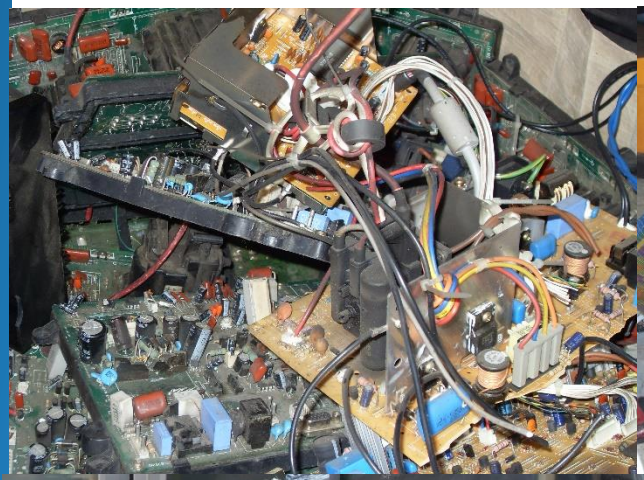
E-waste Programme at IETC
Capacity Building for Management of ULABs




Mushtaq Ahmed MEMON Programme Officer, UNEP - IETC

Overview

- E-waste Management Scenario
- E-waste Programme at IETC
- Pilot Project on E-waste Management Plan
- Designing a Pilot Project for ULABs Management Plan

Innovative Policies and Programmes

20th CENTURY

WASTE MANAGEMENT

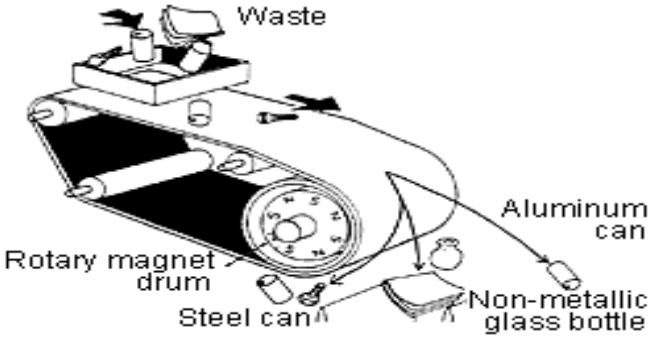
"How do we get rid of our waste efficiently with minimum damage to public health and the environment?"

21st CENTURY

RESOURCE MANAGEMENT – CIRCULAR ECONOMY

"How do we handle our discarded resources in ways which do not deprive future generations of some, if not all, of their value?"

Source: Dr. Paul Connett, Zero Waste, Power Point



Metals Life Cycle and E-waste

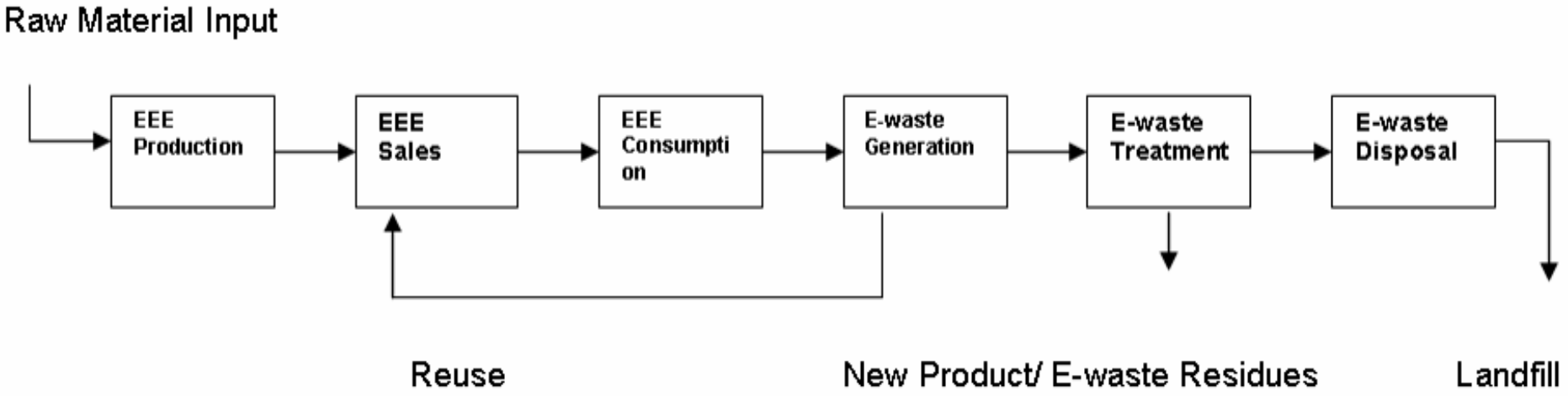


Figure 3.3: Conceptual Life Cycle of Electrical and Electronic Equipment

1. EEE production: import/ manufacturing of EEE
2. EEE sales
3. EEE consumption (stock)
4. E-waste generation
5. Re-use / down cycle
6. E-waste treatment/ Re-cycle
7. Secondary raw material / disposal

