambay Resort 	AM: VADODARA City GANDHINAGAR City
Day 5(11/21) (FRI)	 Visit to Government Agencies/ Industry sectors: -e Waste Attend to Wastech 2014 international summit and Expo 	GANDHINAGAR Gujarat State
Day 6(11/22) (SAT)	 Attending Wastech 2014 Conclusion and Discussion of Next Step with ROC and India 	GANDHINAGAR Gujarat State
Day 7(11/23) (SUN)	Departure • 0740 DEP:AHMEDABAD AHMEDABAD • 2040 ARR:TAIPEI TAOYUAN	GANDHINAGAR





Paradigm Shift towards Green Productivity For Asia-Pacific Region

