PROJECT EXECUTIVE SUMMARY
GEF COUNCIL SUBMISSION

FINANCING PLAN (US$)	
GEF PROJECT/COMPONENT	
Project POPs IW	 **9,942,455** **384,000**
PDF A	25,000
PDF B	699,948
PDF C	N/A
Sub-total GEF	**11,051,403**
CO-FINANCING*	
Governments and National partners	**10,549,494**
Project Partners	**2,421,000**
Sub-total Co-financing	**12,970,494**
Total Project Financing	24,021,897
FINANCING FOR ASSOCIATED ACTIVITIES IF ANY: US $1,430,000 (*refer to Associated Financing to be provided by WHO, pp. 186-188 of FSP*)	
LEVERAGED RESOURCES IF ANY: N/A	

* Details provided under the Financial Modality and Cost Effectiveness section and Annex C.

AGENCY'S PROJECT ID: 2596
GEFSEC PROJECT ID: 1802
COUNTRIES: Argentina, India, Latvia, Lebanon, Philippines, Senegal, Tanzania, and Vietnam
PROJECT TITLE: Demonstrating and Promoting Best Techniques and Practices for Reducing Health-Care Waste to Avoid Environmental Releases of Dioxins and Mercury
GEF AGENCY: United Nations Development Programme
OTHER EXECUTING AGENCY(IES): UNOPS, Governments
DURATION: 4 years
GEF FOCAL AREA: Persistent Organic Pollutants; International Waters
GEF OPERATIONAL PROGRAM: OP 14, OP 10
GEF STRATEGIC PRIORITY:
POPs ~ SP-3 Demonstrations of Technologies and Practices
IW ~ SP-4: Reducing PTS and testing adaptive mgmt of waters with melting ice
Pipeline Entry Date: June 17, 2003
ESTIMATED STARTING DATE: October 2006
IA FEE: US $994,626

CONTRIBUTION TO KEY INDICATORS OF THE BUSINESS PLAN:
The project supports GEF OP-14, SP-3 "Demonstration of innovative and cost-effective technologies and alternative practices" GEF-3 targets as follows:
Number of projects: 1 project out of 5 targeted, submitted;
Number of countries: 8 countries out of a total of 15 targeted, being addressed.

RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT(S):
ARGENTINA: 23 NOVEMBER 2003; Ministerio de Relaciones Exteriores, Comercio Internacional y Culto, Dirección de Cooperación Multilateral
INDIA: 25 AUGUST 2004; S.K. Joshi, Director (SD), Ministry of Environment and Forests
LATVIA: 12 OCTOBER 2004; Ms. Ingrida Apene, GEF Operational Focal Point
LEBANON: 7 OCTOBER 2004; Dr. Berj Hatjian, Director General, Ministry of Environment
PHILIPPINES: 14 APRIL 2004; Ms. Elisea G. Gozun, Secretary, Department of Environment and Natural Resources
SENEGAL: 19 AUGUST 2003; Mme. Fatima Dia Toure, Directeur, Direction de l'Environnement et des Etablissements Classés, Ministère de l'Environnement et de la Protection de la Nature
TANZANIA: 21 APRIL 2006; A. Madete for the Permanent Secretary, Vice-President's Office
VIET NAM: 21 APRIL 2003; Dr. Tran Hong Ha, Vice Director General, Viet Nam Environmental Protection Agency

Approved on behalf of the United Nations Development Programme: This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for work program inclusion. [UPDATED FOR CEO ENDORSEMENT, AUGUST 2007]

Maryam Niamir-Fuller
Officer in Charge
UNDP-GEF
Date: 24 March 2006

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1. PROJECT SUMMARY

a) PROJECT RATIONALE, OBJECTIVES, OUTPUTS/OUTCOMES AND ACTIVITIES

The health sector is a major source of dioxins and mercury in the global environment primarily as a result of medical waste incineration and the breakage and improper disposal of mercury-containing devices such as thermometers and sphygmomanometers. As health systems are strengthened and health-care coverage expanded in developing countries through efforts to meet the Millennium Development Goals, the releases of persistent organic pollutants (POPs) and other persistent toxic substances (PTS) to the environment can increase substantially. This is often an unintended consequence of choices in materials and processes that seek to improve health outcomes.

The Stockholm Convention encourages and gives priority consideration to the promotion of waste treatment processes, techniques and practices that are as effective as medical waste incinerators but avoid the unintentional formation and release of persistent organic pollutants (POPs). The convention also recommends that consideration be given to resource recovery, reuse, recycling, waste separation and the promotion of products that generate less waste, while cautioning that public health concerns must be carefully considered. As such, there is an urgent need to demonstrate and promote best practices and techniques for health-care waste management in countries that have ratified the Convention but have not yet fully operationalized it, and to facilitate operationalization by developing appropriate and affordable infectious waste treatment technologies that avoid formation and release of POPs where none are yet available. The main countries participating in this Project – Argentina, India, Latvia, Lebanon, Philippines, Senegal and Vietnam – have demonstrated an interest in modeling best health-care waste management practices, but require a further investment of resources, training and technical capacity to do so. This Project is designed to assist these countries in developing and sustaining best practices in a way that is both locally appropriate and globally replicable. An additional component in Tanzania will develop, test and disseminate affordable and effective alternative health-care waste treatment technologies appropriate to conditions in much of sub-Saharan Africa.

The Project aims to demonstrate and promote replication of best environmental practices and techniques for health-care waste management through model facilities and programs, and to reduce barriers to national implementation of these strategies. These best practices and techniques, if replicated nationally and sustained, could reduce the release of an estimated 187 g TEQ of dioxin[1] and 2,910 kg of mercury[2] to the environment each year by the participating countries' health-care sectors, while demonstrating approaches that are more broadly replicable. This will be accomplished by minimizing the amount of health-care waste generated, limiting the amount of waste burned in medical waste incinerators, and reducing the quantity of broken mercury-containing devices improperly discarded or burned.

Without GEF financial assistance, the participating countries do not have sufficient capacity to develop and adopt best health-care waste management practices and technologies that minimize or eliminate POPs and mercury releases to the environment. Working in this context, Project activities support objectives of the Strategic Approach to International Chemicals Management, and can be considered an application of Paragraphs 2 and 3 of the *Instrument for the Establishment of the Restructured Global Environment Facility.* Proposed activities are consistent with GEF-eligible activities under the GEF's Operational Program on Persistent Organic Pollutants (OP 14). The Project's mercury component falls within GEF OP 10, the Contaminants-Based Operational Program of the International Waters Focal Area.

The inability to implement best health-care waste management practices and technologies lies in the fact that the participating countries' health-care sectors need essential equipment and materials for conversion to non-burn waste treatment methods, as well as resources for training, technical assistance and policy development. Without GEF assistance (i.e. baseline scenario), releases of dioxins and mercury are expected to continue at an estimated 187 g TEQ and 2,910 kg per year, respectively, with their consequent impact on public health and the global environment.

[1] Dioxin baseline data were obtained for five of the seven countries. The total estimated dioxin releases from healthcare in the five countries amount to approximately 187 g TEQ per year.

[2] Mercury baseline estimates were obtained using total beds in all the countries (and only 6 states in India where data were available) and an emission factor of 2.8 g mercury per bed per year from both thermometers and sphygmomanometers. The total estimated amount of mercury released from the seven countries' health-care sectors amounts to approximately 2,910 kg per year.

However, with GEF assistance and co-funding (i.e. alternate scenario) the participating countries will be able to reduce or eliminate these releases, thereby assisting in the improvement of global public and environmental health.

The main project objectives and outputs are as follows:

(1) Leveraging existing infrastructure and expertise for the development and implementation of local, national and global co-ordination structures and mechanisms to carry out the work of the project;
(2) Demonstrating best practices in health-care waste management in model facilities, including installation and use of non-burn waste treatment technologies, waste segregation and other waste management practices with participatory training at the local and national levels, with a focus on the replicability of these models to permit country operationalization of the Stockholm Convention;
(3) Raising and enhancing awareness in the health-care sector and related stakeholders about the connection between waste management and public health, resulting from the provision of easy-to-use educational and technical information and materials for health-care and waste-treatment staff, and increasing the sector's ability to manage its waste in a way that is environmentally responsible and protective of public health. Monitoring the technical efficacy and economic performance of alternatives to incineration and mercury devices and improving alternatives where necessary to achieve Project goals will also be completed.
(4) Building capacity for the broader and longer-term use of best practices in health-care waste management based on non-burn treatment technologies and the phase-out of mercury devices, reducing dependency on technologies resulting in the unintentional release of dioxins and mercury to the environment and ensuring sustainability in the long term. This also has linkages with chemical management and enhanced health security.

The Project will focus primarily on activities necessary to demonstrate best practices in health-care waste management, such as promoting the use of alternative waste treatment technologies, improved waste segregation practices and the use of appropriate alternatives to mercury-containing devices. Training will be provided and training programs put in place to ensure the sustainability and replication of Project gains.

The main Project activities will include:

- Establishment of model facilities and programs exemplifying health-care waste management best practices, and development of replication materials;
- Deployment and evaluation of appropriate commercially-available, non-incineration health-care waste treatment technologies;
- Development, testing, manufacture and deployment of appropriate and affordable, small-scale non-incineration technologies for sub-Saharan African facilities, and preparation and dissemination of manuals;
- Introduction of mercury-free devices in model facilities, evaluation of their acceptability and efficacy, and development and dissemination of awareness-raising and educational materials;
- Establishment/enhancement of capacity-building training programs for best practices and appropriate technologies implementation beyond the model facilities and programs;
- Review of relevant policies, seeking of agreement by relevant authorities on recommended updates or reformulations, seeking of implementation plan agreement, and assistance in any policy review conference;
- Distribution of best techniques and practices results to relevant stakeholders; and
- Dissemination of results on demonstrated best techniques and practices for scaling up regionally and globally.

b) KEY INDICATORS, ASSUMPTIONS AND RISKS (FROM LOGFRAME)

Key indicators of success:

- Model facilities and programs established and implemented to exemplify best practices in health-care waste management; their performance documented and evaluated; and useful replication toolkits on how to implement best practices and techniques developed;
- Commercially-available, non-incineration health-care waste treatment technologies that are appropriate to the needs of the facility or cluster and that satisfy their needs, purchased, deployed and evaluated;
- Appropriate, affordable, small-scale non-incineration health-care waste treatment technologies developed, tested, manufactured and deployed for use in small and medium-size facilities under conditions that prevail in much of sub-Saharan Africa; blueprints and manuals for manufacture, installation, operation, maintenance and repair prepared and disseminated;

- Affordable mercury-free devices purchased and introduced for acceptable and efficient use in model facilities; practices on safe handling and disposal of phased-out mercury devices developed, staff training completed, and practices implemented in model facilities in a replicable way;
- Effective national training programs established or enhanced to build capacity in the health-care and related sectors for the implementation of best practices and use of appropriate technologies beyond model facilities and programs; and
- Review of relevant national policies, regulations and guidelines conducted in light of Project experiences; appropriate policy updates or revisions recommended and further agreement/commitments by relevant authorities pursued; and if appropriate, national policy review conference by relevant authorities held for these purposes.

Assumptions:
- Political and social stability in participating countries during the Project;
- Health sector buy-in and cooperation in the face of urgent competing priorities and demands;
- Ability to purchase, deploy and evaluate commercially-available alternative health-care waste treatment technologies that are affordable and appropriate to facility needs (except for some African facilities where research into lower-cost alternatives will be undertaken);
- No undue delays in Project progress due to customs formalities in the event that technologies need to be imported;
- Honest and accurate reporting by facility management on facility needs and technology performance;
- Local availability of skills and materials necessary to build and repair small-scale alternative health-care waste treatment technologies;
- Ability to develop technologies within reasonable bounds of cost and affordability;
- Availability of satisfactory mercury-free devices at costs that are consistent with Project replication objectives;
- Political and economic support for the acquisition and use of mercury-free devices and the safe handling and disposal of phased-out mercury devices;
- Facility staff support for the use of non-mercury devices, and honest and accurate reporting on device efficacy and acceptability;
- Training programs targeted to the most appropriate personnel;
- Willingness of non-Project facilities to implement systems of the kind demonstrated by the Project, and their ability to effectively utilize the skills that the training program is designed to impart;
- Efficacy of training programs in providing knowledge that spreads to other personnel and will outlast the Project itself;
- Willingness of Project countries, given the political and economic climate, to undertake a policy review aimed at possible reformulations and/or updates to relevant policy instruments;
- Ability of relevant stakeholders to institute the recommended changes, if any;
- Appropriate supporting policy instruments in place to facilitate the success of replication efforts;
- Availability of sufficient human and economic resources to engage in these activities in light of other important health-care priorities;
- Ability of leadership at all levels, from the national to the state to the facility level, to engage on these important issues; and
- Usefulness of demonstration results to inform interventions in other countries.

However, should the reality not embody these assumptions, they immediately become risks if they are not closely monitored during the Project. The Project Co-ordination structure described in Section 5 of this document sets up a system for exchange of information between co-ordinating and executing bodies at the global and national levels. Honest dialogue, reporting and commitment are facilitated by the National Working Group feedback mechanisms. In addition the Global Project Steering Committee (described below in Section 5c) meets twice to ensure that all is going according to plan, and to offer expert advice to avert any risks that arise. The participatory methodology of training with the training-of-trainers approach should also nationalize knowledge and build capacity and support for Project goals, lessening the impact of potential risks.

2. COUNTRY OWNERSHIP

a) COUNTRY ELIGIBILITY

The nature of this effort is a global demonstration project. As a result, a diverse set of countries has been brought together through the PDF A and PDF B phases. In the development of the project components, the investigation of the conditions in each country, and the identification of the infrastructure that would allow each country to effectively engage in the effort, participating countries have demonstrated their eligibility. Furthermore, all participating countries have ratified the Stockholm convention, a key component of the project rationale.

b) COUNTRY DRIVENNESS

Participating countries have displayed a number of indicators of their growing commitment to the Project. These include the following:

- All participating countries have ratified the Stockholm Convention, a key component of the project rationale. The success of the Project can be a significant contributor to demonstrating the country commitment to operationalizing the Convention.
- In all project countries with the exception of the special project component in Tanzania,[3] both the Ministries of Health and of Environment have appointed a high-level contact to work on the Project and to serve on the Project's National Working Group and National Steering Committee.
- Key stakeholders from environmental and health sectors in the government, NGO and private sectors as appropriate, and the international donor community, have participated and provided significant input through both the National Working Groups and the National Project Steering Committees. In most countries these groups are both active and continue to attract new members and contributors.

3. PROGRAM AND POLICY CONFORMITY

a) FIT TO GEF OPERATIONAL PROGRAM AND STRATEGIC PRIORITY

The proposed Project is consistent with the GEF Focal Area of Persistent Organic Pollutants (POPs) under OP 14. Within this Focal Area, there are three Strategic Priorities as identified in Annex 5 'Persistent Organic Pollutants Directions and Targets' of the GEF document titled "Strategic Business Planning: Directions and Targets" (GEF/C.21/Inf.11). The three strategic priorities are: 'Foundational capacity building,' 'Implementation of policy/regulatory reforms and investments' and 'Demonstration of innovative and cost-effective technologies.'[4] This Project is consistent with all three priorities but is principally a demonstration project with links to policy/regulatory reform as well as foundational capacity building, especially in countries where health-care waste is a priority in National Implementation Plans.

The mercury component of the Project is consistent with the GEF OP 10, the Contaminants-Based Operational Program of the International Waters Portfolio. The GEF has already identified releases of mercury to the environment as a threat to international waters when it approved the project: "Removal of Barriers to the Introduction of Cleaner Artisanal Gold Mining and Extraction Technologies." In demonstrating effective minimization of mercury releases to the environment resulting from health-care practice, this Project component is a barrier-reduction effort aimed at protecting International Waters from contamination by persistent toxic substances, as described in GEF OP 10. Although this proposed Project falls under Focal Area POPs under OP14, modest OP 10 mercury-related activities have been incorporated into the Project as well. Mercury reduction is an integral part of proper HCWM and falls under best practices. To ignore mercury releases from the health-care sector in this Project

[3] The work in Tanzania will focus on the development of an affordable and effective alternative treatment technology appropriate for use in sub-Saharan Africa.

