Integrated waste management and resource efficiency

1. Summary

The proposal aims to conduct strategic research on integrated waste management and resource efficiency, taking into account the following aspects: the rapid increase in waste generation along with development of the Asia-Pacific economy, internationalisation of waste issues, and the need for capacity development in developing countries.

Taking into account the rapid increase in waste generation in the Asia-Pacific region and the internationalisation of waste-related issues, the research proposal aims to propose necessary policy measures and mechanisms to address the policy needs in upstream and downstream material flows. The research focuses on i) capacity development, changing role of stakeholders, and appropriate institutional settings in developing countries, ii) capacity development from the perspective of enabling factors for governmental intervention and national and regional industrial development for recycling, iii) need for possible policy responses and international policy harmonisation to prevent a loop-hole of domestic recycling mechanisms due to the expanding international material flow, and iv) need for possible upstream policy measures including information tools targeting transnational product life cycles to secure an environmentally sound downstream material flow.

The proposal includes the following components:
1. Capacity development for a community-based approach to waste management
2. National capacity development through eco-industrial park policy
3. Regional recycling framework development
4. Upstream policy development for resource efficiency

Component 1 focuses on informal recycling activities and a community-based approach to waste management, addressing the needs for capacity development, the changing role of stakeholders, and institutional development in developing countries. Component 2, addressing the needs for capacity development of waste management and recycling at the national level, aims to identify the enabling environment for developing effective governmental interventions, such as promoting recycling-based eco-industrial parks. This component will analyse, in particular, the 10-year history of eco-town policies in Japan and the recently introduced eco-industrial park policies in the People's Republic of China and others to extract lessons for Asian developing countries. Component 3 addresses possible policy responses and international policy harmonisation to prevent loopholes in domestic recycling mechanisms through on-going international collaborative research among research institutes in Asia and Europe. Component 4 views the issue from possible upstream policy measures including information tools, targeting product life cycles to secure an environmentally sound downstream material flow and utilisation.

Both qualitative and quantitative research methods will be used, such as literature research, analysis of secondary data, interviews, and surveys in targeted countries.

This proposal intends to position IGES as a centre of policy research on integrated waste management and resource efficiency for the Asia-Pacific region. By doing so, in close collaboration with international organisations, IGES will contribute to the promotion of the 3Rs

and contribute to realising the vision of achieving more efficient use of resources in a socially desirable, economically viable, and environmentally sound manner.

2. Background/Rationale

There is a growing concern that further economic development in Asia should take a more sustainable path. In fact, in the 1990s developed countries such as the EU and Japan promoted policy concepts such as *Junkan-gata shakai* (societies based on sound material-recycling), the 3Rs (reduce, reuse and recycle), sustainable resource management, cleaner production, industrial ecology, and eco-efficiency which all focus on resource saving rather than just waste collection and disposal.

Depending on the level of economic development, countries tend to face different conditions and problems in managing their wastes and in resource efficiency. Low-income countries and communities struggle to provide their residents with basic sanitation and waste management. It can be argued that the priorities for low-income communities are improving waste collection and disposal, doing so in an affordable manner that creates jobs, and reducing poverty and promoting recycling. Recycling activities in low-income countries rely on thousands of scavengers. Middle-income and rapidly industrialising countries tend to face increasing waste generation from residents and industry. As a country industrialises, its generation of hazardous wastes tends to rise dramatically. A wealthier and better educated population also demands a cleaner environment. Middle-income countries begin to create recycling programmes, and informal recycling activities tend to diminish. Pollution prevention and improving the infrastructure for waste collection and disposal become priorities for middle-income countries. Developed countries have adequate human and financial resources, as well as infrastructure for dealing with their waste. Stringent government regulations and opposition from residents to the siting of waste processing or disposal facilities drive up the cost of disposal. Under these conditions, maximising recycling and resource efficiency become high priorities for higher-income countries. International trafficking of industrial materials containing hazardous substances has been exacerbating problems in waste management in less developed countries. This proposal addresses some of the most pressing issues for a wide variety of conditions that Asian countries face. Integrated waste management encompasses all aspects of waste management, from waste prevention, reuse and recycling, to collection, storage, composting, incineration and final disposal. Thus, integrated waste management includes both the 3Rs and conventional waste management. Also, from the point of view of resource efficiency and environmental risk management in global product life cycles from resource extraction to disposal, “concerns in upstream material flow” such as risk management of hazardous materials in the design stage, design for recycling, or waste management and hazardous substances management in the production stage, and “concerns in downstream material flow” such as a shortage of landfill sites, illegal dumping and trade in waste, improper recycling practices, or environmental and health hazards of recyclers will be merged.