Metals Life Cycle – Recovery Stages

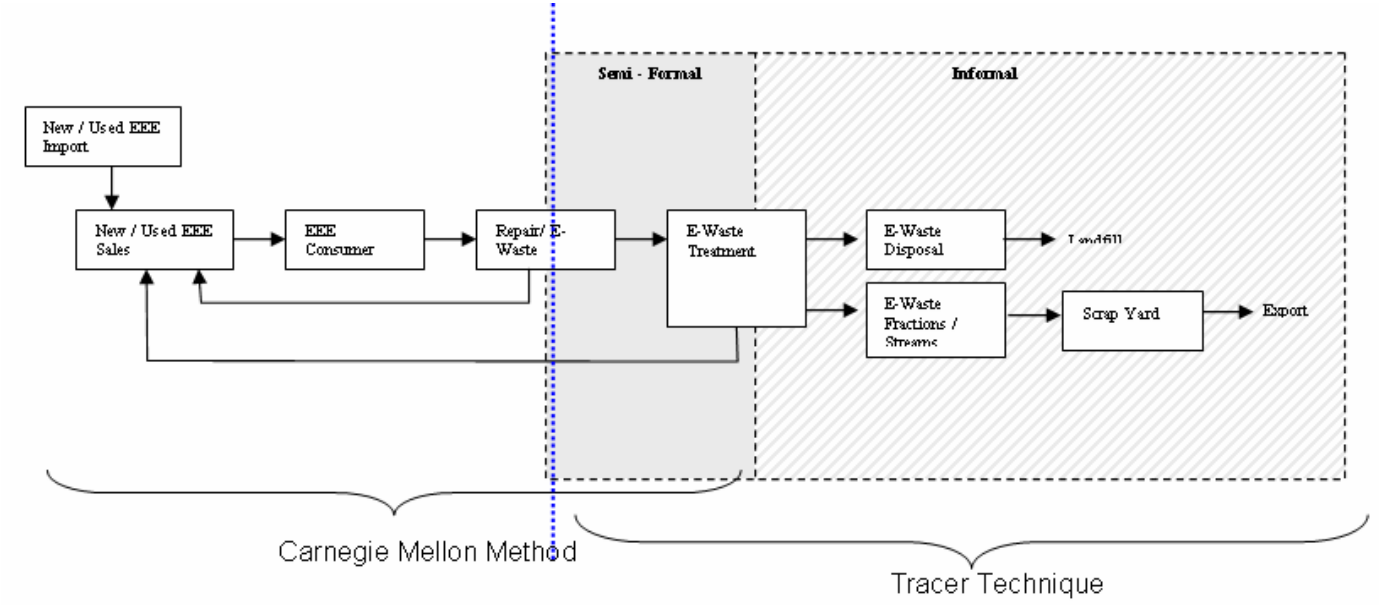
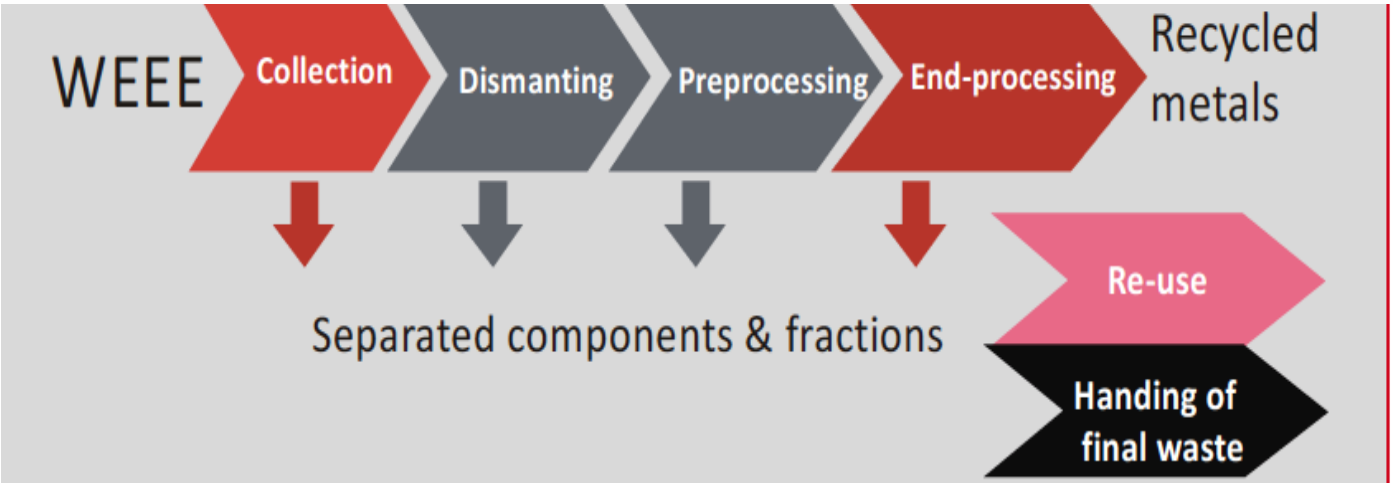
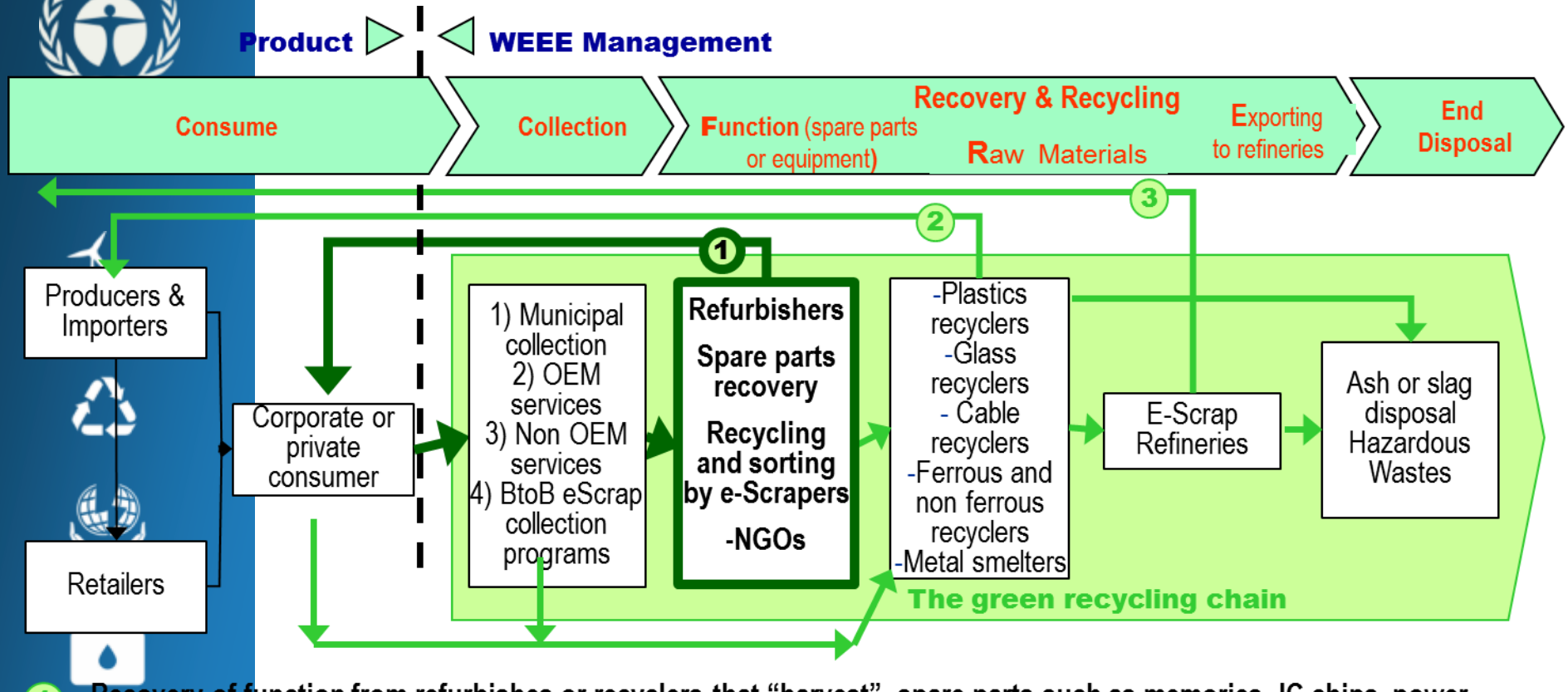