[4] "Strategic Business Planning: Directions and Targets," GEF/C.21/Inf.11, found on the GEF website at http://thegef.org/Documents/Council_Documents/GEF_C21/C21.Inf.11-_Strategic_Business_Planning.pdf

would leave a gap towards adequate HCWM. Hence, additional low cost (less than 1% of overall project budget) global benefits have been incorporated into the Project.

Additionally, the Project supports the operationalization of the Stockholm Convention as explained in Section 1A of this Project Executive Summary. It also supports the objectives of the Strategic Approach to International Chemicals Management, and can be considered as an application of Paragraph 3 of the *Instrument for the Establishment of the Restructured Global Environment Facility* which states: "The agreed incremental costs of activities to achieve global environmental benefits concerning chemicals management as they relate to the above focal areas [e.g. international waters and POPs] shall be eligible for funding."

b) SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY)

Project sustainability will be assured through a combination of the following: active participation of stakeholders; the development and institutionalization of permanent organizational structures and systems; contractual arrangements that require long-term commitment by model facilities; and recommendations on national policy changes, replication and scaling-up of activities. Efforts during the fourth year to help selected countries seek funding to maintain selected activities beyond the end of the Project will also enhance sustainability. These activities to enhance sustainability will be carried out at both the local and national levels.

At the local level of the model facilities or clusters, key activities to ensure sustainability include the adoption of supporting policies, regular training, enhanced budget allocation, stakeholder involvement in health-care waste management systems, the development of environmental champions and the creation of permanent organizational structures. Model facilities are expected to adopt policies reflecting a strong commitment to the use of best practices in health-care waste management with buy-in from top leadership. Facilities are also expected to institutionalize regular training for all staff, including new employees, and to allocate funding to maintain the improved waste management system. These commitments will be reflected in Memoranda of Understanding to be signed by representatives of model facilities at the start of the Project. In addition to these measures, the planning and implementation of health-care waste management systems will involve local stakeholder participation as an essential part of the process, ensuring broad local acceptance and "ownership" of the system. Equally crucial to local sustainability will be the identification, nurturing and development of "environmental champions." These champions will be individuals in each hospital or clinic who will act as advocates for best environmental practices within their departments. Finally, a permanent organization within each facility, headed by a health-care waste management committee, will be responsible for long-term monitoring, evaluation and continuous improvement.

In some countries, alternative treatment technologies are considered part of the private sector, with investments supported by business plans and activities organized through centralized plant or mobile system enterprises (such as in Lebanon). In other countries (e.g., Vietnam), these technologies are part of the public services provided to health-care facilities by the government. In either case, health-care waste treatment systems using deployed capital equipment will become self-sustaining through fees paid by hospitals and clinics for the treatment of their wastes.

At the national level, the Project will work with a National Project Steering Committee and a National Working Group with extensive stakeholder participation. Both organizations were created in each participating country during the PDF B phase of this Project. Memoranda of Understanding with various national stakeholders will help ensure broad ownership of the Project and long-term sustainability. In particular, a Memorandum of Understanding will be signed with institutions that will host national training programs, thereby creating and securing the infrastructure necessary for capacity-building over the long term. In many countries, these memoranda will be supplemented by national policies that require training and, where applicable, certification. By engaging policy-makers in a discussion of policy changes and national plans, the Project will institutionalize best practices in health-care waste management in the participating countries. This will be complemented by replication and scaling-up activities that will reinforce and promote the use of existing best practices and technologies throughout the participating countries, further supporting the sustainability of Project gains.

On the global level, information sharing and networking to bolster sustainability will be promoted by the Global Project Team, including the University of Illinois' School of Public Health Great Lakes Center. After the Project's end, the Great Lakes Center will continue to disseminate information gained during the Project. During the last year of the Project, the Global Project Team will help selected countries obtain funding to continue programs that are

deemed necessary for sustainability, such as training programs or programs pertaining to the implementation of national plans.

c) REPLICABILITY

The strategies for replication, like the sustainability strategies, have local, national and global frameworks; each will depend and build on the others. Local implementation of model projects at the facility or "cluster" level (or even the state level in the case of India) will provide the key demonstration of technologies that are effectively meeting the Project goals under very diverse circumstances. The following Project components provide a framework that will sustain the local activities while creating opportunities for replication at regional, national and global levels.

At the local level, the basic project unit is a set of model facilities and clusters that utilizes best practices and technologies. Specific practices at the individual facility level will be identified, evaluated and incorporated into training curricula by national training and educational institutions for reinforcement of lessons learned at the local and national levels. These facility-level experiences also serve to provide background on best practices and technologies for integration into any national legislation, regulation or policy. In addition to the development of these curricula, peer-to-peer training will complement more formal training both within and among individual facilities. The adoption of best practices is intended to spread locally among neighboring facilities as well as through networks of associated facilities (e.g., health systems). Through their MOU with the Project, model facilities agree to be training and education sites for classes and delegations seeking to learn from their experience. These classes and delegations can be local, regional or international. Another crucial component of replicability at the individual facility or cluster level is the identification of process holders or "environmental champions" who will promote replication of the Project outcomes locally and regionally. Identifying the attributes of individuals who can provide such leadership and direction, and providing guidance on how to nurture and develop such leadership, will be vital to ensuring local sustainability and the transfer of best practice knowledge to other facilities.

At the national level, the replication component will be designed around the parallel efforts of engaging national stakeholders and international donor agencies, implementing national training and education programs, and strategically involving private enterprise. The national partners in health sector reform and development, including government agencies, NGOs and international donor agencies, will be engaged in following and evaluating the progress of the Project. This process will build stakeholder networks and establish grounds for these actors to work collaboratively on other projects and programs, including the financing of further health-sector development. The partnership with international donor agencies will be of particular benefit, as these agencies will be able to use the Project to identify more uniform and effective responses to solving the health-care waste problems that must be addressed in each of their health-sector projects. These replication efforts will be complemented by the participation of relevant academic institutions in disseminating Project information. An important partnership being incorporated into each national education and training initiative is the development of cooperative agreements with medical and nursing schools to incorporate specific lessons from the Project into training curricula for physicians, nurses and other health professionals. This work, in conjunction with the development of the national training curriculum and program, will help to set new national health-care waste management standards, and will solidify and institutionalize Project gains. Additionally, a number of specific opportunities for private sector involvement in Project implementation will be identified and quantified, establishing the "business" rationale for program participation. These opportunities include product procurement, design and manufacture, as well as the provision of services. The growth of private enterprise in delivering services in the health-care sector may prove advantageous to the Project, as private health-care waste management providers increase the availability of funding mechanisms, have a strong desire to be in compliance with government regulations, and are willing to adopt the use of best practices and techniques to maintain a leadership position in the field.

Globally, monitoring and evaluation will enable the Global Project Team to chronicle the progress of each national component and the global Project as a whole. The experience at the national and local levels will inform international agencies and agencies involved in standard-setting about best practices in advancing safe health care and reducing the impact of waste management systems on the spread of global pollutants. The technology development Project component based in Tanzania is designed specifically to disseminate knowledge and advance technology transfer across national borders in sub-Saharan Africa, but may also have applications throughout a much broader global range. In some cases (e.g., India through WHO SEARO), there are specific mechanisms

already in place for the transfer of new knowledge and experience. Some of the education/training partners at the national level also have regional educational missions and cooperative arrangements with neighboring countries that can be used to disseminate results and advance education regionally (e.g., in India through Indira Gandhi National Open University).

Global dissemination of Project results will be facilitated at all levels of this Project. The two principle cooperating agencies, WHO and HCWH, have strong global networks and are supported by equally strong information dissemination systems that will advance global dissemination of the lessons learned. These systems include websites, publications, instructional activities, demonstration projects and conferences in the field of health-care waste management. The project partners at the national and global levels also play a critical role in global dissemination, and have already identified appropriate international forums in which to share Project progress and results. These venues, including the World Health Assembly, International Congress of Nurses, World Federation of Public Health Associations, Safe Injection Global Network and Global Alliance for Vaccines and Immunization, among others, have already witnessed national and global partner participation during the PDF A and PDF B phases of the project.

d) STAKEHOLDER INVOLVEMENT

As stakeholder involvement is essential to the full success of this Project, in each participating country a wide range of stakeholders has been identified and engaged in the various design meetings and processes to produce the final Project document. The stakeholders during the PDF B phase included representatives of the Ministries of Health and Environment, hospitals and health centers, health-care professionals, waste workers, waste service providers in the public and private sectors, technology developers, training institutions and universities and a broad range of NGOs including environmental, health and community development organizations on the local, national and international levels. It should be noted that specific plans to maintain stakeholder participation through and beyond the Project period were discussed as part of Project replicability. Annex G shows the coordinated arrangements for stakeholder participation through the National Working Groups (NWG), the National Project Steering Committees (NPSC), the Global Project Steering Committee (GPSC) and the roles of the Global Expert Team (GET) and the National Consultants (NC).

National Consultants play a critical role in coordinating and encouraging the flow of information and participation, especially of the NWG and NPSC. They work directly with the GET to channel assistance, to draw on the GET's technical expertise, and to build and maintain networks that enhance stakeholder efforts. A key attribute of National Consultants will be their ability to effectively engage stakeholders and coordinate stakeholder activities to be effective and appropriate in supporting the Project activities and goals. This is written into the Terms of Reference as a qualification for the national consultants.

The Project's success centers on the building of successful local models and the translation of that experience to other levels. The responsibility to accomplish this lies in the hands of local and national stakeholders who must cooperate and keep channels of communication open. Each level of stakeholder has a distinct role; the responsibility to build successful local models is solidly in the hands of local stakeholders, and the responsibility to "nationalize" that success rests squarely with national stakeholder partners who must be fully engaged and prepared to utilize the local results. Because of this, the project management arrangements were devised to ensure a constant two-way flow of information and support that is appropriate to each situation. These arrangements will provide appropriate connections to national and global expertise for local-level work, and will facilitate communicating local-level efforts to the national and international stakeholders. The local results are designed to contribute to an evidence-based body of information that will enable national stakeholders to confidently incorporate this information into national policy and decision-making.

e) MONITORING AND EVALUATION

Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the Project team and the UNDP Country Offices (UNDP-COs) with support from UNDP-GEF-HQ. The Logical Framework Matrix in Annex D provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the Project's Monitoring and Evaluation system will be built. The Project's indicative M&E workplan is as follows:

Table 1. Indicative monitoring and evaluation workplan and corresponding budget

Type of M&E activity	Responsible parties	Budget (US$) *Excluding project team staff time*	Timeframe
Inception workshop	• Global Expert Team • UNDP-CO	None	Within first six months of project start-up
Inception report	• UNDP-CO	None	Immediately following IW
APR and PIR	• National Project Coordinator • UNDP-CO	None	Annually
TPR and TPR report	• National Project Coordinator • UNDP-CO	None	Annually, upon receipt of APR
Global Steering Committee meetings	• Project Coordinator • UNDP-GEF-HQ	Costed into project activities	Twice during project implementation
Quarterly progress reports	• National Project Consultant	None	Each quarter
Mid-term external evaluation	• UNDP-GEF-HQ • External consultants	40,000	At the mid-point of project implementation
Final external evaluation	• UNDP-GEF-HQ • External consultants	60,000	At the end of project implementation
Terminal report	• UNDP-CO	None	At least one month before the end of the Project
Lessons learned	• National Project Consultant	None	Annually
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	• UNDP-CO	Costed into project activities	As required
Total indicative cost *Excluding project team staff time and UNDP staff and travel expenses*		**100,000**	

Table 2. Indicative monitoring and evaluation plan

	Year 1				Year 2				Year 3				Year 4			
	Quarter															
Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Inception report																
Annual Workplan (AWP)																
Annual Project Report (APR)																
Tripartite Review (TPR)																
Project Implementation Review (PIR)																
Mid-term Evaluation																
Audit																
Final Evaluation																
Terminal Report																
Terminal Tripartite Review (TTR)																

Table 3: Quantitative and Semi-Quantitative Indicators

Outcome	Baseline*	Quantitative or Semi-Quantitative Indicator
1. Best practices for health-care waste management demonstrated, documented and made replicable	• Facilities selected to become models currently practice little or no segregation nor minimization of waste • Facilities selected to become models currently do not have facility policies promulgating best practices • Few or no personnel have undergone training in the facilities selected to become models	Model facilities demonstrate best practices for HCWM as reflected in: • Policies requiring best practices existing in all model facilities • 50% reduction of overall waste at those facilities that do not currently practice segregation • 100% training of health care staff responsible for HCWM in model facility (excluding newly hired staff)
2. Appropriate non-incineration health-care waste treatment technologies successfully deployed and demonstrated	• Facilities, clusters or programs selected to become models either do not have treatment systems (except for Latvia and Lebanon and in one facility in Argentina) or they operate incinerators that do not meet international standards	• By Quarter 8 of the Project, at least one alternative technology will be installed and fully operational in all countries that plan to deploy technologies.
3. Affordable, non-incineration, health-care waste treatment technologies successfully designed to meet African needs and manufactured, and their replication plans in place	• No local manufacturers of alternative treatment technologies currently exist in Africa	• At least one manufacturer in Africa will be commercially fabricating the designed technologies.
4. Use of mercury-free devices and best practices for management of mercury waste demonstrated, documented and made replicable	• Facilities selected to become models currently do not have policies on management of mercury waste • Facilities selected to become models currently do not use mercury-free devices	Model facilities demonstrate best practices for mercury waste management as reflected in: • Facility policies that require best practices for mercury waste management in all model facilities • 80% of mercury devices in model facilities replaced with mercury-free alternatives.
5. New and/or enhanced training programs established to build capacity for the implementation of best practices and appropriate technologies beyond model facilities and programs	• Majority of participating countries have no national training programs specific to HCWM • In the few countries that have national training programs, participation is limited due to inadequate resources, capacity, and outreach	• Comprehensive national training programs specific to HCW are established in all participating countries • An increase of at least 10% in the number of personnel trained in Year 3 on best practices for HCWM in existing national training programs • At least two national training sessions have been conducted in each country
6. National policies aimed at replicating and sustaining best techniques and practices demonstrated by the Project explored and, where feasible, initiated	• Participating countries have no national polices on HCWM or have minimal policies that do not incorporate comprehensive best practices and techniques	• All participating countries have initiated dialogue on national health-care waste management policies • At least one participating country has revised or further developed its HCWM policies

Outcome	Baseline*	Quantitative or Semi-Quantitative Indicator
7. Project results disseminated to all stakeholders for awareness-raising aimed at their replication		• At least one national conference or workshop in each participating country • One set of toolkits developed and disseminated to appropriate parties in participating countries
8. Global, regional and national counterparts from agencies, governments and NGOs beyond participating countries informed of best techniques and practices for the purpose of replication		• Website developed with country-specific information all countries • GEOLibrary contains information from at least 5 training programs • Project results presented at least six international or regional conferences or meetings.

** Country-specific baseline data will be refined during the first phase of Full Project implementation.*

Note: Except for Outcome 3, this table of quantitative and semi-quantitative indicators refers to the seven project countries where model facilities, clusters and programs are being demonstrated. Outcome 3 refers to Tanzania.

4. FINANCIAL MODALITY AND COST EFFECTIVENESS

a) FINANCIAL MODALITY

The total cost of achieving the project's global environmental objective is estimated at US $24,203,735, of which a total of US $9,934,350 (which does not include the US $724,948 total in PDF A and B funds approved to date) is being requested in GEF resources to cover a portion of the total project costs. The remainder, US $14,340,494, has been committed by participating national government and private sector partners, as well as from other project partners as described in the table below.

b) COST EFFECTIVENESS

Application of best practices and techniques (non-burn) for health-care waste management is a cost-effective means by which to minimize and/or eliminate releases of persistent organic pollutants (dioxins) and mercury to the environment. Barriers to national implementation of best environmental practices and techniques will be reduced by establishing model facilities and focused programs based on national considerations, thereby enhancing future scale-up potential.