Due to rapid economic development and integration, the following are some of the most pressing issues in developing counties in the Asia-Pacific region:

- rapid increase in waste generation
- internationalisation of waste and recycling-related concerns with expansion of international material flow
- environmentally unsound waste management practices.

Rapid increase in waste generation alongside development of the Asia-Pacific economy

Asia faces serious problems in managing its waste. Asia’s population growth and dynamic

economies will put additional pressure on waste management systems already unable to meet current needs. It is estimated that Asia's urban population will increase from a current 1.5 billion to 2.5 billion by the year 2020. Asia already spends about US$25 billion per year on solid waste management, which will double by the year 2025. Despite these expenditures, most cities in the developing countries of Asia do not collect all waste generated. In some cases, less than 50% of waste is collected. Even when waste is collected, the most common disposal method is open dumping. Open dumps lack any pollution control measures. Insufficient collection and inappropriate final disposal of waste create water, air, and land pollution, and pose significant risks to human health and the environment. As Asia consumes more and more resources, such as energy, water, and materials, due to its economic development, efficient and sustainable use of resources and materials has increasingly become a key issue to mitigate the environmental impacts of mass production, consumption and waste.

Internationalisation of waste and recycling-related concerns along an expanding international material flow

However, the shift in policy discourse on waste management from collection and disposal towards more efficient resource use has highlighted the need for policy measures that address globalisation of downstream material flows and integration of both downstream and upstream policy concerns (design for environment (DfE), sustainable production, and so on). International trade in recyclables can be beneficial to both buyers and sellers, but developing countries are concerned that this trade can be abused and that developed countries could dump wastes and obsolete items on developing countries. Research is needed to find ways to facilitate trade while preventing the dumping of wastes in developing countries. The increasing global flow of post-consumed materials and goods (secondary materials) should be understood as an example of the structural change that is taking place in the economic relations among developed and developing countries due to rapid economic development and integration. Developed countries have experienced a rapid increase in the recovery of recyclables due to successful implementation of recycling-related legislation but also have a lowered demand for recyclables due to the shift in location of manufacturing industries from developed countries to the Asian developing countries. The corresponding increase in demand for recyclables in developing countries parallels the improvements in their export-oriented economies. This leads to increased international flows of post-consumed materials and goods and negative environmental impacts from inappropriate recycling processes in the recipient countries. Indeed, resource extraction, production, distribution, consumption, recycling and final disposal are taking place along a global supply chain across national borders. Without taking into account international flows, policies on resource efficiency and waste management may not work efficiently.

Need for capacity development in developing countries

From the viewpoint of developing countries, conventional waste management (waste collection, transportation and final disposal) may be a more urgent concern than the 3Rs or material circulation and resource productivity. However, it is not enough to secure sanitary waste management. National capacity building on recycling is crucial for raising international resource productivity. Recently, resource prices have risen due to the high demand for resources in China and other East Asian developing countries, and this contributes to market-based recycling at the international level. Recycling in developing countries relies on the informal recovery of materials carried out by waste pickers. This proposal hypothesises that the informal sector can contribute towards a more efficient use of resources, as well as contributing to poverty reduction and a more competitive economy. However, considering such labour intensive and marked-based recycling which depends on relatively cheap labour and high profits from resource recovery without taking into account external costs such as environmental and health damages, this form of recycling may not be sustainable (from both economic and environmental points of view) in countries which have experienced rapid economic development and better living

standards. As many developing countries in Asia such as China, Thailand and Malaysia are rapidly becoming middle-developed countries (a transition that Republic of Korea and Singapore experienced more than a decade ago), it will be necessary to develop infrastructure and policy measures for improving recycling capacity by appropriate governmental intervention as well as environmentally sound waste management. The form of governmental intervention also needs to be clarified.