Figure 5.1: Application of two methodologies in the E-waste trade value chain



Source: Recycling – From E-waste to Resources: Sustainable Innovation and Technology Transfer Industrial Sector Studies, UNEP, 2009

Scrap-chain in Developed Countries



1. Recovery of function from refurbishes or recyclers that "harvest" spare parts such as memories, IC chips, power supplies, batteries, etc.
2. Raw material recyclers : get ferrous scrap for iron/steel smelters; plastics for extruders; copper/aluminum and other base metals processors or smelters
3. Base and precious metal refineries

Adapted from EMPA

Urban Mining – Metals Recovery

weight-%	plastics	Fe	Al	Cu	Ag [ppm]	Au [ppm]	Pd [ppm]
TV-board	28%	28%	10%	10%	280	20	10
PC-board	23%	7%	5%	20%	1000	250	110
mobile phone	56%	5%	2%	13%	3500	340	130
portable audio	47%	23%	1%	21%	150	10	4
DVD-player	24%	62%	2%	5%	115	15	4
calculator	61%	4%	5%	3%	260	50	5

value-share	Fe	Al	Cu	Ag	Au	Pd	sum PM
TV-board	4%	10%	50%	7%	22%	7%	36%
PC-board	0%	1%	18%	5%	61%	15%	81%
mobile phone	0%	0%	9%	13%	64%	14%	91%
portable audio	2%	0%	82%	3%	10%	2%	15%
DVD-player	13%	3%	42%	5%	32%	5%	42%
calculator	0%	5%	14%	7%	69%	4%	80%

<1%	1-10%	10-20%	20-50%	50-70%	>70%

Prices of Oct. 2006

Metals Recovery Landscape

IETC Programme on WEEE / E-waste Management

Approach → Regional training workshops for national and local stakeholders

- Normative → Trainings for local project teams
- Demonstration Projects at City / Municipality Level:

- E-Waste Inventory
- Situation Analysis of Present E-Waste Management System
- Target Setting and Identification of Issues of Concern
- Development of E-waste Management Plan
- Awareness Raising, Training and Public Dissemination
- Capacity building on development of specific activities / projects for E-waste management

Activities (2007~):

- Normative: Three manuals on E-waste (E-waste inventory, E-waste management system, and take-back system), regional training workshops and policy dialogues – Compendium of technologies (under consideration) and disposal of counterfeit goods (led by CAP/OzonAction UNEP, Bangkok)
- Demonstration Projects: Phnom Penh – Cambodia