If replicated nationally and sustained, best practices and techniques are expected to reduce the release of dioxins and mercury to the environment from participating countries' health-care sectors[5] by an estimated 187 g TEQ of dioxins[6] and 2,910 kg of mercury[7] each year, while demonstrating approaches that are more broadly replicable. In addition, the Tanzania Project component will develop, test, and disseminate locally affordable and effective alternative health-care waste treatment technologies appropriate to conditions in much of sub-Saharan Africa.

The multiple execution project approach has also been selected for its cost-effectiveness potential as global activities will be streamlined and national-level activities, including extensive use of national experts and establishment of

[5] This will be accomplished by minimizing the amount of health-care waste generated, limiting the amount of waste burned in medical waste incinerators and by reducing the quantity of broken mercury-containing devices improperly discarded or burned.

[6] Dioxin baseline data were obtained for five of the seven countries. The total estimated dioxin releases from the five countries amount to approximately 187 g TEQ per year.

[7] Mercury baseline estimates were obtained using total beds in all the countries (and only six states in India where data were available) and an emission factor of 2.8 g mercury per bed per year from both thermometers and sphygmomanometers. The total estimated amount of mercury released from the seven countries' health-care sectors amounts to approximately 2,910 kg per year.

mutually beneficial partnerships with complementary national programs in the health-care sector, will be managed at the national level.

Cost-effectiveness calculations were conducted using annualized costs per annual reduction in UPOPs emissions. These calculations are based on generic simulations corresponding to 5,448 beds. These calculations are provided in order to inform the readers. During the Full Project implementation, actual cost computations will be documented.

Table 4: Cost Effectiveness of Alternative Treatment Systems

Technology and Cost Comparison	Cost Effectiveness (in $/g TEQ reduced)
A. Comparison of Technologies and Practices:	
High-Tech Incineration With Best Practices	3192
Alternative Treatment Technology With Best Practices	1300
B. Comparison of Technologies Only:	
High Tech Incinerator	2200
Alternative Treatment Technology	300

Table 5. Detailed description of co-financing sources and estimated amounts

Name of Co-financier (source)	Classification	Type	Amount (US$)	Status
Argentina	Government; hospitals; training program; technology; central facility; NGOs	Cash and in-kind	2,186,166	Confirmed with letters of support
India	Training program; NGOs	In-kind	480,555	Confirmed with letters of support
Latvia	Government; hospitals; technologies	Cash and in-kind	2,847,211	Confirmed with letters of support
Lebanon	Government; technologies; hospitals	Cash and in-kind	1,578,632	Confirmed with some letters of support
Philippines	Government; hospitals; training program	Cash and in-kind	1,425,774	Confirmed with letters of support
Senegal	Government; hospitals; training program	In-kind	810,000	Confirmed with some letters of support
Vietnam	Government; central facility; training program	Cash and in-kind	1,040,000	Confirmed with letters of support
Tanzania	Research institutions and universities; NGOs; hospitals; public health agencies	In-kind	181,156	Confirmed with letters of support
WHO	UN agency	In-kind	536,000	Confirmed with letter of support
HCWH	Coalition of NGOs	Cash and in-kind	1,375,000	Confirmed with letter of support
UIC	Academic institution	In-kind	465,000	Confirmed with letter of support
Other	Website; legal support; technical support	Cash and in-kind	45,000	Confirmed with some letters of support, available upon request
Total Co-financing			**12,970,494 ***	

***** *Total co-financing amount reduced from amount presented at time of consideration by Council in order to reflect differentiation between 'Associated financing' and 'Co-financing' provided by the WHO.*

5. INSTITUTIONAL COORDINATION AND SUPPORT

a) CORE COMMITMENTS AND LINKAGES

Environmental sustainability has been identified as one of the key areas of support to the participating governments as part of their UNDP Country Programs. This project will contribute to strengthening environment management frameworks with the Country Programs. In addition, the framework of assistance of UNDP closely follows the objectives set by the Millennium Declaration. The project's activities, which are expected to result in the reduction of dioxins and mercury and improved health care waste management practices are in line with UNDP activities in support of the MDGs.

The Project links to World Health Organization principles related to health-care waste management which include: promoting sound health-care waste management policies and practices; preventing health risks to patients, workers and the public from exposure to health-care wastes; supporting implementation of the Stockholm convention on Persistent Organic Pollutants; promoting alternatives to mercury-containing thermometers and other medical instruments with a goal of their eventual phase-out; and generally minimizing human exposure to toxic pollutants.

All the governments participating in the Project are Parties to the Stockholm Convention and have agreed to implement this Project in close consultation with their Stockholm National Implementation Planning committee. All have demonstrated commitment to the Project through active engagement by responsible government officials and agencies in meetings and activities of National Project Steering Committees and National Working Groups. All participating governments have also embraced project goals aimed at minimizing mercury releases.

Each of the participating countries has already promulgated relevant laws and guidelines that relate to health-care waste management.[8] In each country, the Project has been designed to link specifically to these national laws and guidelines, and in some cases, to national efforts to update or reform them.

Throughout the Project, the team will work closely with the relevant national committees and respective health-care institutions. The National Project Steering Committees will also maintain ongoing ties with relevant national, regional and municipal institutions and authorities.

b) CONSULTATION, COORDINATION AND COLLABORATION BETWEEN IAS, AND IAS AND EAS, IF APPROPRIATE

The Project's IA and EAs have conducted the necessary consultation, coordination and collaboration arrangements in a participative approach with the stakeholders in a series of meetings, workshops and official communications during the PDF B process. Project funds have been allocated in order to collaborate with relevant projects being implemented by UNDP as well as other IA/EAs.

C) PROJECT IMPLEMENTATION ARRANGEMENT

The Project will be executed using a multiple execution modality, in accordance with UNDP guidelines. Adoption of the multiple execution (MEX) modality will entail the establishment of a global 'main' project whose execution will be managed by the United Nations Office of Project Services (UNOPS). Under the global 'main' project, seven individual national execution (NEX) 'sub' projects will be established, for whom oversight management services will be provided by the UNDP Country Offices in each of the respective countries (with the exception of the Tanzania component that will figure under the global 'main' component). In addition, under the terms of the Executing Agency Agreement between UNDP and the World Health Organization, the WHO will manage an eighth sub-project and provide financial oversight management services for the funds associated with the project activities to be carried out by the organization. Each of the seven NEX sub-projects and the WHO sub-project will be linked financially to the global main project in order to facilitate financial reporting and accountability.

[8] See Project Document Annex 4. In each country section of the Annex, see items under the heading: *Relevant laws and guidelines*.

The Project's implementation arrangements will figure as follows:

- Full Project implementation will be carried out under the guidance of a **Global Project Steering Committee** (GPSC) whose members include one representative from each of the following: UNDP, as Project Implementing Agency; UNOPS as Project Executing Agency for the global project component; a senior level official designated by each of the Project participating Governments[9]; one representative each from HCWH and WHO as Principle Cooperating Agencies; as well as other major donors and partners, if any. Representatives from UNDP Country Offices in the participating countries, as well as other GEF IA/EAs and the Stockholm Convention Secretariat will be invited to participate in the Steering Committee.
- In each participating country, a **National Project Steering Committee (NPSC)** will assume oversight for national Full Project activities.
- A project **Chief Technical Advisor** (CTA) will have overall responsibility for Project implementation. The CTA will be assisted by a Senior Public Health Advisor provided by WHO; a Senior Policy Advisor provided by HCWH; and a Global Project Coordinator/Technical Advisor. The CTA will additionally be assisted by a Senior Expert on Health-care Waste Management Systems, a Technology Development Expert (provided by the University of Dar es Salaam Department of Mechanical and Chemical Engineering), and a Training Program Advisor (provided by the University of Illinois School of Public Health Great Lakes Center). The above will constitute the Project **Global Expert Team** (GET).
- The **Global Expert Team** (GET) will provide technical and policy expertise and will have joint responsibility to assure that Project activities are successfully implemented. The GET will oversee global coordination and management, under the overall policy direction provided by the Project Steering Committee (GPSC), with the day-to-day guidance of the Chief Technical Advisor (CTA) and/or the Global Project Coordinator/Technical Advisor, and in consultation with the HCWH and WHO Advisors.
- Each participating country will also benefit from a working-level **National Working Group** (NWG) that will be composed of individuals from appropriate ministries, agencies and stakeholder groups who have practical involvement or interest in day-to-day Project activities.
- **National Consultants** (NCs) will be hired as necessary to coordinate and implement Project activities.

The Project also will benefit from the participation of two Principle Cooperating Agencies—the World Health Organization, on behalf of the WHO member states participating in the Project, and the international NGO coalition Health Care Without Harm—as well as a number of other Project Partners including the University of Illinois at Chicago Great Lakes Center (GLC) for Environmental and Occupational Safety and Health; AGENDA, a Tanzania-based NGO; country-specific NGO groups and experts; and the World Federation of Public Health Associations and the International Council of Nurses.

[9] Project activities in Tanzania are limited to research and development in service of regional and global needs.

ANNEXES for EXECUTIVE SUMMARY

ANNEX A: INCREMENTAL COST ANALYSIS

Global Environmental and Developmental Objectives

The proposed Project contributes to meeting the objectives of the GEF Operational Program 14 on Persistent Organic Pollutants, whose aim is to provide assistance to reduce and eliminate releases of POPs into the environment in developing countries and countries with economies in transition. The mercury components of the Project are consistent with GEF Operational Program 10, the Contaminants-Based Operational Program of the International Waters Focal Area. The Project's ultimate goal is the protection of the global environment and public health, as well as the protection of patients, health-care workers and communities, from the impacts of dioxins and mercury releases.

The overall Project objectives seek to demonstrate and promote best techniques and practices for health-care waste management, thereby minimizing health-care waste and reducing or eliminating releases of dioxins and mercury to the environment. This will be achieved by demonstrating the applicability of global best techniques and practices in seven countries in the world's five development regions. Barriers to national implementation of best environmental practices and techniques will be reduced by establishing model facilities and focused programs based on national considerations. If replicated nationally and sustained, best practices and techniques initiated during the Project's implementation are expected to reduce the release of an estimated 187 g TEQ of dioxins[10] and 2,910 kg of mercury[11] to the environment each year from participating countries' health-care sectors,[12] while demonstrating approaches that are more broadly replicable, and therefore possess important future scale-up potential. With respect to this last goal, the Project will establish or enhance national training programs, pursue policy reform, develop replication toolkits and awareness-raising materials, and disseminate these materials nationally and internationally.

The Project's global objectives will reduce barriers to the implementation of the Stockholm Convention on POPs, the International Waters Global Programme of Action (GPA), the Strategic Approach to International Chemicals Management (SAICM), and the World Health Organization's policies on safe health-care waste management and on mercury in health-care. An ancillary benefit of this work will be the improvement of health-delivery systems through the fostering of good health-care waste management practices, thereby supporting the prerequisites for achieving the Millennium Development Goals.

Baseline

The general trend in Project countries and in the rest of the world is growth in the total quantity of wastes that are generated by health-care activities. This growth is due to a significant increase in total health-care services delivered, as well as an increase in packaging and in the utilization of one-time use items. Another factor is the health requirement that all wastes that have come into contact with infectious materials must be treated as infectious wastes. Since most health-care facilities do not adequately segregate infectious or hazardous waste from ordinary domestic waste, the total quantity of waste deemed 'infectious' and requiring treatment as such, is greater than would be expected from the increase in medical waste alone.

At the time the Project entered into the GEF pipeline, the main emphasis in most developing countries and countries with economies in transition was to promote the combustion of infectious wastes in controlled incinerators where possible, but by open burning and locally built burners as necessary. This approach has

[10] Dioxin baseline data were obtained for five of the seven countries. The total estimated dioxin releases from the five countries amount to approximately 187 g TEQ per year.

[11] Mercury baseline estimates were obtained using total beds in all the countries (and only 6 states in India where data were available) and an emission factor of 2.8 g mercury per bed per year from both thermometers and sphygmomanometers. The total estimated amount of mercury released from the seven countries' health-care sectors amounts to approximately 2910 kg per year.

[12] This will be accomplished by minimizing the amount of health-care waste generated, limiting the amount of waste burned in medical waste incinerators and by reducing the quantity of broken mercury-containing devices improperly discarded or burned.

led to an increase in the combustion of health-care wastes under uncontrolled or poorly controlled conditions.

In August 2004, the WHO policy[13] on safe health-care waste management recommended scaled-up promotion of effective non-incineration technologies as a long-term strategy. Meeting the provisions of the Stockholm Convention was among the reasons cited for this policy position.[14]
Even so, in the countries in question pressure to expand the burning and incineration of health-care wastes continues because of a widespread insufficient understanding of the availability and efficacy of alternative approaches. The baseline, therefore, is a growing trend in developing and transition countries toward the combustion of increasingly large quantities of health-care waste by open burning and in poorly performing incinerators. This, in turn, increases the total generation and release of unintentional POPs to the global environment. In the absence of the outcomes and results to be demonstrated by this Project, this trend will continue and will therefore continue to pose significant risks to human health and the environment.

The Project will also demonstrate the effective removal of barriers to pollution prevention approaches aimed at minimizing mercury releases to the environment from health-care activities. At present, mercury-containing thermometers, blood pressure cuffs and other medical devices are in widespread use. At the time the Project was entered into the GEF pipeline, few developing countries or countries with economies in transition – and none of the participating Project countries – had programs or policies in place to reduce mercury releases from health-care facilities. In August 2005, WHO adopted a policy[15] on mercury in health-care that promotes the proper clean-up, handling and storage of mercury wastes in health-care settings, encourages the use of mercury-free medical devices, and supports an eventual ban on the use of mercury-containing medical devices. This Project will provide one of the first opportunities to demonstrate the implementation of the new WHO mercury policy in the developing and transition country setting.

GEF Intervention

Adverse environmental and public health impacts of health-care waste management can be traced to both improper practices and use of environmentally unsound technologies. Lack of segregation, unsafe handling of waste, dumping of untreated waste, preferential procurement of toxic products, extensive use of disposable materials, inadequate procedures for clean-up and containment of spills, weak inventory controls of time-sensitive pharmaceuticals and reagents, and inappropriate classification of non-infectious waste as bio-hazardous waste are examples of poor practices that lead to high rates of medical waste generation in health facilities. Attempts to solve the challenge of infectious waste disposal through burning and incineration have often been less than fully satisfactory in many developing countries, even without considering the serious problems of dioxin formation and release. In many cases, the incinerators of choice cause objectionable smoke and odors, break down frequently, are difficult to properly operate and maintain, produce toxic ash, and discourage efforts at segregation, recycling and waste minimization. The solution, therefore, must address both the practices and technologies used.

There is a growing understanding that proper treatment of infectious health-care wastes must be part of a facility-wide systems approach to waste management. At the level of "on the ground" intervention, the approach must involve institutionalizing best environmental practices at health-care facilities in order to minimize the production of health-care waste. In addition, the systems approach entails the use of appropriate technologies that do not involve combustion of health-care waste. Together these components comprise an Alternative Systems Approach to health-care waste management that can effectively reduce and eliminate releases of dioxins and mercury. The Project's Alternative Systems Approach to health-care waste management will fully integrate the Project's global environmental objectives into more immediate efforts to improve the performance of health-care delivery systems, protect worker health and safety, and support the adoption of alternative technologies suitable for the treatment of health-care waste that

[13] "Safe health-care waste management," policy paper, World Health Organization, Geneva, August 2004.
[14] While such techniques and practices are being applied in many OECD countries, there is little experience in their application under the conditions that prevail in many developing countries and countries with economies in transition.
[15] "Mercury in health care," policy paper, World Health Organization, Geneva, August 2005.

effectively decontaminate waste, but do so below temperatures at which combustion and dioxin formation take place.

In virtually each and every case, despite Stockholm Convention obligations and in the absence of the Project, the baseline would be the generation of substantially larger quantities of health-care waste by the facilities to be targeted, and as a result, a substantially higher level of combustion of those wastes by open burning, uncontrolled burners or inadequately controlled incinerators.

GEF intervention will lay the basis for replication measures that serve to meet country obligations under the Convention with respect to requirements/promotion of Best Available Techniques and Best Environmental Practices for Medical Waste Incinerators and thereby, meet the objectives of Annex C which, in addressing *General prevention measures relating to both best available techniques and best environmental practices*[16] states: "Priority should be given to the consideration of approaches to prevent the formation and release of [unintentional POPs]."