Responding to the pressing issues, it is very important for developing countries to identify the necessary policies and mechanisms for i) capacity development at the community level for recycling, ii) national industrial development for recycling, iii) international policy harmonisation to prevent loopholes in domestic recycling mechanisms due to expanding international material flow, and iv) harmonisation of upstream policy measures including information sharing systems targeting transnational product life cycles.

3. Goals and objectives

Overall Goal:

- to establish environmentally sound material flows and to realise sustainable production and consumption in the Asia-Pacific region

Overall objectives:
The project aims to identify the necessary upstream and downstream policy measures by conducting strategic research in response to specific policy needs generated by the drastic increase in waste generation in the Asia-Pacific region and the internationalisation of waste issues.

The specific objectives of each component follow:

Component 1:Capacity Development for Community-based Waste Management

- to identify appropriate governmental intervention and institutional settings for capacity development in response to changing roles of related stakeholders in recycling and solid waste management along with socio-economic development trends in developing countries
- provide useful inputs to national strategies for capacity development

Component 2: National Recycling Capacity Development through Recycling-oriented Eco-industrial Park Policy

- to identify an appropriate enabling environment for improving waste management and recycling capacity, focusing on recycling-oriented eco-industrial park policies
- to establish efficient and self-sustained nationwide material recycling mechanisms
- provide useful inputs to national strategies for capacity development

Component 3 Regional Recycling Framework Development

- to identify deficiencies in current regulatory frameworks and market mechanisms which prevent effective domestic recycling mechanisms
- to identify enabling factors in the application of the Extended Producer Responsibilities (EPR) scheme in developing countries in the Asia-Pacific region in order to mitigate environmental pollution and health hazards stemming from inappropriate waste management and disposal and to enhance environmentally sound material flows and

resource efficiency in product life cycles

Component 4: Upstream Policy Development for Resource Efficiency

- to identify the major impacts on global supply chains of electric appliances in the Asia-Pacific region caused by introduction of chemical product policies such as REACH and RoHS in EU.
- to establish necessary policy measures including information sharing systems so that developing countries in the region can harmonise upstream policies and secure environmentally sound material flows and resource efficiency, focusing upon the product life cycle management of electric appliances.

4. Expected outcomes

The following research outcomes are expected from each component.

Component 1: Capacity Development for Community-based Waste Management

The component is expected to:

- identify appropriate governmental intervention and institutional settings for community-based waste management systems in developing countries.
- demonstrate that community-based systems can be a part of socially desirable solutions to the seemingly intractable problem of collection and disposal of solid wastes in developing countries.
- establish a template and mechanism to facilitate the sharing, dissemination, and use of lessons learned from this research component.

Component 2: National Recycling Capacity Development through Recycling-oriented Eco-industrial park policy

The component is expected to:

- identify enabling factors in the establishment of self-sustained, recycling-based eco-industrial parks in developing countries
- develop policy guidelines to establish appropriate nation-wide material recycling networks

Component 3 Regional Recycling Framework Development

The component is expected to:

- identify lessons learned from 3Rs experience in Japan and Germany and the pilot project on a bilateral recycling network between Japan and China, which may be useful in establishing appropriate recycling and waste-management mechanisms for developing countries.
- establish an impact assessment method for regional material recycling and flows
- identify potential impacts of regional material recycling and flows
- develop policy guidelines for the application of Extended Producer Responsibilities (EPR) scheme to developing countries, taking international aspects into consideration

Component 4: Upstream Policy Development for Resource Efficiency

The component is expected to:

- establish methods to assess the impact of REACH implementation on the global product supply chain of electric appliances
- develop guidelines for harmonised policy measures and a framework for an information sharing system in the region, focusing on product life cycle management of electric appliances
- develop regional collaboration schemes in Asia, particularly, among China, Republic of Korea and Japan on chemical management policy

Each component will provide inputs for the following policy dialogues and expert workshops in which IGES will be involved.