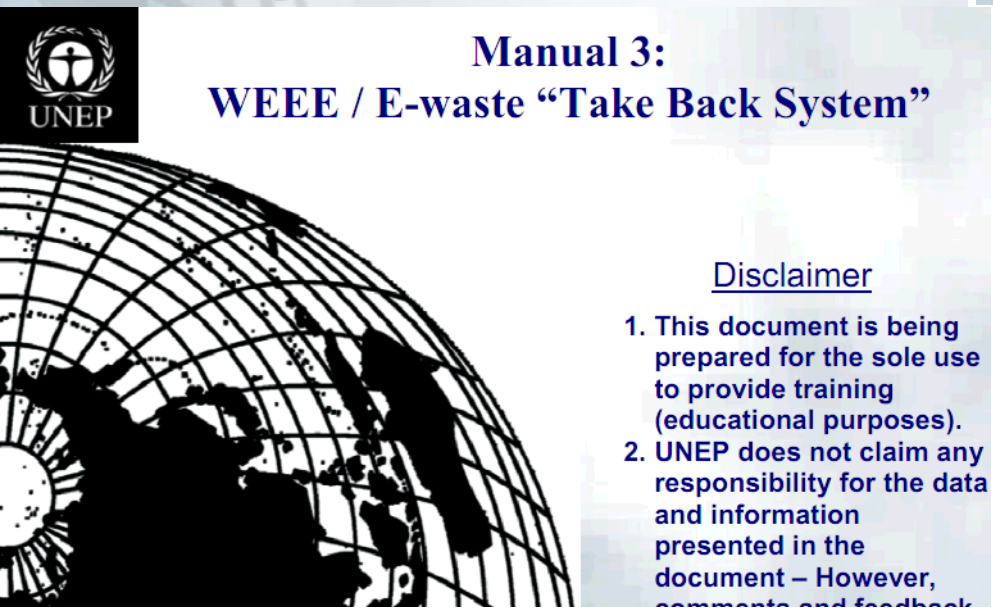
IETC' Support on E-waste Mangement

- Project team-building and training
- Awareness raising and political/community support
- Baseline reports on
  1. E-waste(quantification and characterization with future trends)
  2. Assessment of current E-waste management system (institutions, policies, financing, infrastructure and technology and stakeholder roles)
- Target setting for E-waste
- Stakeholders' concerns (environmental, economic, social and technical) for meeting the targets
- E-waste management plan with detailed actions (policy, technical and voluntary)
- Training and demonstration activities from E-waste management plan

Step 1 - Training Materials

http://www.unep.or.jp/Ietc/Publications/spc/EWasteManual_Vol1.pdf

http://www.unep.or.jp/Ietc/Publications/spc/EWasteManual_Vol2.pdf



Case studies: experiences/lessons learned

Compendium of technologies

http://www.unep.or.jp/IETC/SPC/news-jul11/UNEP_Ewaste_Manual3_TakeBackSystem.pdf

Workshop on Take Back System

In order to support development of policy framework and capacity building on WEEE/E-waste at national and local level, a training workshop on WEEE/E-waste management was held in Osaka, Japan, on 13-15 July 2011. This workshop was attended by national governments, international organizations, the private sector and civil society. The outcome of the workshop identified a need to build the capacity and policy framework on WEEE/E-waste “take back” system and financial mechanism to sustain this system. In this context, a third manual on WEEE/E-waste take-back system has been developed in continuation to the series of manual 1 and 2.

http://www.unep.org/ietc/wastemanagementworkshopontakebacksystem/tabid/79437/default.aspx

Step 2 – Awareness Raising

1. Government (National & Local) – All relevant departments
2. Stakeholders (waste generators, service providers, informal and formal businesses)
3. Civil society and academia
4. Project Team