Incremental Cost Matrix

The incremental cost matrix is provided directly below this summary. Under the baseline, the prevailing view is that some sporadic investment in elimination of unintentional POPs dioxin and mercury releases would likely occur, but at a significantly reduced rate. As Parties to the Stockholm Convention, Government legislation would lend support to efforts for elimination of unintentional POPs dioxin and mercury releases, but such support would not be expected to rapidly translate into increases in health sector organization or investment. Financing support for health-care waste management often does not appear as a significant budget line item for national or district health ministries or agencies, if it appears at all. Activities with respect to health-care waste management are often haphazardly organized, and implementation of initiatives intending to promote enhanced health-care waste management is often not enforced. Other barriers including lack of awareness of the benefits of adoption of best practices and techniques in health-care waste management and a lack of incentives for institutional and individual stakeholders, will also remain unaddressed without GEF intervention.

National circumstances in the different countries participating in this demonstration project vary greatly. Therefore, it makes sense to provide a narrative description of the baseline, alternative and increment for each participating country. On the other hand, the quantitative incremental cost calculation is given globally, by project component. In part, this is to simplify the preparation and presentation of information. (Presentation by both country and component would have been voluminous.) Additionally, a significant fraction of co-financing is not (or is not yet) allocated to individual countries, but is available to the Project globally, in some cases for later allocation as needed.

[16] See Annex C, Part V A chapeau, of the Stockholm Convention.

Table 6. Incremental cost analysis by country

Component	Baseline	Alternative	Increment
Global environmental benefits	Investments in adoption of Best Available Techniques and Best Environmental Practices with respect to medical health-care waste management will, to varying degrees amongst the participating countries, be limited due to a lack of incentives, a lack of awareness and capacity amongst stakeholders.	Total releases of dioxins and mercury to the global environment will have been reduced in countries participating in the Project. Appropriate and affordable health-care waste treatment technologies will be available for use in sub-Saharan Africa. Model approaches will have been demonstrated in countries at different stages of development and in different regions, and the lessons-learned will have been disseminated. Health-care institutions, governments, stakeholders and funding agencies will be able to take into account Project experiences in developing future Projects and interventions.	Reductions in dioxin and mercury releases will have been achieved that would not have been possible without the Project. Appropriate and affordable health-care waste treatment technologies will be available for use in sub-Saharan Africa, that otherwise would not be available. A more consistent and coherent approach to the implementation of best practices for health-care waste management will be in place in seven countries where this otherwise would have been impossible. Models and experiences that otherwise would not have been available can be taken into account by health-care institutions, governments, stakeholders and funding agencies in developing future Projects and interventions
National benefits			
Argentina	A number of disparate activities are in place. Buenos Aires has instigated a ban on incineration and one city hospital has announced a mercury-free pledge. There is a move underway to include chemotherapy waste with medical wastes presently burned. No centralized approach is in place or planned in absence of the Project.	Accelerate the pace of change. Initiation of a centralized training program; incorporation of Best Available Techniques and Practices methodologies into national training curricula; implementation of a centralized health-care waste management strategy based on an Alternative Systems Approach in all regions in the country.	Reductions in dioxin and mercury releases will have been achieved that would not have been possible without the Project. A more consistent and coherent approach at the national and state level to the implementation of best practices for health-care waste management will be in place than would otherwise have been possible. New Investment in appropriate technology, and related new understanding will have occurred that otherwise would not have happened.

Component	Baseline	Alternative	Increment
India	A ban on incineration is in place for all types of wastes save category 1 and 2 types – human and animal pathological waste. However, the ban is not well-implemented or enforced. Centralized incineration facilities in urban sectors manage waste poorly and often burn more than category 1 and 2 wastes. In rural areas, awareness is virtually non-existent and open burning is the standard. Despite existence of good models, the application of policy and practices is varied and inconsistent.	Accelerate the pace of change. Adoption of a centralized and holistic system at the state level; enhancement of policy to support enforcement of ban on incineration.	Reductions in dioxin and mercury releases will have been achieved that would not have occurred without the Project. An improved state level model will be in place that can serve as a model to other states. Advances that would not otherwise be possible will have been made in one state that is currently having difficulty implementing national policies.
Latvia	Knowledge with respect to the issue is relatively high but no centralized/harmonized treatment or training program is in place or is being considered.	Enhancement of existing practices, brought up to EU standards. Accelerate the speed of change.	Reductions in dioxin and mercury releases will have been achieved that would not have been possible without the Project. A more consistent and coherent approach to the implementation of best practices for health-care waste management will be in place than would otherwise have occurred.
Lebanon	Despite a higher level of knowledge with respect to the issue, practices are not ideal at present and there is no cohesive plan of action for sustainable health-care waste management.	Accelerate the speed of change. Develop model for dissemination of BAT and BEP in sector throughout Arab states.	Reductions in dioxin and mercury releases will have been achieved that would not have been possible without the Project. A more consistent and coherent approach to the implementation of best practices for health-care waste management will be in place than would otherwise have occurred.

Component	Baseline	Alternative	Increment
Philippines	Some hospitals have adopted health-care waste management practices and a good immunization model is in place under the management of the Department of Health. DOH conducts some training but it is not strategically organized to address HCWM practices in a holistic manner. The country has put in place a ban on incineration but lack of awareness of options threatens to jeopardize its success.	Maintain and enforce the ban on incineration. Incorporation of Best Available Techniques and Practices methodologies into national training curricula; implementation of a centralized health-care waste management strategy based on an Alternative Systems Approach in all regions in the country.	Reductions in dioxin and mercury releases will have been achieved that would not have been possible without the Project. A more consistent and coherent approach to the implementation of best practices for health-care waste management will be in place than would otherwise have been possible. New Investment in appropriate technology, and related new understanding will have occurred that otherwise would not have happened.
Senegal	No BAT and BEP practices in place in hospitals; no availability of alternative technologies; little to no management or budget allocation for health-care waste management. Open burn or basic incineration is standard.	Incorporation of Best Available Techniques and Practices methodologies into national training curricula; implementation of a centralized health-care waste management strategy based on an Alternative Systems Approach in the country. Link with Tanzania research and development component will aim to provide cost-effective technological solutions.	Reductions in dioxin and mercury releases will have been achieved that would not have been possible without the Project. Advances will have been made toward establishing a more consistent and coherent approach to the implementation of best practices for health-care waste management than would otherwise have been possible.
Tanzania (R&D component)	No access to affordable, viable no-burn technologies in sub-Saharan Africa.	Design alternative technologies that meet critical local demands that the technologies be: easily made at the local level using local materials; viable and effective; inexpensive/affordable; energy efficient; easily mass-produced. Make blue prints available and propose simple business model.	Appropriate and affordable health-care waste treatment technologies will be available for use in sub-Saharan Africa that would otherwise not have been available. In many cases, these will be the first practical alternatives available that can replace open burning of health-care waste or combustion in locally built incinerators that lack adequate (or any) controls.

Component	Baseline	Alternative	Increment
Vietnam	Health-care waste management practices are not the standard operating procedure in hospitals. Burning is presently considered the best option and most incinerators are of basic design, with no pollution controls applied.	Incorporation of Best Available Techniques and Practices methodologies into national training curricula; implementation of a centralized health-care waste management strategy based on an Alternative Systems Approach in all regions in the country.	Reductions in dioxin and mercury releases will have been achieved that would not have been possible without the Project. Advances will have been made toward establishing a more consistent and coherent approach to the implementation of best practices for health-care waste management than would otherwise have been possible.

Table 7. Incremental cost analysis by Project component

Component	Baseline Cost (US$)	Alternative Cost (US$)	Incremental Cost (US$)	Cost to GEF (US$)
1. Establish model facilities and programs to exemplify best practices in health-care waste management, and develop materials to facilitate replication.	100,000	Costs: **4,801,828** GEF: 1,969,911 Co-funders: 2,831,917	4,701,828	1,969,911
2. Deploy and evaluate commercially-available, non-incineration health-care waste treatment technologies appropriate to the needs of the facility or cluster.	3,500,000	Costs: **7,315,299** GEF: 2,852,497 Co-funders: 4,462,802	3,815,299	2,852,497
3. Develop, test, manufacture and deploy affordable, small-scale non-incineration technologies for appropriate use in small- and medium-size facilities in sub-Saharan Africa, and prepare and disseminate manuals for their manufacture, installation, operation, maintenance and repair.	130,000	Costs: **1,521,842** GEF: 1,123,686 Co-funders: 398,156	1,391,842	1,123,686
4. Introduce and demonstrate best practices for management of mercury waste, and develop and disseminate awareness-raising and educational materials related to mercury.	150,000	Costs: **999,500** GEF: 384,000 Co-funders: 615,500	849,500	384,000
5. Establish or enhance training programs to build capacity for implementation of best practices and appropriate technologies beyond the model facilities and programs.	350,000	Costs: **4,441,365** GEF:1,664,879 Co-funders: 2,776,486	4,091,365	1,664,879
6. Review relevant policies, seek agreement by relevant authorities on recommended updates or reformulations if needed, seek agreement on an implementation plan, and if appropriate, assist in holding a policy review conference for these purposes.	180,000	Costs: **662,823** GEF: 380,823 Co-funders: 282,000	482,823	380,823
7. Distribute Project results on best techniques and practices to relevant stakeholders, disseminate materials and hold conferences or workshops to encourage replication.	120,000	Costs: **2,161,007** GEF: 1,194,484 Co-funders: 966,523	2,041,007	1,194,484
8. Make Project results on demonstrated best techniques and practices available for dissemination and scaling-up regionally and globally.	400,000	Costs: **1,393,287** GEF: 756,176 Co-funders: 637,111	993,287	756,176
Total costs	**4,930,000**	**Total: 23,296,949** **GEF: 10,326,455** **Co-funders: 12,970,494**	**18,366,949**	**10,326,455**

ANNEX B: PROJECT BUDGET BY COMPONENT

Project Component	GEF fund (US$)	Country/ partner co-financing (US$)	Total project activity (US$)
1. Establish model facilities and programs to exemplify best practices in health-care waste management, and develop materials to facilitate replication.	1,969,911	2,831,917	**4,801,828**
2. Deploy and evaluate commercially-available, non-incineration health-care waste treatment technologies appropriate to the needs of the facility or cluster.	2,852,497	4,462,802	**7,315,299**
3. Develop, test, manufacture and deploy affordable, small-scale non-incineration technologies for appropriate use in small- and medium-size facilities in sub-Saharan Africa, and prepare and disseminate manuals for their manufacture, installation, operation, maintenance and repair.	1,123,686	398,156	**1,521,842**
4. Introduce and demonstrate best practices for management of mercury waste, and develop and disseminate awareness-raising and educational materials related to mercury.	384,000	615,500	**999,500**
5. Establish or enhance training programs to build capacity for implementation of best practices and appropriate technologies beyond the model facilities and programs.	1,664,879	2,776,486	**4,441,365**
6. Review relevant policies, seek agreement by relevant authorities on recommended updates or reformulations if needed, seek agreement on an implementation plan, and if appropriate, assist in holding a policy review conference for these purposes.	380,823	282,000	**662,823**
7. Distribute Project results on best techniques and practices to relevant stakeholders, disseminate materials and hold conferences or workshops to encourage replication.	1,194,484	966,523	**2,161,007**
8. Make Project results on demonstrated best techniques and practices available for dissemination and scaling-up regionally and globally.	756,176	637,111	**1,393,287**
Total	**10,326,455**	**12,970,494**	**23,296,949**

ANNEX C: PROJECT CO-FINANCING BY COMPONENT AND SOURCE

	Component 1: Model facility	**Component 2:** Technology demonstration	**Component 3:** Technology development	**Component 4:** Mercury elimination	**Component 5:** National training program	**Component 6:** Policy review	**Component 7:** National dissemination	**Component 8:** Global/ regional dissemination	**Total co-financing by country/ partner**
	US$	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**
Project countries									
Argentina	846,398	270,000	0	65,000	464,884	105,000	434,884	0	**2,186,166**
India	127,500	42,500	0	127,500	140,555	0	42,500	0	**480,555**
Latvia	170,211	2,521,000	0	136,000	0	20,000	0	0	**2,847,211**
Lebanon	729,632	249,000	0	0	600,000	0	0	0	**1,578,632**
Philippines	363,509	528,302	0	0	458,491	0	75,472	0	**1,425,774**
Senegal	90,000	0	0	0	720,000	0	0	0	**810,000**
Vietnam	45,000	710,000	0	20,000	220,000	15,000	30,000	0	**1,040,000**
Tanzania	0	0	181,156	0	0	0	0	0	**181,156**
Country Total									**10,549,494**
Project partners									
HCWH	385,000	75,000	150,000	200,000	50,000	75,000	150,000	290,000	**1,375,000**
WHO	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	**536,000**
UIC	7,667	0	0	0	55,556	0	166,667	235,111	**465,000**
Other*	0	0	0	0	0	0	0	45,000	**45,000**
Partner Total									**2,361,000**
Total co-financing by component	**2,831,917**	**4,462,802**	**398,156**	**615,500**	**2,776,486**	**282,000**	**966,523**	**637,111**	**12,970,494**

*Other minor co-financing sources available upon request.

ANNEX D: PROJECT LOGICAL FRAMEWORK

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Goal	Protection of the global environment and public health by reducing releases of dioxins and mercury			
Global objective	Reduction of barriers to implementation of the Stockholm Convention, International Waters GPA, SAICM and WHO policies			
Project objective	Demonstration and promotion of best practices and techniques for health-care waste management			
Outcome/ Component 1	Best practices for health-care waste management demonstrated, documented and made replicable			
Output 1	• Model facilities and programs are established and implemented. • Activities of model facilities/programs are documented and their performance is evaluated to exemplify best practices in health-care waste management. • Useful replication toolkits on how to implement best practices and techniques are developed.	• Tools for baseline assessment developed/adapted and facility baseline assessment completed • System for measurement and documentation established • Health-care waste management plan completed and implemented • Facility-wide training instituted • Practices at facility measured, evaluated and documented • Replication materials on best practices and techniques created and distributed • Replication materials evaluated	• Tool document and baseline report • Guidelines for measurement and documentation of results • Health-care waste management plan and its implementation records • Training curricula and programs • List of training attendees • Facility-wide training reports • Quarterly and final reports on facility activities • Replication materials • Replication toolkits and their evaluation • Project website	• Political and social stability will be maintained. • Full buy-in and cooperation from the health sector will be maintained in the face of urgent competing priorities and demands.

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Outcome/ Component 2	Appropriate non-incineration health-care waste treatment technologies successfully deployed and demonstrated			
Output 2	• Commercially-available, non-incineration health-care waste treatment technologies that are appropriate to the needs of the facility or cluster, and that satisfy their needs, are purchased, deployed and evaluated.	• Commercially-available non-incineration technologies successfully purchased and deployed • Institutional needs satisfied • Environmental and performance standards satisfied • Use/efficiency and cost implications reported	o Technologies operating at facilities and photographs o Interviews with facility management o Reports covering microbial inactivation tests, use and costs, throughput, environmental performance and records of treatment cycles o Project website	• Satisfactory technologies that meet Project demonstration requirements can be purchased within budget (except for some facilities in Africa where research on lower cost alternatives will be undertaken). • In the event that technologies will need to be imported, customs formalities will not significantly delay Project progress. • Facility management will honestly and accurately report on facility needs and technology performance.