- East Asia and Southeast Asia 3R Expert Workshop (recommendations on trans-boundary movement, EPR, and national strategy making in developing countries), February 2007
- ADB/IGES 3R Asia Report (recommendations on regional cooperation, resource efficiency, and investment perspectives), May 2007
- 3R Action Plan for the G8 (drafting the action plan in collaboration with MOEJ), from 2007-2008
- International Conference on German-Japanese Cooperation and Mutual Learning Processes in the field of 3Rs, co-organised by MOEJ, BMU, Wuppertal Institute, and IGES
- In collaboration with UNCRD and UNEP, support in developing national 3R strategies for several developing countries, including Thailand, Philippines, Viet Nam, and Indonesia.
- In collaboration with JICA, work toward the preparation of Mexico's national strategy for the 3Rs
- Tripartite Environment Ministers' Meeting (TEMM), 9 November 2007

5. Research questions/assumptions/hypotheses

Overall assumption/hypotheses

1) Waste management, resource efficiency, and recycling related issues are no longer purely local or domestic policy matters but are increasingly issues related to international political economies and expanding international material flows.
2) The efficiency of recycling systems in Asian developing countries can be improved by government intervention.
3) Further economic integration in East Asia and Southeast Asia will lead to calls for regional and international policy harmonisation in the area of waste management and resource efficiency.

Overall research questions

1) How should we respond to the rapid increase in waste generation in the Asia-Pacific region?
2) Without regional policy harmonisation mechanisms in the Asia-Pacific region (unlike the EU), how can developing countries respond to the internationalisation of waste and recycling-related issues?
3) What kind of policy approaches can facilitate capacity development for implementation of environmentally sound waste management and sustainable material circulation in the Asia-Pacific region?

Component 1: Capacity development for a community-based approach to waste management

a. Research questions

- Considering the shortage of financial and institutional capacity of local government in developing countries, are there any effective ways to introduce environmentally sound waste management and recycling practices, taking into consideration poverty reduction?

b. Hypothesis

- Collaborative approaches between local governments and communities such as community participation and multi-stakeholder involvement in waste management and

recycling can facilitate environmentally sound waste management practices and poverty reduction in urban environments.

Component 2: National Capacity Development through Eco-industrial Park Policy

a. Research questions

- As Asian countries have diverse social and economic conditions, is Japan's experience in eco-town policies directly transferable to developing countries?
- What kind of approach and policy measures need to be considered to establish efficient and self-sustained recycling-based eco-industrial parks?

b. Hypotheses

- The concept, scale and development approach of recycling-based eco-industrial park are largely site specific and determined by social and economic conditions.
- In order to develop efficient and self-sustained recycling-based eco-industry parks, close collaboration among various stakeholders is important. Networking among eco-industrial park communities and entrepreneurs is a powerful determinant factor in successful development.

Component 3: Regional Recycling Framework Development

a. Research questions

- Can domestic policy prevent the global market for reusable products and recyclable materials from affecting negatively the domestic recycling industry?
- As EPR is considered to be a major approach for governmental intervention in recycling policy and a cost sharing mechanism for recycling and waste management, what are the major problems regarding EPR application in developing countries, especially in an international market? What are the enabling factors in EPR harmonisation among different economies facing globalised product life cycles?

b. Hypothesis

- Without taking international material flows into consideration, the effectiveness of domestic recycling mechanisms will be disrupted.
- Taking into consideration the gaps in recycling and waste management mechanisms between developed countries and developing countries, the EPR scheme needs to be harmonised with step-wise regulatory and institutional arrangements and regional cooperation schemes such as technology transfer and cost sharing systems among them.

Component 4: Upstream Policy Development for Resource Efficiency

a. Research questions

- Manufacturers in Asian countries, especially those that export their products to the EU, need to respond to REACH. Are there any other ways in which the global product supply chain in Asia can survive, without harmonisation with REACH?
- In order to improve recycling and waste management, what kinds of information have to be shared? How should the information sharing be secured?

b. Hypothesis

- Manufacturers in Asian countries, especially those that export their products to the EU, need to respond to REACH. However, they do not have to harmonise their chemical product policies with REACH. Rather, they may find a better way to create regional harmonisation of chemical product policies in Asia in order to survive amidst global competition.
- Information sharing on substances in downstream articles can secure appropriate

responsible sharing from the viewpoint of product life cycle management and facilitate appropriate waste management and recycling downstream.