Step 3 – Training for Project Team

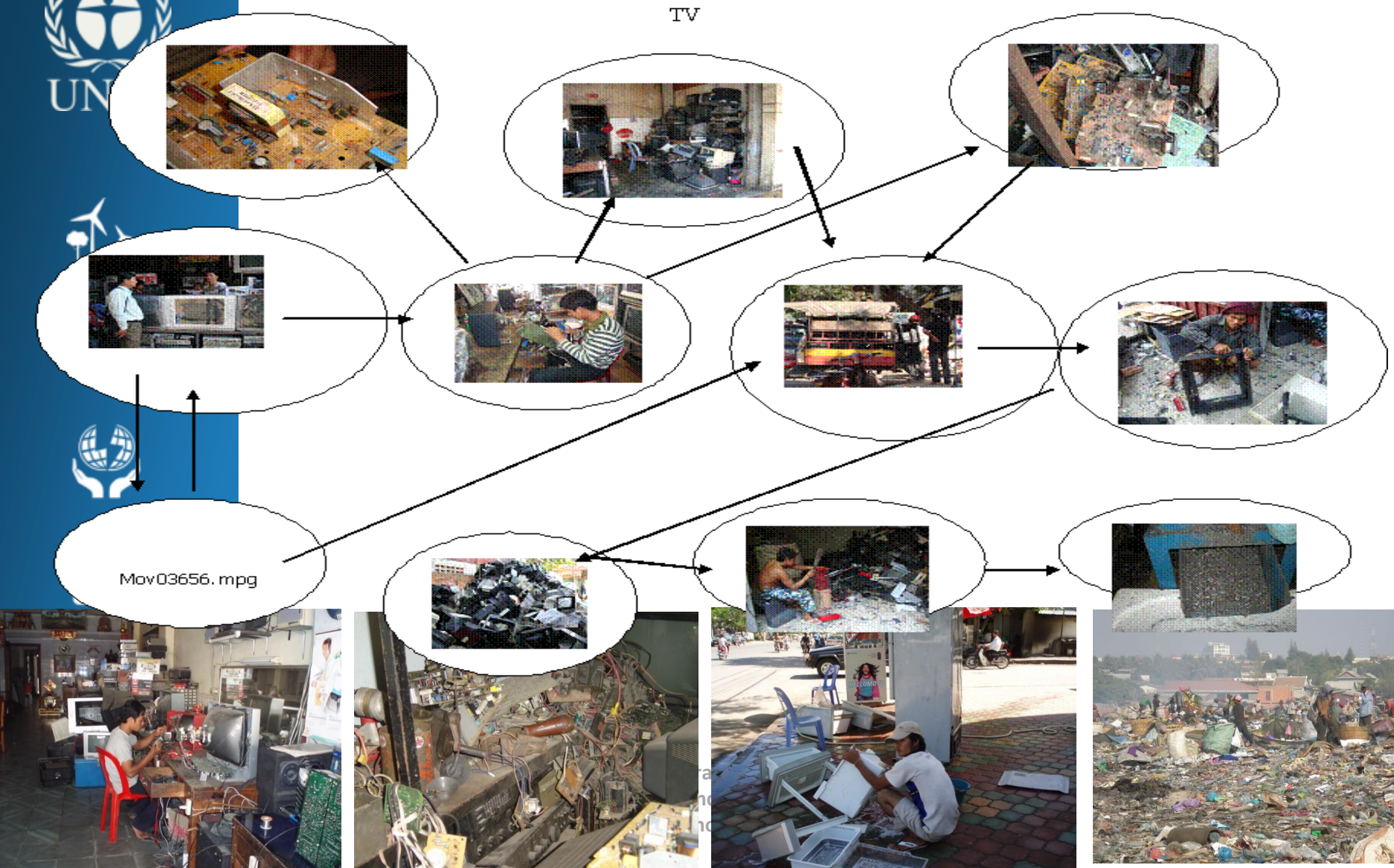
Project team consists of:

- National government (Environment, Industries, Customs, etc.)
- Local government (provincial and local government)
- Local experts from academia and non-profit organizations

Step 4 – Data & Information Collection

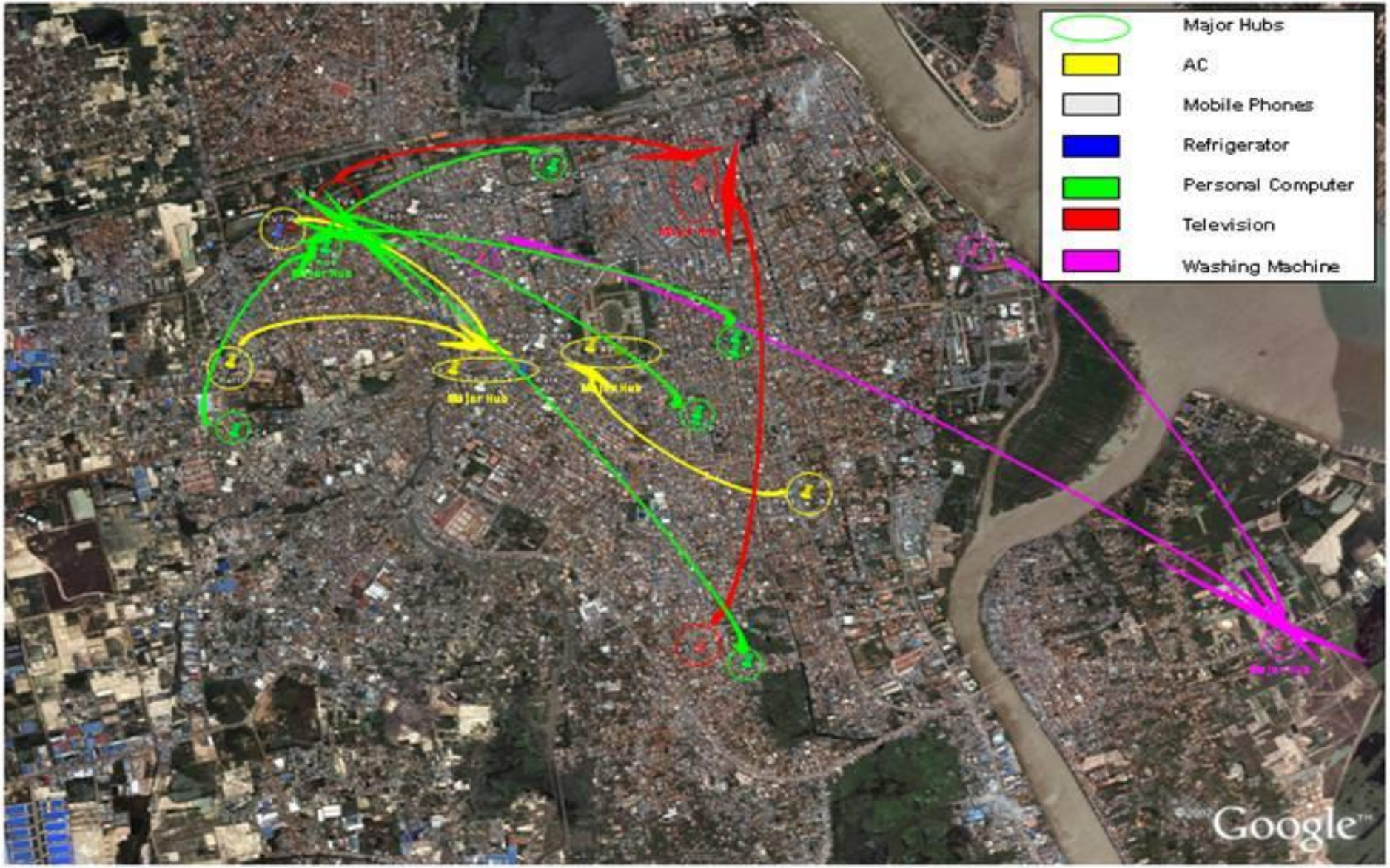
1. WEEE / E-waste Inventory
2. Current management system for WEEE / E-waste (Policies/Regulations, Institutions, Financing Mechanisms, Technology and Stakeholders' role)