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Outcome/ Component 3	Affordable, non-incineration, health-care waste treatment technologies successfully designed to meet African needs and manufactured, and their replication plans in place			
Output 3	• Appropriate, affordable, small-scale non-incineration health-care waste treatment technologies are developed, tested, manufactured and deployed for use in small- and medium-sized facilities under conditions that prevail in much of sub-Saharan Africa. • Blueprints and manuals for manufacture, installation, operation, maintenance and repair are prepared and disseminated.	• Needs assessment and performance requirements completed for technologies to be developed • Engineering designs developed • Prototypes built and tested • Technology fabrication demonstrated and technology validated • Technology demonstrated and tested in a health-care setting • Manuals for construction, installation, operation, maintenance and repair completed and disseminated • At least one manufacturer in Africa commercially constructing new technologies, and a program in place to provide assistance to other potential manufacturers	• Needs assessment report • Written performance specifications • Engineering design drawings and files • Digital photographs of prototypes • Laboratory and field-test results • Digital photographs of fabricated technologies • Validation report • Reports on performance in health-care setting by developers and users, including photographs • Manuals • Manufacturer business plan • Report on ongoing programs to assist potential manufacturers • Project website	• Political and social stability will be maintained. • Locally available skills and materials necessary to build and repair these technologies exist and will be available. • Technologies can be developed within reasonable bounds of cost and affordability.

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Outcome/ Component 4	Best practices for management of mercury waste demonstrated, documented and made replicable, and use of mercury-free devices promoted * *the latter will only be executed if suitable additional bilateral co-financing can be secured.*			
Output 4	• Practices on safe handling and disposal of phased-out mercury devices are developed, staff training is completed and practices are implemented in model facilities in a replicable way. • Affordable mercury-free devices are purchased and introduced for acceptable and efficient use in model facilities.	• Guidelines on safe handling and disposal of phased-out mercury devices developed • Training on mercury practices organized • Comparisons of the efficacy, acceptability, full costs, device lifespan and other relevant characteristics of mercury-free versus mercury-containing devices carried out • Awareness-raising and educational materials on mercury developed • Mercury conferences held, where applicable • Devices received and used by the facilities • 80% of mercury devices in facilities replaced with mercury-free alternatives	• Guidelines on safe handling and disposal of phased-out mercury devices • Training report • Reports on comparisons of mercury-free versus mercury-containing devices • Mercury practices implementation report • Awareness-raising and educational materials on mercury • Conference minutes, agenda and participant list • Interviews and evaluation reports from model facility staff and other participants • Project website • Device receipts and usage records	• Facility staff can be convinced of the efficacy of non-mercury devices and will honestly and accurately report on their efficacy and acceptability. • Political and economic conditions will not negatively impact the acquisition or adoption of mercury-free devices. • Satisfactory mercury-free devices will be available at costs that are consistent with Project replication objectives.

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Outcome/ Component 5	New and/or enhanced training programs established to build capacity for the implementation of best practices and appropriate technologies beyond model facilities and programs			
Output 5	• Effective national training programs are established or enhanced and are building capacity in the health-care and related sectors for the implementation of best practices and the use of appropriate technologies beyond model facilities and programs.	• Core curriculum developed • Partnership with host institutions formalized • Training TORs/plan developed • At least two training sessions conducted • Student certification program established, if applicable • Training evaluation completed	• Core curriculum documents • MOU with host training institutions • Training reports with lists of attendees • Test scores and copy of test if applicable • Copies of student certificates, if applicable • Training evaluation forms • Interview with employers • Project website	• The training program will target the most appropriate personnel. • Non-Project facilities will be willing to implement systems of the kind demonstrated by the Project, and are in a position to effectively utilize the skills that the training program is designed to impart. • Training programs will provide knowledge that spreads to other personnel and will outlast the Project itself.

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Outcome/ Component 6	National policies aimed at replicating and sustaining best techniques and practices demonstrated by the Project explored and, where feasible, initiated			
Output 6	• Review of relevant national policies, regulations and guidelines is conducted in light of Project experiences. • Appropriate policy updates or revisions are recommended and further agreement and commitments by relevant authorities are pursued. • If appropriate, a national policy review conference by relevant authorities is held for these purposes.	• Relevant national policies listed and analyzed in light of Project experiences • Consideration of updates or revisions to relevant guidelines or other national policy instruments recommended • Dialogue/interview with relevant authorities (MOE, MOH, others) on possible updates or reformulations of policies or guidelines aimed at replicating and sustaining the demonstrated best practices • National policy review conference held, if appropriate	• Review and recommendation reports • Government working papers and documents • Dialogue/interview notes • Conference minutes with participant list • Project website	• Project countries will be willing, given the political and economic climate, to undertake a policy review aimed at possible reformulations and/or updates to their policy instruments. • If policy updates are recommended, the relevant stakeholders will be able to institute the recommended changes.

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Outcome/ Component 7	Project results disseminated to all stakeholders for awareness-raising aimed at their replication			
Output 7	• Project results on best techniques and practices are distributed to relevant federal and state ministries or agencies, health service delivery institutions and other stakeholders. • Targeted promotional materials, workbooks and other tools are disseminated to promote widespread replication. • Conferences or workshops are held to encourage replication. • Agreement of relevant authorities is sought on an implementation plan for replication of best practices.	• Awareness-raising and educational materials developed and localized • National conferences and/or workshops held • Toolkits distributed and utilized • Public awareness campaign conducted to provide information to the general public, patients and families • Interviews/dialogues with relevant authorities held for further agreement or commitment on implementation plan for replication of best practices • Local language materials distributed	• Awareness-raising and educational materials • Conference agenda and participant lists • Number of toolkits distributed • List of stakeholders and stakeholder networks who have been reached and reports on the manner by which they were reached • Report on dissemination strategies used • Reports on public awareness campaign • Report on evaluation of effectiveness • Interview/dialogue notes • List of receivers of materials printed in local languages • Project website and online resource access statistics	Information and encouragement will not by themselves be sufficient for securing broad replication. Other conditions prerequisite for replication include: • Appropriate supporting policy instruments (as described in Component 4) will be put in place. • Human and economic resources will be sufficiently available, relative to other important health-care priorities, to engage in these activities. • Leadership at all levels, from the national to the state to the facility, will be able and willing to engage on these important issues.

	Project strategy	Objectively verifiable indicators	Sources of verification	Assumptions and risks
Outcome/ Component 8	Global, regional and national counterparts from agencies, governments and NGOs beyond participating countries informed of best techniques and practices for the purpose of replication			
Output 8	• Project results on demonstrated best techniques and practices are made available for dissemination globally and regionally. • Project materials are disseminated through international and regional networks.	• Project-related materials developed • Project results disseminated at international and regional meetings • Project website developed and updated • Materials distributed • GEOLibrary augmented with Project results	• Materials related to Project results • List of international and regional stakeholders who received results from Project partners • List of international and regional conferences where presentations were made and information was disseminated • Project website and online resource access statistics • List of people who received printed materials • Project-specific content in the GEOLibrary	• Global and regional dissemination of Project results will not be sufficient to globally reform health-care waste management practice. It is assumed, however, that demonstration results in the Project countries will help inform interventions that may be instituted in other countries.

ANNEX E: DETAILED PROJECT BUDGET

1) OVERALL PROJECT BUDGET

Description	Year 1	Year 2	Year 3	Year 4	Total
	US$	US$	US$	US$	US$
International personnel					
Global coordination, Global Expert Team and international technical consultants	**373,870**	**373,870**	**373,870**	**224,600**	**1,346,210**
Global and regional dissemination					
Project website; participation at global and regional conferences; validation of emerging health-care waste management technologies and mercury-free technologies; Project-related publications and validation testing; and collaboration and information-exchange with related GEF Projects	**93,750**	**93,750**	**93,750**	**93,750**	**375,000**
Global meetings					
Global Project Steering Committee Meetings and National Consultant trainings	**100,000**	**100,000**	**100,000**	**0**	**300,000**
Country budgets					
Argentina	474,312	217,592	205,583	116,513	1,014,000
India	415,217	259,187	207,658	132,238	1,014,300
Latvia	223,137	222,990	222,843	145,330	814,300
Lebanon	262,664	228,373	194,081	129,182	814,300
Philippines	578,642	194,415	172,188	99,190	1,044,435
Senegal	538,744	240,498	153,313	80,315	1,012,870
Tanzania	332,720	288,480	116,977	36,823	775,000
Vietnam	592,017	211,290	169,563	101,065	1,073,935
Line total	**3,417,453**	**1,862,825**	**1,442,206**	**840,656**	**7,563,140**
Miscellaneous					
Technology contingency	300,000	0	0	0	300,000
Miscellaneous, reporting, evaluation	0	40,000	0	60,000	100,000
UNOPS (8% of global & Tanzania components)	142,105	100,000	100,000	0	342,105
Line total	**442,105**	**140,000**	**100,000**	**60,000**	**742,105**
Total Project budget excluding PDF A and PDF B	**4,427,178**	**2,570,445**	**2,109,826**	**1,219,006**	**10,326,455**
Project co-financing and in-kind contributions					**12,970,494**
Sub-total					**23,296,949**
PDF A					25,000
PDF B					699,948
Total Project budget including PDF A and PDF B					**24,021,897**

2) COUNTRY-SPECIFIC PROJECT BUDGET

Annex E-B contains country-specific budgets categorized by activity over the Project's four years. Categories include: national management, model facilities, demonstration technologies, non-mercury equipment and policies, national policy review, national dissemination activities, national missions and international support from Project partners (the World Health Organization, Health Care Without Harm and the University of Illinois at Chicago). The Project's technology-development activities (component 3) will be implemented in Tanzania. For more information on this component, please refer to the Tanzania budget breakdown.

Argentina Budget Breakdown (estimate)

National activities and components	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
National management: national meetings, national coordination, consulting and translations	22,375	22,375	22,375	22,375	**89,500**
Model facilities (component 1): non-technology capital costs, recurring costs, storage units if applicable, equipment for on-site training and consultation	109,293	54,647	0	0	**163,940**
Demonstration technology linked to model facilities (component 2): capital costs, accessories, site preparation, permits, trainings, transportation vehicles, repair and maintenance and validation testing	244,710	0	0	0	**244,710**
Non-mercury equipment and policy (component 4): spill kits, safe storage for existing mercury equipment, mercury-free alternative devices, mercury assessment tools and activities, public awareness activities and national mercury conference if applicable	11,875	11,875	11,875	11,875	**47,500**
National training program (component 5): One-time costs include curriculum development, translation if applicable, equipment procurement, activities related to the inclusion of HCWM best practices in related professional curricula, and program evaluation. Costs per training session include student materials; facility cost; subsidies for room, board and transportation of students; trainer costs; administrative costs; and transportation to model facilities.	0	42,637	85,275	42,638	**170,550**
National policy review (component 6)	3,750	3,750	3,750	3,750	**15,000**
National dissemination activities (component 7): development and design of dissemination materials, national conference(s) to increase knowledge and awareness of relevant professional and government officials on HCWM and to disseminate Project results, and dissemination through relevant public health-care associations and Project partners	17,125	17,125	17,125	17,125	**68,500**
National missions: costs related to all missions to Argentina (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
International support: costs associated with support received from WHO, HCWH and UIC	46,434	46,433	46,433	0	**139,300**
Total	**474,312**	**217,592**	**205,583**	**116,513**	**1,014,000**

India Budget Breakdown (estimate)

National activities and components	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
National management: national meetings, national coordination and consulting and translations	23,250	23,250	23,250	23,250	**93,000**
Model facilities (component 1): non-technology capital costs, recurring costs, storage units if applicable and equipment for on-site training and consultation. This applies both to the individual facility in the less-resourced state, and to strategic interventions in upgrading systems at a number of facilities to build a model network in another state.	105,034	52,516	0	0	**157,550**
Demonstration technology linked to model facilities (component 2): capital costs, accessories, site preparation, permits, trainings, transportation vehicles, repair and maintenance, and validation testing both for a specific technology in an on-site application at one model facility in a less-resourced state, and for technology enhancements possibly at a central treatment facility or within individual facilities in the model state project	198,750	66,250	0	0	**265,000**
Non-mercury equipment and policy (component 4): spill kits, safe storage for existing mercury equipment, mercury-free alternative technologies, mercury assessment tools and activities, public awareness activities and national mercury conference if applicable	18,000	18,000	18,000	18,000	**72,000**
National training program (component 5): One-time cost includes curriculum development and enhancement of existing programs to build on lessons learned from the Project, translation if applicable, equipment procurement, activities related to the inclusion of HCWM best practices in related professional curricula, and program evaluation. Costs per training session include student materials; facility cost; subsidies for room, board and transportation of students; trainer costs; administrative costs; and transportation to model facilities.	0	28,987	57,975	28,988	**115,950**
National policy review (component 6)	5,000	5,000	5,000	5,000	**20,000**
National dissemination activities (component 7): development and design of dissemination materials, national conference(s) to increase knowledge and awareness of relevant professional and government officials on HCWM and to disseminate Project results, and dissemination through relevant public health-care associations and Project partners	0	0	38250	38250	**76,500**
National missions: costs related to all missions to India (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
International support: costs associated with support received from WHO, HCWH and UIC	46,433	46,434	46,433	0	**139,300**
Total	**415,217**	**259,187**	**207,658**	**132,238**	**1,014,300**

Latvia Budget Breakdown (estimate)

National activities and components	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
National management: national meetings, national coordination and consulting and translations	48,625	48,625	48,625	48,625	**194,500**
Model facilities (component 1): non-technology capital costs, recurring costs, storage units if applicable and equipment for on-site training and consultation	62,453	31,227	0	0	**93,680**
Demonstration technology linked to model facilities (component 2): capital costs, accessories, site preparation, permits, trainings, transportation vehicles, repair and maintenance, and validation testing	0	0	0	0	**0**
Non-mercury equipment and policy (component 4): spill kits, safe storage for existing mercury equipment, mercury-free alternative devices, mercury assessment tools and activities, public awareness activities and national mercury conference if applicable	14,375	14,375	14,375	14,375	**57,500**
National training program (component 5): One-time cost includes curriculum development, translation if applicable, equipment procurement, activities related to the inclusion of HCWM best practices in related professional curricula, and program evaluation. Costs per training session include student materials; facility cost; subsidies for room, board and transportation of students; trainer costs; administrative costs; and transportation to model facilities.	0	31,080	62,160	31,080	**124,320**
National policy review (component 6)	6,250	6,250	6,250	6,250	**25,000**
National dissemination activities (component 7): development and design of dissemination materials, national conference(s) to increase knowledge and awareness of relevant professional and government officials on HCWM and to disseminate Project results, and dissemination through relevant public health-care associations and Project partners	26,250	26,250	26,250	26,250	**105,000**
National missions: costs related to all missions to Latvia (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
International support: costs associated with support received from WHO, HCWH and UIC	46,434	46,433	46,433	0	**139,300**
Total	**223,137**	**222,990**	**222,843**	**145,330**	**814,300**

Lebanon Budget Breakdown (estimate)

National activities and components	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
National management: national meetings, national coordination and consulting and translations	61,216	61,218	61,218	61,218	**244,870**
Model facilities (component 1): non-technology capital costs, recurring costs, storage units if applicable and equipment for on-site training and consultation	105,513	52,757	0	0	**158,270**
Demonstration technology linked to model facilities (component 2): capital costs, accessories, site preparation, permits, trainings, transportation vehicles, repair and maintenance and validation testing	0	0	0	0	
Non-mercury equipment and policy (component 4): spill kits, safe storage for existing mercury equipment, mercury-free alternative devices, mercury assessment tools and activities, public awareness activities and national mercury conference if applicable	12,625	12,625	12,625	12,625	**50,500**
National training program (component 5): One-time cost includes curriculum development, translation if applicable, equipment procurement, activities related to the inclusion of HCWM best practices in related professional curricula, and program evaluation. Costs per training session include student materials; facility cost; subsidies for room, board and transportation of students; trainer costs; administrative costs; and transportation to model facilities.	0	18,465	36,930	18,465	**73,860**
National policy review (component 6)	2,500	2,500	2,500	2,500	**10,000**
National dissemination activities (component 7): development and design of dissemination materials, national conference(s) to increase knowledge and awareness of relevant professional and government officials on HCWM and to disseminate Project results, and dissemination through relevant public health-care associations and Project partners	15,626	15,625	15,625	15,624	**62,500**
National missions: costs related to all missions to Lebanon (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
International support: costs associated with support received from WHO, HCWH and UIC	46,434	46,433	46,433	0	**139,300**
Total	**262,664**	**228,373**	**194,081**	**129,182**	**814,300**

Philippines Budget Breakdown (estimate)