6. Research Components

Component 1: Capacity development for a community-based approach to waste management (30 person months)

This component addresses how to involve various stakeholders, in particular the informal recycling sector, to improve waste management and resource efficiency in developing countries. It focuses on the changing roles of stakeholders and appropriate institutional settings alongside economic development in developing countries for capacity development, and builds on the current joint project with Kitakyushu University related to this topic. The component will include case studies and will conduct the following research activities on: 1) analyses of successful practices in various countries such as Cambodia, China, India, Indonesia, Philippines, Sri Lanka, Thailand and Viet Nam, and 2) identification of lessons learned from those case studies.

Component 2: National capacity development through eco-industrial park policy (24 person months)

This component addresses the policy-relevant concerns relating to industrial development and institutional capacity for recycling at the national level in response to drastic increases in domestic waste generation and recyclable materials trade, and builds on the ongoing research which includes evaluation of Japanese experiences of eco-town policies, especially in Kitakyushu City. This component will include research on 1) evaluation of eco-industrial park policies in other countries and 2) assessment of the transferability of Japanese experiences to other Asian countries. This component ultimately aims to identify an important enabling environment for eco-industrial park policies applicable to the different socio-economic conditions of developing countries. Target countries include Thailand and Taiwan in addition to China (Tsingtao and Tianjin) which are currently being studied in collaboration with Kitakyushu University.

Component 3: Regional recycling framework development (30 person months)

This component addresses policy-relevant concerns relating to regional and global recycling networks and builds on the RISPO-II project which is currently being conducted in collaboration with research institutes such as McGill University, TEI, KEI and NIES. This component aims to identify what kinds of mechanisms are necessary to establish a regional recycling network and includes 1) comparative analysis of 3R related policies in Japan and Germany, 2) factor analysis of a pilot project on a bilateral network development between Kitakyushu City and Tianjin, and 3) examination and assessment of the effectiveness and institutional capacity for introduction of an EPR scheme for end-of-life vehicles or WEEE in China, Republic of Korea, Thailand and Viet Nam.

Component 4: Upstream policy development for resource efficiency (30 person months)

REACH is one of the representative product policies and is expected to have serious impacts on global supply chains although it is only a regulation within EU. In particular, the developing countries in the Asia-Pacific region, which are production bases for global supply chains but do not have well developed chemical management policies, may be considerably affected by REACH implications. This component aims to identify the possible ways of harmonising the chemical product policies (CPPs) of developing countries, focusing upon global supply chains of electronic appliances. This component will conduct the following researches:

1) trend analysis of major chemical product policies,
2) impact assessment on global product supply chains due to REACH implications, and
3) analysis of possible ways to bring about regional harmonisation of chemical product policy.
Target countries include China, Republic of Korea, Japan, Viet Nam, and Thailand, taking into account the levels of chemical management policy and economic development.

7. Methodologies

The following methodologies will be used for each component.

Component 1: Capacity Development in Community-based Waste Management

- The case studies have already been identified and some information has been gathered based upon the field surveys in countries such as Cambodia, China, India, Indonesia, Philippines, Thailand and Viet Nam. In order to obtain more detailed information, additional case studies in those countries will be conducted through research networks of the APFED NetRes..
- All of these case studies should include a strong community-based component and the data and information on each case study will be gathered through a personal field visit to each programme, using participant observation, and in-depth interviews.
- Analysis of the information will proceed when the questionnaires are returned. Univariate, bivariate and multivariate analysis of the data collected by the survey will be conducted. Detailed information will be presented for the programme, as well as summary results, conclusions, and policy implications.

Component 2: National capacity development through eco-industrial park policy

1) Literature survey: detailed information on challenges, obstacles and successful factors in eco-industrial park policies in China (Tsingtao and Tianjin),Thailand, and Taiwan will be collected
2) Focus group interviews: to supplement the literature survey, interviews with local government, industries and communities will be conducted
3) Comparative analysis of the different eco-industrial parks in different cities such as China (Tsingtao and Tianjin), Thailand and Taiwan, in collaboration with research institutes in the target countries.