Step 5 – Tracer Tracking



Step 6 – Mapping the Markets

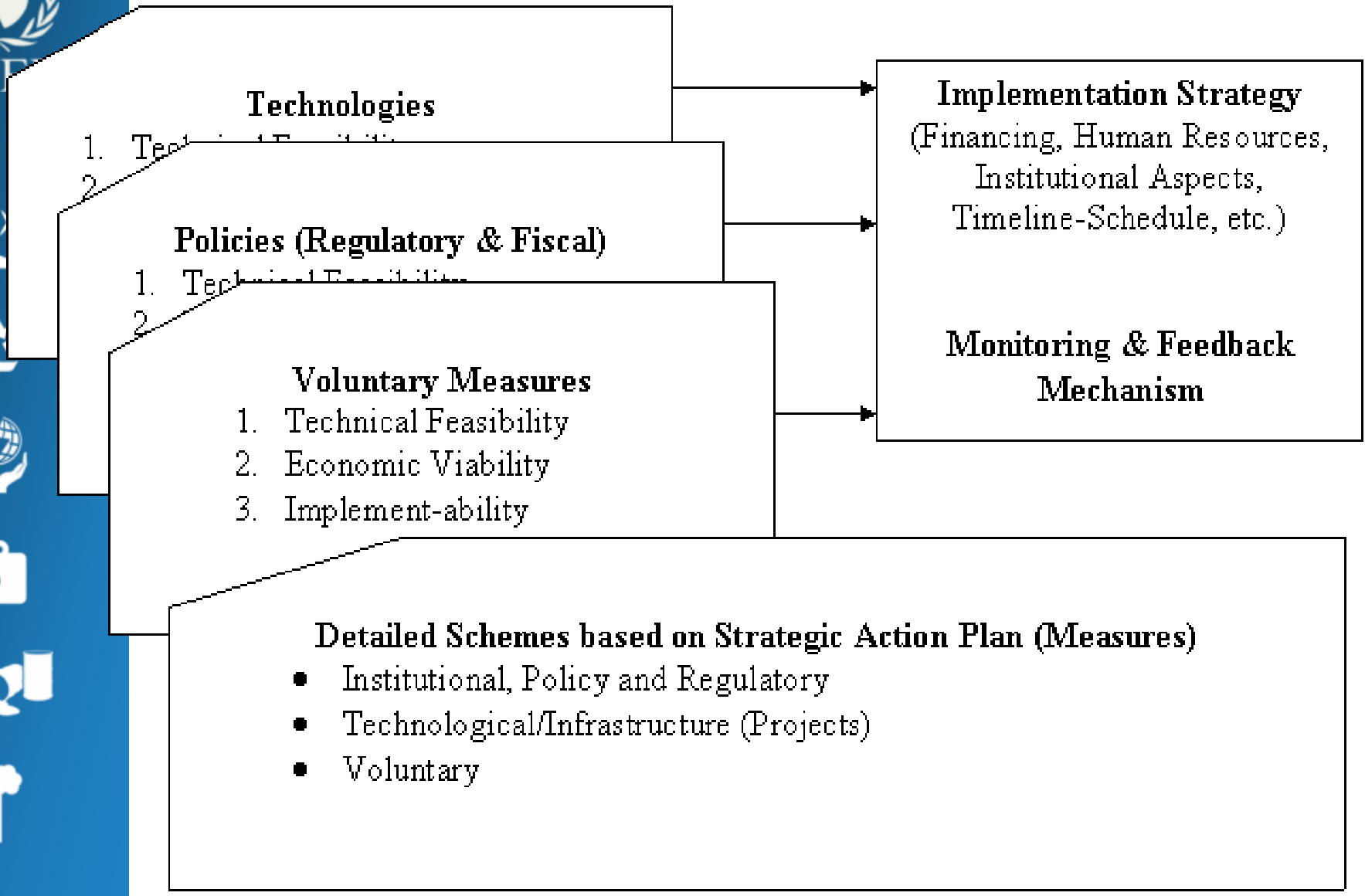
Step 7 – Tracing the Trade Value Chain



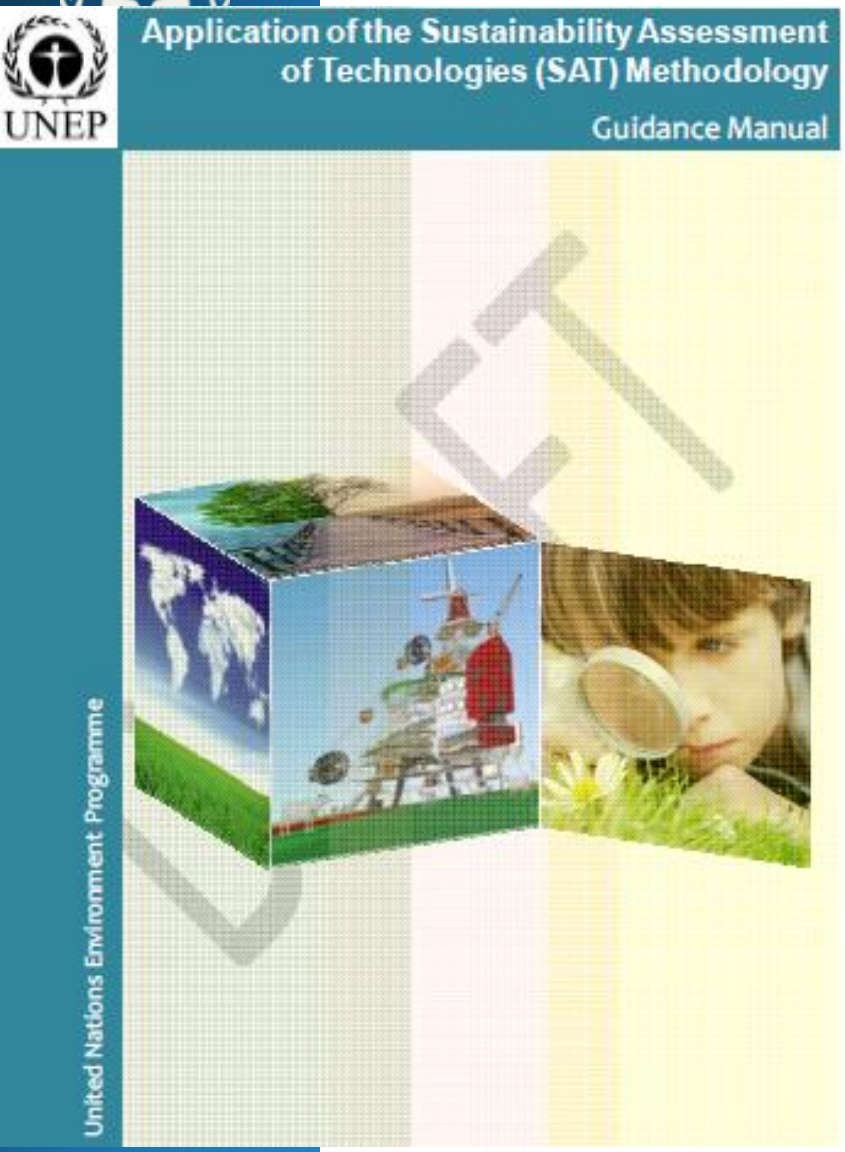
Step 8 – Smart Scenarios

Year	Scenario 1: Inventory (TV)	Scenario 2: Inventory (TV)	Scenario 1: Inventory (PC)	Scenario 2: Inventory (PC)	Scenario 1: Inventory (MP)	Scenario 2: Inventory (MP)	Scenario 1: Inventory (Ref)	Scenario 2: Inventory (Ref)	Scenario 1: Inventory (Air Con)	Scenario 2: Inventory (Air Con)	Scenario 1: Inventory (WM)	Scenario 2: Inventory (WM)
2006	**104907.47**	**69142.10**	**111858.79**	**106781.85**	**83200.00**		**19851.35**	16464.02	**18736.18**		**26440.24**	24058.47
2007	109310.61	85977.85	110495.94	109228.35	138543.96		20821.86	18676.82	19741.84		27718.14	25221.26
2008	144272.21	104907.47	120616.08	111858.79	189756.39	83200.00	21609.34	19851.35	20699.28	18736.18	29057.81	26440.24
2009	179260.95	109310.61	122996.01	110495.94	269227.20	138543.96	26471.10	20821.86	23524.00	19741.84	30462.22	27718.14
2010	**215480.22**	**144272.21**	**125514.78**	**120616.08**	**330980.65**	**189756.39**	**25950.54**	**21609.34**	**23968.12**	**20699.28**	**31934.51**	**29057.81**