National activities and components	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
National management: national meetings, national coordination and translations	18,625	18,625	18,625	18,625	**74,500**
Model facilities (component 1): non-technology capital costs, recurring costs, storage units if applicable and equipment for on-site training and consultation	97,583	48,792	0	0	**146,375**
Demonstration technology linked to model facilities (component 2): capital costs, accessories, site preparation, permits, trainings, transportation vehicles, repair and maintenance and validation testing	362,000	0	0	0	**362,000**
Non-mercury equipment and policy (component 4): spill kits, safe storage for existing mercury equipment, mercury-free alternative devices, mercury assessment tools and activities, public awareness activities and national mercury conference if applicable	13,125	13,125	13,125	13,125	**52,500**
National training program (component 5): One-time cost includes curriculum development, translation if applicable, equipment procurement, activities related to the inclusion of HCWM best practices in related professional curricula and program evaluation. Costs per training session include student materials; facility cost; subsidies for room, board and transportation of students; trainer costs; administrative costs; and transportation to model facilities.	0	26,565	53,130	26,565	**106,260**
National policy review (component 6)	5,000	5,000	5,000	5,000	**20,000**
National dissemination activities (component 7): development and design of dissemination materials, national conference(s) to increase knowledge and awareness of relevant professional and government officials on HCWM and to disseminate Project results, and dissemination through relevant public health-care associations and Project partners	17,125	17,125	17,125	17,125	**68,500**
National missions: costs related to all missions to the Philippines (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
International support: costs associated with support received from WHO, HCWH and UIC	46,434	46,433	46,433	0	**139,300**
Total	**578,642**	**194,415**	**172,188**	**99,190**	**1,044,435**

Senegal Budget Breakdown (estimate)

National activities and components	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
National management: national meetings, national coordination and translations	63,000	31,500	0	0	**94,500**
Model facilities (component 1): non-technology capital costs, recurring costs, storage units if applicable and equipment for on-site training and consultation	128,810	0	0	0	**128,810**
Demonstration Technology linked to model facilities (component 2): capital costs, accessories, site preparation, permits, trainings, transportation vehicles, repair and maintenance and validation testing	246,750	82,250	0	0	**329,000**
Non-mercury equipment and policy (component 4): spill kits, safe storage for existing mercury equipment, mercury-free alternative devices, mercury assessment tools and activities, public awareness activities and national mercury conference if applicable	12,875	12,875	12,875	12,875	**51,500**
National Training Program (component 5): One-time cost includes curriculum development, translation if applicable, equipment procurement, activities related to the inclusion of HCWM best practices in related professional curricula and program evaluation. Costs per training session include student materials; facility cost; subsidies for room, board and transportation of students; trainer costs; administrative costs; and transportation to model facilities.	0	26,565	53,130	26,565	**106,260**
National policy review (component 6)	5,000	5,000	5,000	5,000	**20,000**
National dissemination activities (component 7): development and design of dissemination materials, national conference(s) to increase knowledge and awareness of relevant professional and government officials on HCWM and to disseminate Project results, and dissemination through relevant public health-care associations and Project partners	17,125	17,125	17,125	17,125	**68,500**
National missions: costs related to all missions to Senegal (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
International support: costs associated with support received from WHO, HCWH and UIC	46,434	46,433	46,433	0	**139,300**
Total	**538,744**	**240,498**	**153,313**	**80,315**	**1,012,870**

Tanzania Budget Breakdown (estimate)

Technology Development Component and respective activities (component 3)	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
Activity 1: Identification of concepts for development. Output: criteria/specifications identified, expert group convened, and advisory committee or network created. Expert group will develop criteria/engineering specifications, oversee technology development and testing and liaise with GET and GPSC. Advisory body will review criteria, specifications and designs. (Includes site visits by members of GET to two existing fabrication plants.)	56,210	0	0	0	**56,210**
Activity 2: Prototype development. Output: designs and prototypes for small- and medium-sized systems created and reviewed by expert group and advisory committee. Designs: Small-scale technology (multiple energy options), medium-scale technology (several energy options), small- and medium-scale shredders and reusable sharps containers.	143,953	47,984	0	0	**191,937**
Activity 3: Testing, modifications and draft manuals. Output: results of testing recorded and manuals finalized. Tests: performance, microbiological, durability, test of reusable sharps containers, and other tests. Draft manuals: construction, installation and operation/maintenance.	44,486	14,829	0	0	**59,315**
Activity 4: Field testing and documentation. Output: results of field tests recorded, modifications made, documentation and training materials completed. Tasks: (1) finalize arrangement with hospital and JSI, and conduct assessment, training, etc., on HCWM at hospital; (2) install technology and revise manual; (3) train hospital operators and draft training materials; (4) monitor usage, testing results, maintenance/repair and disposal of residues; and (5) review and finalize manuals and training materials.	24,348	24,348	12,174	0	**60,870**
Activity 5: Fabrication demonstration. Output: technology built using construction manuals, test results recorded, and fabrication of many units completed (50 small, 10 medium, 600 reusable sharps containers). Tasks: (1) assess market (drivers, barriers and solutions); (2) identify factories and entrepreneurs; (3) fabricate technologies using manuals; (4) test and certify technologies; (5) document replicability, costs and test results; and (6) fabricate several units (listed above).	0	92,118	39,479	0	**131,597**
Activity 6: Finalization of documentation and replication assistance. Output: manuals and training materials finalized and translated. Tasks: (1) finalize documents; (2) translate; (3) post materials on website, print copies and produce electronic copies on CD; (4) present results at national and regional GEF project conferences and other conferences; and (5) Tech Transfer teams assist in technology transfer to other countries.	0	49,499	21,214	0	**70,713**
Activity 7: Global and regional dissemination of component results.	16,430	16,430	16,430	16,431	**65,721**
Sub-total	285,427	245,209	89,297	16,430	**636,363**
10% Technology contingency	28,543	24,521	8,930	1,643	**63,637**
National missions: costs related to all missions to Tanzania (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
Total	**332,720**	**288,480**	**116,977**	**36,823**	**775,000**

Vietnam Budget Breakdown (estimate)

National activities and components	Year 1	Year 2	Year 3	Year 4	GEF Total
	US$	US$	US$	US$	US$
National management: national meetings, national coordination and translations	21,125	21,125	21,125	21,125	**84,500**
Model facilities (component 1): non-technology capital costs, recurring costs, storage units if applicable and equipment for on-site training and consultation	97,583	48,792	0	0	**146,375**
Demonstration technology linked to model facilities (component 2): capital costs, accessories, site preparation, permits, trainings, transportation vehicles, repair and maintenance, and validation testing	324,000	0	0	0	**324,000**
City-wide sharp waste management (component 2)	45,000	15,000	0	0	**60,000**
Non-mercury equipment and policy (component 4): spill kits, safe storage for existing mercury equipment, mercury-free alternative devices, mercury assessment tools and activities, public awareness activities and national mercury conference if applicable	13,125	13,125	13,125	13,125	**52,500**
National training program (component 5): One-time cost includes curriculum development, translation if applicable, equipment procurement, activities related to the inclusion of health-care waste management in related professional curricula and program evaluation. Costs per training session include student materials; facility cost; subsidies for room, board and transportation of students; trainer costs; administrative costs; and transportation to model facilities.	0	22,065	44,130	22,065	**88,260**
National policy review (component 6)	5,000	5,000	5,000	5,000	**20,000**
National dissemination activities (component 7): development and design of dissemination materials, national conference(s) to increase knowledge and awareness of relevant professional and government officials on HCWM and to disseminate Project results, and dissemination through relevant public health-care associations and Project partners	21,000	21,000	21,000	21,000	**84,000**
National missions: costs related to all missions to Vietnam (not including consultant salaries/fees)	18,750	18,750	18,750	18,750	**75,000**
International support: costs associated with support received from WHO, HCWH and UIC	46,434	46,433	46,433	0	**139,300**
Total	**592,017**	**211,290**	**169,563**	**101,065**	**1,073,935**

ANNEX F: RESPONSE TO PROJECT REVIEWS
ANNEX F1) WBG COMMENTS FROM THE PDF B PHASE
The World Bank, Global Environment Facility Operations
MSN MC4-419, 1818 H Street, N.W., Washington, DC 20433
December 08, 2004

Comment	Response
Overall Assessment of Project Design and Objectives	
Comment 1. While we believe the Project addresses an issue of major global concern, namely the reduction of dioxins, furans (D&F) and mercury emissions from improper disposal of healthcare waste (HCW), the proposal is overly ambitious in its scope, and its goals will be difficult to achieve. The approach presented tends to oversimplify the complexity of achieving adequate management of HCW, even at the single hospital level. The Project proposes to put in place separation and waste reduction programs at the national and regional levels, with a goal of ultimately decreasing D&F and mercury emissions. While reducing emissions would indeed be a great achievement, the preliminary step of developing efficient HCW management at a national level would be, in itself, a tremendous accomplishment. This will require: a. Policy changes, development and implementation of legal and regulatory framework for the management of HCW, and designation of responsible agencies (e.g. Ministries of Health, of Environment, Municipalities, etc.). b. Investments in training and development of national guidelines for HCW management and training of staff at healthcare facilities and staff at agencies or firms that provide waste management services (e.g. collection and disposal). c. Investments in equipment and infrastructure, including, but not limited to bags, bins and containers, safety gear, storage areas for waste at healthcare facilities, collection trucks, waste treatment equipment, landfill sites. d. Management training and incentives: engaging the management of healthcare facilities in HCW management initiatives is critical to their success. Close supervision and monitoring of staff performance is also paramount. e. Cost-recovery considerations: the feasibility of waste disposal methods and technologies, as well as their long-term sustainability are tightly linked to the effectiveness of their financial arrangements. Municipal versus private sector arrangements for waste management service provision, and costs of services need to be set up in order for HCW management systems to be effective.	The proposed approach and expected outcomes are explicitly designed to establish successful pilot programs and models in specific facilities or clusters of facilities. These pilot programs will demonstrate best practices relevant to local and national contexts and work to ensure that Project outputs are achieved. National dissemination will take place through specifically identified policy and educational channels. The investigation under the PDF B phase has not only identified a more consistent and user-friendly set of tools, guidance materials and standards produced internationally (e.g., by WHO and international aid agencies), but has also been instrumental in identifying and nurturing expertise beyond the Global Expert Team that will be enlisted in the full Project. The technical experts engaged by the Global Expert Team in the PDF B phase represented a wealth of experience in training, systems design, technology selection and HCW management on an institutional and policy level that allowed for discernment of and planning for the complexity of Project elements. This expertise is reflected in the composition of the Global Expert Team for the full Project, and in the composition of the NPSCs and NWGs in participating countries. In India and the Philippines in particular, there are already enough people with on-the-ground experience in "achieving adequate management of HCW" at the level of a single hospital, as well as in immunization campaigns and other activities, to sufficiently guide further development of the Project and ensure long-term sustainability. Full details on how the Project will successfully address the complexity of achieving adequate management of HCW are detailed in the full proposal. Specifically, however, policy change is addressed in Component 6; the development and implementation of legal and regulatory frameworks for the management of HCW are addressed in Components 6 and 7, Outcome 6 and 7, and Outputs 6 and 7; investments in training and development of national guidelines are addressed in Components 5-7, Outcome 5, and Output 5; investments in equipment and infrastructure are addressed in Components 1-3, Outcomes 2-4, and Outputs 2-4; and cost-recovery considerations are addressed in Components 2 and 3.

Comment	Response
Comment 2. Focusing on seven countries of such varying contexts and development levels may provide a diverse range of experiences and lessons-learned that can later be replicated in other countries. However, at the same time, it will limit both the financial and human resources available to effectively carry out Project objectives and may reduce the overall impact and success of the Project. A more gradual approach that considers individual countries may be easier to coordinate and supervise, and therefore ultimately more effective.	The PDF B activities undertaken to develop the Project provide an excellent template on which to build systems to track, manage and adequately resource the many activities in each individual country. As the nature of the Project is that of a global demonstration project, the seven principle countries were selected to provide the best basis for learning and demonstration. These national examples will serve as a global resource, drawing widely applicable lessons from a diverse set of cultures, languages, scales and development levels. The management experience from the PDF B phase has provided a solid base of experience that will reduce the cost and time burdens of coordinating such an enterprise, and the plan for use of web-based communications, information and resource sharing, distance learning and consultative activities will allow for an efficient expenditure of resources to reach the desired results. The partnering of HCWH and WHO as principal cooperating agencies brings a valuable set of global and local collaborators to the participating countries that the Project will not have to replicate.
Technical background	
Comment 3. It would be beneficial to define what exactly is understood by waste separation, and how this will lead to the decrease of D&F and mercury. It is clear that HCW needs to be separated into risk and non-risk waste. However, will the Project only concentrate on the treatment of the separated fraction of risk-waste (as defined by WHO standards) or will it also consider the treatment of non-risk HCW? Will the Project recommend additional separation of non-risk waste in countries where all HCW is incinerated?	The technical aspects of the Project in establishing best practices at model facilities, as described in Component 1, follow WHO standards and guidance on proper waste management that clearly identify waste segregation as a critical component in waste management processes as a means to limit risks to workers and releases of environmental pollutants. The identification and provision of non-combustion treatment for the infectious waste component will have a significant impact on reducing the creation of D&F as an unintended consequence of treatment of wastes from health care. Similarly, the identification and segregation of wastes containing mercury, and the proper handling and disposal of materials that do not allow for releases to waste water or to the air through vaporization or combustion, will significantly decrease the contribution of health-care activities to global mercury pollution. As noted in Component 4, a holistic approach to waste management will be developed that will start with an evaluation of procurement policies and materials management so as to reduce or eliminate those materials that are used in health care that contribute to the release of mercury. This approach will be followed by management efforts stressing careful segregation and waste management, and will be further encompassed in wider waste treatment approaches that reduce these releases. With regards to “non-risk” waste, principles of waste minimization, environmentally preferable procurement, source reduction, recycling, reuse, composting, etc. will be applied and, where available, sanitary landfill sites will be employed.

Comment	Response
Comment 4. Healthcare facilities do not typically treat their waste on site, unless they are sufficiently large. The provision of waste management services (i.e. collection and disposal) is thus a responsibility of the municipalities or of the private sector, depending on country's regulations and on the specific arrangements made by healthcare facilities. Separate collection and disposal are not always guaranteed, and therefore achieving effective waste management at the healthcare facilities does not necessarily ensure that the waste will arrive separated at the disposal/treatment point. The proposal only focuses on emissions from healthcare facilities and should also consider other scenarios of HCW treatment.	The connection of health-care facilities to a municipal or private sector waste collection, treatment and disposal system varies from country to county. In some countries or regions, treatment and disposal of all wastes onsite is not an uncommon practice, as observed during the PDF B phase investigation. As a result, the Project is designed, in part, to explore and develop models that respond to existing infrastructure (or lack thereof) that includes onsite management, treatment and possible disposal options, as well as waste reduction activities. For example, in Argentina and the Philippines, treating infectious waste onsite and rendering them non-infectious allows treated waste to be collected and disposed of as domestic waste. In Lebanon, mobile treatment systems will treat waste onsite at multiple locations using one treatment unit while achieving the same results as a permanently installed onsite system. This will be complemented in other parts of the country where the infrastructure allows collection and centralized treatment in an alternative treatment system. In addition, models will be established that incorporate both private sector and municipal services that collect, treat and dispose of waste off-site for multiple facilities in both rural and urban settings. (See Table 1. Model facilities, under Project Rationale.) The Project focus on the review and development of new national guidelines and regulations, as addressed in Component 6, will also include this provision for offsite collection, treatment and disposal in order to ensure further that a framework is established for countries to move toward an infrastructure that supports proper management of wastes from health care. Examples of this developing infrastructure supported by new regulatory regimes were noted in the investigations pursued in most of the countries during the PDF B phase.
Comment 5. Finally, the proposal presents a general objective of eliminating practices of incineration from future HCW management projects of all implementing agencies (page 14). This is not a pertinent objective, nor is it recommendable. While the use of batch HCW incinerators with no emissions control should be controlled and ultimately stopped, recommending an end to HCW incineration, with no analysis of the context, the technologies, or the alternatives, is misleading.	The Project intends to demonstrate that the practice of burning HCW is not necessary to ensure that public health goals are met, and that viable alternatives, established under very diverse conditions and contexts, are available and may be adopted to replace these practices. The purpose of a Global Demonstration Project of this kind is to support a comprehensive contextual analysis, ensure access to and information about appropriate technologies, and provide the education necessary to make this broader goal achievable. When the demonstration project is finished, and when its results are available and analyzed, the global community will be in a better position to further evaluate and contextualize the circumstances under which HCW incineration may or may not be considered to be "recommendable." Undertaking this Project in numerous countries in different regions and at different stages of development will add to the usefulness and global applicability of the results.