Component 3: Regional recycling framework development

- Literature survey on EPR policies
- Policy analysis focusing on possible barriers, enabling factors and impacts of the introduction of EPR mechanisms for end-of-life vehicles or Waste Electrical and Electronic equipment (WEEE) in China, Japan, Thailand, and Viet Nam. Under RISPO-II, a collaborative international research group was formed composed of Hanoi Institute of Technology of Viet Nam, TEI of Thailand, PRCEE/SEPA of China and IGES of Japan in 2006. For this collaborative research, unified policy analysis methodologies through modifying strategic environmental policy assessments have been developed by IGES (2006-2007)
- Comparative policy analysis of Japanese and German 3R-related policy in collaboration with Wuppertal Institute. Wuppertal Institute will analyse the case of Japan through information and data provided by IGES. IGES will analyse the German case through information and data provided by Wuppertal Institute (2006-2007). Using the experiences of two countries in advanced and comprehensive mechanisms for recycling and waste management, lessons learned will be distilled and disseminated. Also, international trade-related loop-holes and possible regional responses to the issue will be identified

through their experience dealing with neighbouring countries and regions.

- Analysis focusing on possible regional policy harmonisation. Causal Chain Analysis of recycling flows has already identified that decreasing secondary resource demand in developed countries and increasing demand in developing countries can lead to mechanisms of global trade working as loop-holes in domestic waste/recycling mechanisms. The existing information will be used and trend analysis and the national policy analysis mentioned above will be conducted in addition to informal discussion groups.
- Impact assessment on regional material recycling will be conducted to identify environmental, resource efficiency, and economic benefits.
- Focus groups interviews regarding i) EPR schemes in Japan, ii) bilateral framework model development between Kitakyushu City and Tianjin (China), and iii) 3R policy in Germany will be conducted. Since this is an issue of policy approach itself, informal discussion groups will be formed by UNESCAP and IGES to discuss the possible introduction, barriers to, and trends in EPR in East Asia. The first meeting was held on February 14, 2007.
- Collaborative examination and assessment of the effectiveness and institutional capacity for introduction of EPR schemes for end-of-life vehicles or WEEE in China, Republic of Korea, Thailand and Viet Nam to identify what mechanisms are necessary to supplement domestic EPR-based policies (2007-2008).

Component 4 Upstream policy development for resource efficiency

- Literature survey will clarify challenges, obstacles, and enabling factors for the harmonisation of chemical product policies
- Focus group interviews to supplement the literature review interview and questionnaire survey of governments and electric appliance manufacturers in those countries will be conducted
- Impact assessment of REACH implications: using assessment methods such as key indicators, which will be developed in the initial stage, will identify major impacts on the economy, society, and environment of developing countries, especially focusing upon global product supply chains of electric appliances in the Asia-Pacific region
- Comparative analysis of the chemical management systems will be conducted by targeting countries to clarify differences and commonalities among the regulatory frameworks such as targeting of hazardous substances, registration rules, and processes of targeting hazardous substance. Risk assessment methods and trends in chemical management systems will also be dealt with.
- Policy dialogue: will discuss and develop regional collaboration schemes on chemical management policy development among China, Republic of Korea, and Japan

8. Four Criteria[1]

8a. Policy relevance

It is considered that all components in this proposal are relevant to various on-going policy processes.

IGES is an integral part of the Group of 8 industrialised countries (G8) 3Rs Initiative, coordinating the efforts of MOEJ and various international organisations, such as ADB, UNCRD, and UNEP. This proposal integrates and incorporates several components that address the most pressing issues in the implementation of integrated waste management and the 3Rs. The proposal includes strategic research on integrated waste management and resource

[1] See pages 8-11 of "Integrative Strategic Research Program of IGES for the Fourth Phase" (IGES/Inf/FY2006/3)

efficiency from the community level to the international level, and from analysis of upstream issues to improving reuse and recycling activities, and poverty reduction.

In addition to their relevance to the 3Rs Initiative, they are also relevant to green growth, sustainable consumption and production, and relevant to achieving the Millennium Development Goals related to poverty reduction, improvement of slums and protection of human health and the environment.

8b. Added value

Considering the available expertise in terms of human resources at IGES, this proposal could provide added value by building up IGES as a key research centre for integrated waste management and resource efficiency in the Asia-Pacific region.