2011	251974.02	179260.95	128093.01	122996.01	380627.75	269227.20	27263.19	26471.10	25276.98	23524.00	33477.96	30462.22
2012	277661.25	215480.22	130672.39	125514.78	412976.40	330980.65	28494.58	25950.54	26592.70	23968.12	35096.00	31934.51
2013	306104.71	251974.02	135884.57	128093.01	474922.86	380627.75	30575.25	27263.19	28336.24	25276.98	36641.73	33477.96
2014	327659.82	277661.25	139911.21	130672.39	546161.29	412976.40	32580.81	28494.58	30095.06	26592.70	39244.08	35096.00
2015	347328.58	306104.71	143862.16	135884.57	628085.49	474922.86	33905.56	30575.25	31600.06	28336.24	40882.70	36641.73
2016	361299.89	327659.82	148877.13	139911.21	722298.31	546161.29	46184.10	32580.81	54556.21	30095.06	42764.64	39244.08
2017	454964.75	347328.58	154096.04	143862.16	775737.80	628085.49	65124.09	33905.56	76763.43	31600.06	43713.90	40882.70
2018	501110.51	361299.89	159528.23	148877.13	851637.30	722298.31	68420.98	46184.10	84878.56	54556.21	45971.00	42764.64
2019	548561.95	454964.75	165183.52	154096.04	929820.20	775737.80	71143.02	65124.09	88542.52	76763.43	47835.54	43713.90