Comment	Response
Specific questions on the establishment of model facilities	
Comment 6. Estimates of D&F emissions will likely be made through the use of UNEP's toolkit. Will the toolkit be sufficient to capture a potential decrease in D&F releases as a result of the Project?	During the baseline assessments at the start of full project implementation, estimates of dioxin and furan emissions at the model facilities will be made using actual activity rates and emission factors based on data from technical reports and published scientific papers, rather than on the more generalized emission factors in the UNEP Toolkit. Selection of emission factors will be based on equipment type, various design parameters, throughput capacity, types of air pollution control devices, operating parameters, etc., in order to closely match the emission factors of existing sources. Even though no actual testing of dioxins and furans will be carried out due to the cost of testing, the use of more accurate emission factors should provide good estimates of decreases in dioxins and furans at the facility as the result of the Project. It should also be pointed out, however, that the main objective of the Project is not to reduce all dioxin and furan emissions from health care in the country. Rather, the Project is intended to demonstrate barrier reduction leading to replication of best environmental practices and technologies in facilities nationwide. While the implementation of best environmental practices and technologies at the facility level will result in reductions of dioxins and furans at the local level, the widespread replication of these practices and other barrier reduction strategies, such as national training programs and information dissemination, have the potential of producing even greater decreases in dioxin and furan releases nationwide.
Comment 7. Will the initiatives at the selected hospitals be coupled with work with the municipalities or with the private sector, such that HCW management outside of the healthcare facilities is also considered? There is a strong possibility that after the staff of a given hospital has undergone training and has managed to decrease the volume of risk waste produced, the lack of waste management service provision (either municipal or private) will ultimately result in risk and non-risk wastes re-mixed at collection and disposal.	Multiple models involving municipalities and the private sector will be established. Many of these models will incorporate systems that are in place through municipal or private sector structures, including transportation, treatment and disposal of wastes. In some cases, the Project will also work with centralized HCW management facilities. (See Table 1. Model facilities, under Project Rationale.)

Comment	Response
Comment 8. Selection and deployment of waste treatment technologies (as suggested in Activity #7) should not be done on a hospital basis but should be done as an integrated approach for the town, or the city in question. This will avoid the need to provide each facility with equipment for treatment of their waste and with resources for training of staff and operation of equipment. Centralized treatment facilities, or private sector HCW treatment companies are in a large majority of cases more economically and technically feasible than the distribution of waste treatment equipment to individual healthcare facilities. Distribution of equipment on a city-wide or national basis is not feasible nor sustainable.	There are a wide variety of contexts in which models will be established. As suggested, where local and regional infrastructures allow, the economies of scale for regional treatment facilities will be leveraged. Model facilities may in fact be regional treatment centers, especially for small institutions in geographically contiguous areas in which there is no municipal or private sector alternative. In more rural or isolated areas, onsite treatment and disposal using lower cost but effective treatment technologies may prove to be the most sustainable. During the PDF B stage of investigation, examples of many different approaches already being explored were catalogued and evaluated in designing the model approach under Component 1. (See also Table 1. Model facilities, under Project Rationale, for the variety of approaches proposed.)
Comment 9. Is there an estimate of the expected duration of this first component?	The establishment of the model facilities is scheduled to be completed in the first year of the Project. The model system will be refined, further developed and monitored and evaluated throughout the remainder of the Project. (See the Project Activity Timeline and Workplan in Annex 3.)
Specific question on training	
Comment 10. WHO has regional training facilities and has developed training materials on HCW management tailored to each region. These should be used as much as possible to avoid duplication of efforts and wasted resources in the development of additional materials, as suggested in Activity #2.	As a principle cooperating agency of the Project, WHO has helped to identify resources for training in the participating countries. WHO materials and guidance documents provide the primary resource for establishing relevant training models in each of the various country contexts, allowing for continuity in curricula while accommodating specific national and regional differences. As addressed in Component 5, training activities will be grounded in locally or nationally recognized facilities. Support for all of these activities will be provided through the WHO collaborating center at the University of Illinois in order to ensure that quality and proper evaluation are incorporated into this component.
Specific questions on the incorporation of the Project experience into national awareness, training and policy	
Comment 11. Although the stakeholder approach presented is appropriate to create national awareness and to develop country-level policy, it will likely not be sufficient to achieve results at the hospital level, and therefore to ultimately lead to emission reductions. Experiences in many countries have shown that national guidelines and procedures do not suffice to reduce the amounts of HCW produced by healthcare facilities, or to achieve consistent waste separation results. Healthcare facilities in developing countries often have difficulties implementing the simplest three-bin-separation method for risk and non-risk waste, unless there is close supervision and strong commitment from management and staff. Incentives may need to be built in to the programs, to encourage healthcare facilities to participate.	Component 1, on the establishing of model facilities, Component 5, on the establishing of training programs and Components 6 and 7, on the setting of national policy, will all address incentives in order to ensure that best practices are adopted and implemented. The experience of countries that have achieved some of the Project goals (e.g., countries of the European Union as well as the United States) shows that a combination of incentives and requirements built in over time are necessary to ensure that practices will change and be sustained. The Project specifically seeks to incentivize and encourage deeper participation through the following methods: incorporate training and education into the established curriculum at medical and nursing schools; establish, where appropriate, certificates in health-care waste management that might be tied to employability and income enhancements; and develop national standards and regulations that reinforce and require that these practices become standard both within hospital facilities and throughout the waste management infrastructure.

Comment	Response
Comment 12. The group of stakeholders proposed does not include representatives from environmental regulatory agencies, from municipal service provision agencies, or from private sector companies involved in HCW collection and treatment. Representatives from these sectors need to be included in the discussions, to ensure that all steps of HCW management are taken into account. The participation of these groups will act as an incentive to management of healthcare facilities in cities where separate collection and disposal of HCW is not guaranteed.	The stakeholders that were identified in the PDF B process of establishing National Working Groups and National Project Steering Committees include representatives from environmental regulatory agencies, municipal service provision agencies and private sector companies involved in HCW collection and treatment. For the full Project, the TOR for the National Project Steering Committees and the guidance for the continued work of National Project Working Groups will explicitly include these entities.
General Comments on PDF B Proposal	
Comment 13. It is not clear whether funds will be provided to cover the costs of staff, at the country level, working on the implementation of Project preparation activities. PDF B funds assigned to cover the costs of the Global Project Team (1 Global Project Coordinator/Technical Advisor, 2 Advisors and 2 Global Technical Consultants) are clearly shown in the budget table, but no information is given on the cost, or on the source of funds for the Country Project Expert, the Government Experts and the Project Consultants. Although it is understood that in-kind counterpart funds will be used to partly cover the costs of the Country team, without a concrete budget, it will be challenging to achieve progress in Project activities.	In each participating country, national experts received compensation in the range of eight to fifteen thousand USD to complete the national activities. This rate was designed to pay for six months full-time equivalence of work. Further, all Project-related costs incurred by national and government experts were paid through Project funds. Similar support will be provided during the implementation phase of the Project.
Comment 14. Project preparation activities are based on inputs expected from a National Steering Committee (NSC), composed of high-level government representatives, and from a National Advisory Committee (NAC), which will include technical advisors. No budget is shown in the proposal for financing meetings of these committees. The NSCs will likely meet to finalize policy-level discussions, but it is to be expected that these high level representatives will not have the time to meet on a regular basis to provide inputs for the Project. On the other hand, members of the NACs will also likely have full schedules, and unless some budget is assigned to these meetings, they will probably not take place with the frequency needed to move forward Project preparation activities. Finally, country Project teams, unless adequately supported will not have the capacity to conduct all the activities planned, in particular, those involved with activities in the pilot healthcare facilities (determination of baselines, monitoring and supervision).	As discussed in the response to Comment 13, time and costs of national and government experts were covered directly by the Project during the PDF B phase. Further, all meeting, conference and travel expenses incurred by the Project stakeholders in the NPSC and NWG were paid using Project funds.

Comment	Response
Comment 15. The travel budget for the Global Project Team (roughly 40% of the cost of PDF B activities) could be significantly reduced and the funds could instead be used to build up local capacity to carry out planned activities.	The GPT agrees that Project funds would be most effectively spent in resource and capacity development at the national level. Travel expenses of the GPT comprised less than 7% of the overall PDF B budget. All airplane tickets purchased for GPT travel were basic economy class in order to keep travel-related costs to a minimum.
Comment 16. No activities have been designed to integrate future Project components to municipal or national waste management strategies. It is proposed that D&F and mercury emissions from healthcare facilities at the national level in the seven countries considered will be reduced (and eventually eliminated) by promoting sound HCW management and final treatment methods that do not involve combustion of the waste. It is not feasible to equip every healthcare facility with non combustion treatment technologies for its waste, nor would it be of priority or even desirable. It is therefore suggested that PDF B activities include the development of terms of reference for feasibility studies that can be conducted in cities around the seven countries, to determine the most cost-effective method of HCW treatment and final disposal, which would include an evaluation of public versus private sector involvement. In order to develop sustainable solutions to HCW disposal, these terms of reference should also include financial analyses (e.g. willingness to pay, cost-recovery and others) that would need to be evaluated alongside the most viable technical options.	Both the national and global expert teams acknowledge that the success of the Project is dependent on full and thoughtful integration of Project activities with relevant municipal waste programs. Regardless of the HCWM systems and technologies used, the final disposal and transportation of HCW remains the responsibility of the municipal waste sector. Thus, in all participating countries (except Tanzania), relevant members of municipal and national waste management programs are involved in NPSCs and/or NWGs. In Argentina, India, Lebanon, Senegal and Vietnam, private and public municipal waste handlers are Project partners. (In Tanzania, the Project activities are limited to technology development and thus do not require participation with national stakeholders.) Further, the Tanzania component was specifically included in the Project to address the mentioned challenges in Comment 16 and to develop viable cost-effective technology options appropriate to the needs of sub-Saharan Africa.

ANNEX F2) STAP EXPERT REVIEW AND IA/EA RESPONSE

Ed Krisiunas, MT(ASCP), CIC, MPH
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March 13, 2006

1. General Overview
This proposal is the culmination of years of trial and error at addressing Health-care Waste Management issue and their impact on the environment. While the term culmination implies an end, it also conveys a sense of moving on to another phase. That is in fact what this proposal presents. The next steps and phases that need to be implemented are presented in very good detail and with extensive objective rationale. Additionally: a. A tremendous amount of groundwork has already been laid in the countries that will be participating. It is exciting to read of the progress made as well as the issue still at hand. Therefore, this project is well out of the starting blocks and the momentum needs to be continued. b. The proposal does a very good job of identifying and stratifying the issues. This is clear when reviewing the various Outcomes and Outputs. Especially important items include the implementation challenges and assumptions and risks. This perspective could only have been gained from actual field work. This perspective already allows the project participants to be thinking of methods to minimize risk, many of which are provided in the proposal. c. The proposal identifies importance of the replacing mercury containing devices with equally or better products that will improve patient care as well as reduce pollution to the environment. We know certain practices are engrained within the healthcare industry and objective scientific information needs to be provided for new devices to have buy-in from the end user. d. The inclusion of a technology development component, specifically in Tanzania is a very positive personal, professional, and national enhancing aspect to the proposal.
Comments: No response necessary.

2. Specific comments, observations and questions	
STAP Comments	**Responses to STAP Comments and Corresponding Changes in the Document (in bold)**
a. Examples of successful programs in locations other than the United States and Western Europe Reference is made to comparable successful programs in the United States and Western Europe. While the issues and challenges can in fact be very similar in the locations as well as in the countries selected for this project, the one overriding difference is the level of income. The United States and countries of Western Europe are considered high income while the project deals with low to middle income countries. Can reference be made to other low to middle income countries with successful programs? This would provide better realistic examples and applications.	Four examples are provided here. In Durban, South Africa, groundWork (an NGO affiliated with Health Care Without Harm) has worked with rural and semi-rural hospital institutions for the past five years to address health-care waste management. groundWork assisted facilities in conducting needs assessments and identified several key facilities with whom to collaborate to create health-care waste management models to demonstrate for other institutions. At each model facility, groundWork obtained the support of top management, involved staff in the development of the model system, worked with a key employee to ensure change within the facility and monitor progress, and consulted with municipal officials. groundWork helped develop institutional policies, provided training, facilitated deployment of an on-site autoclave treatment unit, and made sure that health-care waste management received a sufficient budget annually. The New Delhi-based NGOs Srishti and ToxicsLink have been supporting health-care facilities regarding health-care waste management problems since 1996. The NGOs identified the leading administrator whose influence and authority could produce successful policy and systemic change. This key person also ensured the implementation of good practices and the resulting economic benefits to the hospital. The NGOs also

2. Specific comments, observations and questions	
STAP Comments	**Responses to STAP Comments and Corresponding Changes in the Document (in bold)**
	worked with medical and nursing staff, encouraged a team effort, helped develop regular and tailored training programs for personnel, and worked with the Delhi Pollution Control Committee and private vendors. A recycling program for scrap material was initiated. Today these hospitals have good established health-care waste management systems because of their ongoing commitment since the late 1990s. In the Philippines, a successful model for management of sharps waste from a mass immunization campaign was demonstrated in 2004. The Philippine Measles Elimination Campaign generated an estimated 19.5 million syringes nationwide collected in 162,000 safety boxes in a little over a month. The model system entailed development of a guidebook, micro-planning, training, storage and transport, treatment in autoclave or microwave technologies, and/or cement encapsulation or burial. The results were documented in 19 sites representing urban areas, urban poor communities, rural areas, remote villages, mountainous areas, indigenous communities, coastal towns and small islands. About 406,300 children were vaccinated in the 19 sites. A report on the collaboration of HCWH and the Philippine Department of Health, with the cooperation of WHO-Philippines, is found in: http://www.noharm.org/details.cfm?type=document&id=926 In Uttaranchal in the Himalayas, the Himalayan Institute Hospital Trust (HIHT) has developed a successful model for sharps waste management in remote rural areas. Sharps waste is generated during immunizations and other health services provided to poor communities in remote mountainous areas in Garhwal, Kumaon and other villages. The waste is collected in reusable metal sharps containers. The containers are then brought to the main 750-bed hospital in Uttaranchal where they are treated in a locally manufactured autoclave. The treated waste is then shredded and the shredded parts are allowed to fall into a bin filled with water. The water separates the plastic pieces which float to the top while the metal pieces fall to the bottom. A scoop is used to recover the materials and the plastics are taken to a plastics fabrication plant in India for recycling, while the shredded metal pieces are buried. HCWH visited the site and obtained data on their system which will be used as a model in the Project.
b. National consultants / Oversight For the National Consultants, their efforts will be very imperative to the continued forward movement and success of this project. The selected individuals tasked with this job need to clearly understand their roles and responsibilities and be committed to this project for the term selected.	The National Consultants are indeed key to the success of the Project. The Terms of Reference will specify the duration of work and potential consultants' commitment to the Project will be evaluated as much as possible. It is possible that some of the national consultants will already be familiar with the Project through prior involvement during the PDF B phase. At the start of the Project, a meeting of National Consultants and the Global Expert Team is planned to ensure that the roles and responsibilities are clearly understood.