There are few institutions that conduct strategic research on the implementation of the 3Rs in the Asia-Pacific region. By working with our international partners, IGES can certainly play this role successfully and fulfil this need.

8c. External Funds

In FY 2007, external funds are expected to be provided from various sources such as the 3R Initiative, SAICM, REACH-related funds from MOEJ, as well as Kitakyushu Initiative-related funds from Kitakyushu-city.

IGES has applied to other external funds such as the Waste Management Scientific Research Fund.

8d. Regional/international context

The proposal focuses on the Asia-Pacific region, analysing the most pressing issues related to waste management, resource efficiency and implementation of the 3Rs in the region.

9. Timeline of activities

Component	FY 2007	FY2008	FY2009
Capacity development for a community-based approach to waste management	- Field surveys (Cambodia, China, Thailand, and Viet Nam) - Analysis of successful and transferable local initiatives	- Field surveys (Indonesia, India, Philippines and Sri Lanka) - Analysis of successful and transferable local initiatives	- Comprehensive analysis of the collected case studies - Compilation of research results
National capacity development through eco-industrial parks policy	- Literature survey on eco-industrial parks in China (Tintao and Tianjin) and in Thailand and Taiwan in collaboration with research institutes in target countries - Focus group interviews with local governments, industries, and local communities in the target countries	- Comparative analysis of the different eco-industrial parks in different cities in collaboration with research institutes in the target countries. - Focus group interviews with local governments, Industries, and local communities - Factor analysis to identify enabling factors or obstacles regarding eco-industrial parks	- Development of policy guidelines for eco-industrial park development in developing countries
Regional recycling framework development	- Literature survey of EPR policies - Development of impact assessment methodology for regional material recycling in the light of environment, resource efficiency, and economic benefit. - Focus group interviews with local government, manufacturers and communities on EPR schemes, the pilot project on a bilateral framework model and 3R policy in Japan and Germany. - Factor analysis to identify enabling factors or obstacles regarding the	- Impact assessment of regional material recycling in the light of environment, resource efficiency and economic benefit. - Factor analysis to identify enabling factors or obstacles regarding a region-wide network - Collaborative examination and assessment of the effectiveness and institutional capacity for introduction of EPR mechanisms for end-of-life vehicles or WEEE in Republic of Korea and Viet Nam. - Conduct feasibility study of above	- Conduct feasibility study of above policy proposal based on the study in FY 2007 on international recycling framework and applicability of EPR in the context of transnationalised product life cycle - Development of policy and institution framework for framework development in Asia

	pilot projects on bilateral framework model development between Kitakyushu City and Tianjin, (and between Japan and Germany) - Collaborative examination and assessment of the effectiveness and institutional capacity for introduction of EPR mechanisms for end-of-life vehicles or WEEE in China, Japan, Thailand	policy proposal based on the study in FY2007 on international recycling frameworks and applicability of EPR in the context of transnationalised product life cycles	
Upstream policy development for resource efficiency	- Literature survey on chemical management and chemical product policies in the target countries including China, Republic of Korea, Japan, Viet Nam and EU, USA and Canada - Focus group interview on governments and electric appliance manufactures in targeting countries in Asia including China, Republic of Korea, Japan, Thailand and Vietnam to supplement the literature survey - Comparative analysis on the chemical management systems: will be conducted on the targeting countries to clarify differences and commonalities among the regulatory frameworks and information sharing systems such as target hazardous substances, registration rules and processes of target hazardous substances, and risk assessment methods etc.	- Impact assessment of implications of REACH on the four countries （China, Republic of Korea, Japan Thailand and Viet Nam） - Comparative analysis on the different chemical management systems in the four countries - Factor analysis to identify enabling factors or obstacles for policy and institutional harmonisation and developing information sharing system	- Development of information sharing system framework - Development of policy guidelines for chemical product policy harmonisation in the target countries in Asia - Development of collaboration schemes for policy and institution development among China, Republic of Korea and Japan

- Development of impact assessment methods of REACH implication to the targeting countries in Asia focusing upon global supply chain of electric appliances.
- Collection of information and data necessary for the impact assessment
- Policy dialogues among China, Republic of Korea and Japan