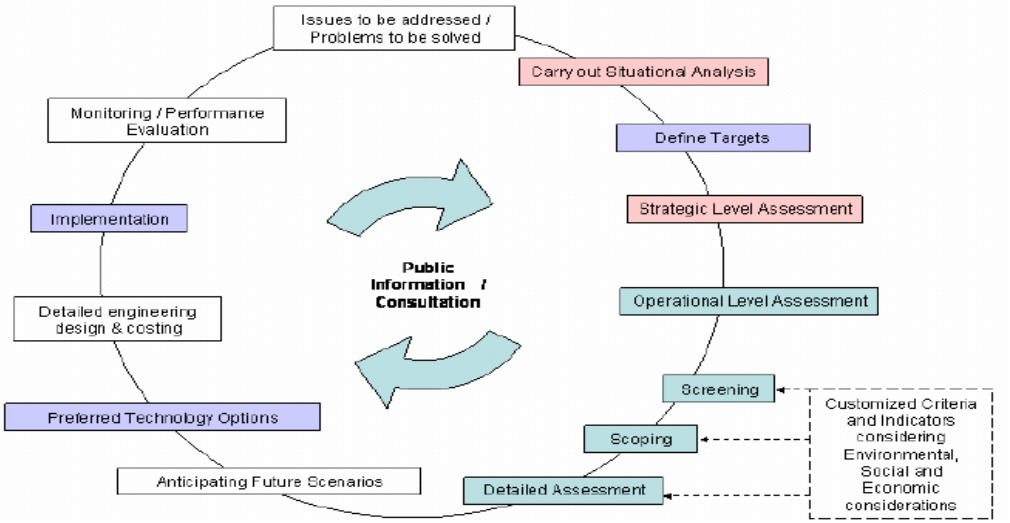
Step 9 – Preparing the Plan with Policy



Sustainability Assessment of Technologies (SAT)



Policy and Government level	• For strategic planning and policy making
Financing Institution Level	• For assessing projects for funding
Operational Level	• For assessment of alternative technologies
Community and Cluster Level	• For assessment and comparison of collective alternative technologies
Village / Enterprise Level	• For comparing technology options



http://www.unep.org/ietc/InformationResources/Publications/tabid/56265/Default.aspx

Step 10 – SWOT Analysis for EPR

Strengths		Weakness		Opportunities		Threats	
EPR	**Conventional**	**EPR**	**Conventional**	**EPR**	**Conventional**	**EPR**	**Conventional**
Limited Material Risk:							
1. Mandates availability of raw material either free or at subsidized rates 2. Ensures constant revenue stream in terms of recycling fee and ownership of recovered material. 3. Monitoring and compliances is stronger. 4. Producers are made responsible for addressing pollution	1. Market based which require limited regulatory intervention. 2. Can easily absorb historical and orphaned E-waste. 3. Complete control over transportation. 4. Can be monitored and made compliant to existing regulatory system. 5. Easy of monitoring due to existing capacity of regulators.	1. Leakages do exist e.g. collection efficiency has been reported to be around 40% in EU 2. Orphaned & historical E-waste are difficult to channelize into formal E-waste recycling stream. 3. Requires time for implementation in Combodian context due to large geographical area. 4. Needs capacity building to implement in Combodian context. 5. Requires change in consumer behavior.	1. Availability of raw material is a constraint. 2. Revenue stream is subject to market fluctuation and dependent on only recovery of base and precious metals.	1. Long term pollution abatement approach based on 3Rs. 2. Producer's will be motivated for more R & D especially in the context of design for environment. 3. Integration with international regulatory regime.	**1st conventional step** 1. Provides stepping milestone for developing E-waste management in the country. 2. Promotion of recycling in waste management 3. Technology transfer and increase of knowledge base.	1. May become monopolistic	May not survive the market risks.

Step 11 – Public Private Partnerships

- Though Cambodia has not much experience of implementing PPP models in infrastructure sector, the proposed E-waste recycling project can be formulated and implemented along the PPP mechanism. Following are the salient features of this model:
  1. The project should fall under the category of urban infrastructure. In case, it is not included in this category then efforts should be made to included it under urban infrastructure category
  2. Any state statutory/ government agency can become partner in the project both in terms of provision of land on concession basis and/ or equity partnership
  3. 20% to 40% of the project cost can be contributed by the government in order to make it viable
  4. “User Fee” or “Service Fee” can be in the form of annuity transferred from the government to the recycling project operators every year. This annuity can be transferred by the authorized government agency in proportion to the recycled E-waste by recycler every year

Recommendations

- Multi-stakeholder support should be garnet through awareness raising campaigns and dialogue. Inter-agency support at international and national level is also vital for an effective and efficient project/programme
- Local project team should be trained for carrying out all the activities under “life cycle approach” and if some activities are beyond the borders then international partners should work closely with local partners and project team
- Training and information is the key so training materials and information should be updated and disseminate on regular basis either through face to face training or through follow-up virtual forums

Pilot Project Concept – ULABs Management Plan

- Awareness raising- stakeholder participation and political will
- Team building and training
- Baseline reports with gap analysis – current amount and practices for ULABs management
- Target setting and identification of stakeholder concerns
- Develop ULABs management plan to fill the gaps (achieve the targets)
- Capacity building for implementation of ULABs management plan

Let us work together for better future!

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