2. Specific comments, observations and questions	
STAP Comments	**Responses to STAP Comments and Corresponding Changes in the Document (in bold)**
c. Incentives The use of "incentives" is mentioned several times throughout the document. However, these incentives are not described in any detail i.e. monetary award, job promotion, supplies etc. The types of incentives may vary based upon local conditions and social norms. It is recommended to include some examples of what the incentives will be.	The specific forms of incentives on the local and national levels will vary in each country and according to a specific level of intervention. Individual incentives will be very important in some countries. An example of this might be the designation of individuals as environmental champions and recognition by their peers. Recognition of environmental champions in an award ceremony, coverage in local media or institutional communication forums, annual designation of environmental champions and engraving their names in a plaque, letters of acknowledgment from upper management, etc, are all techniques that might be applied as appropriate. Some facilities may choose to provide financial incentives in the form of bonuses or monetary awards. Obtaining a certificate after the successful completion of a training program could provide an incentive for individuals to gain a basic competence in health-care waste management. In some countries, the certificate may be linked to future promotions or higher salary levels. The website for this GEF Project could also be used to highlight individuals and describe their accomplishments as another specific incentive. For health-care institutions the specific acts leading to cost savings as a result of waste minimization and proper management and increased regulatory compliance will provide another type of incentive. Similarly, reductions in nosocomial infections and in occupational injuries due to proper waste management are added incentives for infection control and safety officers as well as health workers in general to participate. In regions where health-care tourism is emerging market definition as "environmentally friendly institutions" may prove to be important. In the process of forging relationships with "model" facilities and networks, many of these incentives have been discussed and built into the rationale for institutional participation in the program already.
d. Health-care waste – Diagram of specific categories The document provides several flow diagrams related to various issues i.e., Page 14, Figure 1. Problem Analysis Tree to Indicate Cause-Effect Relationships for Challenges Faced. There is extensive detail related to the subject matter in each of the diagrams. Would it be possible to include a diagram of the categories of Health Care Waste being discussed in this project? They are not very well defined and a simple diagram could be included.	**A simple diagram (Figure 2) showing the general categories of health-care waste and providing examples within each category has been added to the section "Alternative Systems Approach" of the Project Document.**

2. Specific comments, observations and questions	
STAP Comments	**Responses to STAP Comments and Corresponding Changes in the Document (in bold)**
e. Competing projects This is more of a recommendation. Efforts should be taken by National Consultants to be aware of projects funded by other entities that could compete with the effort of this project. It seems unlikely given the existing infrastructure and efforts to date. However, there have been situations where international development banks from different countries fund a project that is similar in design and content to others already underway.	One of the tasks of National Consultants during the PDF B phase was to investigate other related projects including projects of multilateral lending institutions and development agencies, explore possible synergies and avoid duplication with the GEF Project (see Annex 4). This task will continue to be part of the job function of National Consultants during the full project implementation.
f. Comments of the World Bank and Response I concur with many of the comments and perspectives of the World Bank. There is a response on page 133 to a World Bank comment which discusses the approach to managing the "non-risk" wastes. The reply is still too broad in its attempt to specifically answer the question. If the scope of the project intends to cover the universe of healthcare waste (identification, segregation, and disposal/treatment), then it needs to be clarified or stated as such. Or it needs to be stated that this is limited to certain aspects of healthcare waste (infectious, chemo and path waste) and mercury containing material as the alternative technologies mentioned are used primarily for infectious waste. Some additional clarification may be needed at the beginning of the proposal. The remaining responses, with the exception of the items mentioned in this review are very appropriate and address the concerns of the World Bank. The extensive groundwork clearly provides a better vision of the way forward.	In general, with the possible exception of wastewater or sewer discharges, the Project will cover the universe of health-care waste at the facility level with regards to identification, minimization, containment, segregation, handling, on-site storage and transport. For non-risk wastes, the Project at the facility level will also cover recovery, reuse, recycling and disposal as appropriate. For infectious and pathological waste, the Project will include treatment and disposal. However, for chemotherapeutic waste, an alternative technology will be tested and demonstrated only in Argentina. Except for chemotherapeutic waste in Argentina, treatment and disposal of the small amounts of hazardous chemical waste from health care will depend on existing laws and available infrastructure for storage, treatment and disposal. Facility-level training and national training programs will include information on the proper management of the universe of health-care waste. **An explanation of health-care waste categories addressed by the Project has been added to section "Alternative Systems Approach" of the Project Document.**

2. Specific comments, observations and questions	
STAP Comments	**Responses to STAP Comments and Corresponding Changes in the Document (in bold)**
g. Financial resources A very important element of this project will be the availability of financial resources to sustain various components that need to be implemented. Not to lessen the importance of the support and buy-in of all stakeholders, the reality is a strong long-term financial resource will more likely carry this project forward towards fruition.	The overall budget, including co-financing, should provide sufficient financial resources to implement the various components for the duration of the full Project. The portion of GEF funding, however, will decrease during the second half of the Project as local and national stakeholders raise the funds necessary to sustain the work in the long term. In some cases, the funds will come from budget allocations by local or national governments as well as by health facilities, a commitment that will be reflected in the MOUs. In other cases, such as central treatment facilities operated by the private sector, the revenue stream from providing treatment services will sustain the activities. Where appropriate, recommended policies and regulations will incorporate provisions to generate financial resources to sustain various Project components such as the national training program. During the last year of the Project, assistance will be provided to seek other sources of funds to ensure sustainability.
h. Health Care Waste Management – A genuine priority The most challenging aspect of this project will be for each country to view Health-care Waste Management as a genuine priority. In these low and middle income countries issue of waste management will compete with a host of issues including but not limited to the delivery of healthcare services with limited supplies, limited or unskilled healthcare professionals, social and political issues. It would be prudent to further contemplate and include within this proposal what methods could be employed to in fact attract the attention and interest of the waste producer (healthcare provider) and the public instead of pursuing them for their attention. This is the genuine challenge.	The challenge of other competing needs and priorities is well recognized and acknowledged. The participation of local and national stakeholders in Project planning and implementation will help preserve the interest and commitment of health providers. Working with representatives of the ministries of health and environment in the National Project Steering Committee will help maintain a high priority for health-care waste management which could be reflected in national policies, plans and budget allocations. Training and national dissemination, such as a national conference, are components of the Project which would lead to greater awareness and interest among health workers and policy-makers. As a result of their involvement in the National Working Group, environmental and health NGOs could influence public discourse and policy towards keeping a high priority on health-care waste management. During the early part of the Project, public education through announcements and media releases, where appropriate, could also attract public attention to the problems related to health-care waste. It is important to note that a good health-care waste management system could help address some competing needs, such as infection control, health worker safety and environmental protection.

3. Conclusions
With the above items incorporated and/or considered in the proposal, this project for reducing Health-care waste to avoid environmental release of dioxins and mercury is well constructed and thought through. I strongly support allowing it to move forward.
Comments: No response necessary.

ANNEX F3: UNEP CONCEPT PHASE COMMENTS AND RESPONSES

Comment	Response
With relevance to the Stockholm Convention and thus, to dioxins and furans:	
Countries have just started to develop their National Implementation Plans. Therefore, the national release inventories for dioxins (and furans) are not yet quantified; Based on the outcome of the national release inventories and other considerations, the action plan on dioxins and furans has to be established. It needs to be seen if hospital waste management/incineration comes out as a priority in these countries;	All the governments participating in the Project are Parties to the Stockholm Convention and have agreed to implement this Project in close consultation with their Stockholm National Implementation Planning committee. All participating countries that have completed their NIP have identified HCWM as a top priority (see below). For more information please refer to Annex 4. **Argentina** is currently in the inventory stage, and the NIP will be completed in December 2006. Health-care waste management (HCWM) is an identified high priority, and the final plan will include language encouraging the use of non-burn technologies for waste treatment and disposal. **India** is in the process of developing an NIP. No information is available at present. The **Latvia** NIP currently estimates that health-care waste incineration accounts for only 2% of dioxin and furan emissions in Latvia air, but this estimate will likely be revisited during Project implementation. During development of the NIP, there was a lack of information on the contributions by the health sector and health sector representatives were minimally involved because of a reorganization taking place. The NIP includes tasks to reduce POPs emissions from fires in waste disposal sites, promote recycling of POPs sources and introduce technologies at POPs emission stationary sources. In **Lebanon** NIP, health-care waste incineration has been listed first among several industries with the potential for relatively high formation and unintentional release of PCBs as a result of thermal processes involving organic matter and chlorine. Geographic areas located around incinerators, specifically hospitals equipped with incineration facilities, are listed as one of two hotspots for dioxin and furan emissions. In the **Philippines** NIP, hospitals are listed among sectors identified as potential POPs sources, specifically as potential sources of dioxins, furans and PCBs. The sectors on this list are all potential beneficiaries of National Implementation Plan strategies. In **Senegal**'s NIP, incineration of health-care waste is identified as a source of unintentional POPs release. The NIP establishes the goal of reducing unintentional POPs emissions from the burning of medical, municipal and industrial waste by half in the next five years. Health-care waste incineration is named among the sources of dioxins and furans in **Tanzania**. **Vietnam** has identified HCWM as a key priority in its NIP. Heath-care waste management (HCWM) to minimize unintentional POPs release is identified as an urgent and high priority, included in the period from 2006 to 2010 in the implementation roadmap. The program on HCWM is number four of fifteen key programs in the plan.
The Secretariat of the Basel Convention has developed guidelines for hospital waste management, which have been adopted by the Conference of the Parties. These must be taken into account;	The Basel Convention guidelines have been reviewed and incorporated into the Project document and plans.
Guidelines and guidance on BAT and BEP are not yet	The Project is consistent with the draft Guidelines on best available techniques that were considered

Comment	Response
available. The Stockholm Convention INC6 has established an Expert Group on BAT and BEP, which will develop such guidance for the Conference of the Parties. These guidelines will provide the overarching framework for addressing dioxin/furan releases from such facilities;	at Stockholm COP1. It is noted that Stockholm COP1 (in decision SC-1/19) recognized the usefulness of those draft guidelines, and decided that it encourages Parties: "*to take the draft guidelines and provisional guidance into consideration, where practicable and feasible, in the development of action plans and other activities related to unintentionally produced persistent organic pollutants*." The Project Team will remain informed of developments within the current Stockholm Expert Group on BAT and BEP noting that its recommendations will not be considered before Stockholm COP3 in 2007. (One member of the team is a member of that EG.) The team will assure that any relevant new emerging views on the EG will be reflected in Project implementation. Many countries participating in the Project consider improving their health-care waste management systems to be a matter of some urgency and prefer to take actions consistent with the draft guidelines than to defer action, or to proceed along the baseline scenario that will likely make it more difficult in the future to conform to Stockholm Guidelines. Parties are obliged to require BAT for new or significantly modified medical waste incinerators at the latest, four years after entry in force of the Convention. For many, this will be May 2008. One purpose of this demonstration project is to develop new information based on practical experiences in a developing country context that Parties can take into account in deciding how to fulfill their obligations. To delay approval of this Project until after Stockholm COP3 would, therefore, decrease the value of the intended Project outputs. The Basel Secretariat is invited to be part of the Global Project Steering Committee. At the Third Session of the Stockholm Convention Expert Group on BAT/BEP meeting in Tokyo on 11-16 October 2004, developing countries expressed concern regarding the difficulties in meeting BAT/BEP standards with regards to health-care waste management due to lack or inadequacy of capacity and technology. Direct reference was made to this Project: We note with interest the Global Environment Facility (GEF)/United Nations Development Programme/World Health Organization Medical Waste Management demonstration project under development, and we encourage the GEF, its implementing agencies and others to support and rapidly initiate much more work in this area. This would be greatly facilitated by developing countries making the related BAT/BEP issues an important part of their National Sustainable Development Strategies.

Comment	Response
With relevance to Mercury:	
There are no reliable estimates of the quantities of mercury emitted from this source category in these countries, and so the relative importance of mercury emissions from these sources is quite uncertain.	Significant efforts have been made during the PDF B phase of the Project to gather data on mercury emissions from the health care sector. Please see Annex 5B.
The major agencies identified in this project proposal are UNDP and WHO and an NGO (HCWH). It should be noted that UNEP has the mandate to address releases of dioxins and furans (UNEP Governing Council decisions 19/13(c) and 22/4(II)), to assess mercury pollution and to provide technical assistance and capacity building activities to support the efforts of countries to take action regarding mercury pollution, (UNEP Governing Council Decision 22/4 V, February 2003, UNEP Chemicals), and to address hazardous waste, including medical waste (Secretariat of the Basel Convention). Yet UNEP has not been identified as a participant in this project proposal. If this project proceeds ahead, UNEP must be involved, as a member of the Global Steering Committee, Global Project team, and/or other roles, as appropriate.	UNEP is invited and strongly encouraged to become a fully participating member of the Project Steering Committee. In January 2006, UNEP Chemicals co-sponsored with HCWH and the Philippine Department of Health (DoH) a South-East Asia Conference on Mercury in Health Care (which is considered to be a co-financing event for this Project). In this instance, one appropriate role for UNEP in the Project was found. The Project Team is very open to working with UNEP to identify other useful roles it may wish to play.
GEF funding of projects of such size should require that the beneficiary countries are Parties to the Stockholm and Basel Conventions.	All participating countries are Parties to the Stockholm and the Basel conventions.
A concentrated and concerted joint effort is necessary to address the environmentally sound management of health care materials/practices and wastes that should involve ALL relevant UN organizations and address a cradle-to-grave approach starting with acquisition of goods and materials to be brought into a hospital, through the application/use phase until final disposal or reuse. The management of these wastes must address environmental issues, but even more importantly, it must provide safe and effective decontamination of infectious materials to prevent spread of disease.	The Project invites UNEP, the Stockholm Convention Secretariat and the Basel Convention Secretariat to participate in the Project Steering Committee. WHO and UNDP are already actively participating. The only other UN organization that might be considered to be relevant is UNIDO. UNIDO too would be welcome to join and participate. The Project utilizes a cradle-to-grave approach starting with acquisition of goods and materials to be brought into a hospital, through the application/use phase until final disposal or reuse. The Project addresses environmental issues and provides safe and effective decontamination of infectious materials to prevent spread of disease. In all the above regards, the Project will implement state-of-the art practice.
With regard to mercury, UNEP has started a new Mercury Program that will initially focus on awareness raising, capacity building, data gathering, information sharing, the identification of priorities, and related activities. It may be premature to start a major effort to	There is an urgent global need to strengthen the political will to reduce Hg emissions, as indicated by the fact that governments have made no binding commitments to date. The health sector has been shown to be receptive to campaigns towards Hg pollution prevention and is therefore one good starting point. UNEP, apparently, has reached a similar conclusion in that it agreed to co-sponsor and to help fund the Mercury in Health Care Conference as indicated above.

Comment	Response
address one sector of sources of mercury emissions until we get a better understanding of the priorities of various countries and regions for addressing mercury, and how best to address these sources. In particular, it is not at all clear from the concept that mercury release from these sources is even an issue, and if so whether there is either a connection with pollution of international waters or a priority compared with the countries' other mercury sources.	As long as the health sector does not address its own Hg releases, efforts to obtain the support of the health community for broader national and global endeavors regarding mercury pollution would be undermined. On the other hand, engaging the health sector towards Hg elimination in health care would build technical expertise, create advocates that could bolster the political will of countries, and increase support for global Hg reduction activities. Thus, even though Hg emissions from health care are of smaller significance compared to other sources, the attendant benefits of engaging the health sector could be considerable.
Detailed Comments:	
The project is put under the main objective to "minimizing the generation of health care waste" (para 7; para 9.2 – Alternative). Without proper caveats and explanation, this is a dangerous statement since the reduction of waste generated from clinical operations could result in an increase of infections, transmittable diseases, *etc.* In the sector of hospitals and related activities, the first principle of waste management practices, namely to reduce wastes at the source, does not apply. The protection of the health of personnel and the protection from infections should be the primary goal of all operations. Obviously it is very important to ensure that syringes, gloves, and other potentially infectious materials are not reused. Promotion of reuse can pose serious problems in the health care sector (para 7). Minimizing waste from this sector is a worthy goal, but it must be achieved without increased risks of infection.	There is growing international concern about health-care wastes as a source of bloodborne pathogens and other infectious agents. Proper treatment of infectious health-care waste must be part of a facility-wide systems approach to waste management. The objective "minimizing the generation of health care waste" is always understood to mean that this will be done consistent with good patient care and consistent with best practices in infection control. This is stated several times in the Project Document. Any proper facility-wide HCWM system effectively addresses infection control. Moreover, a HCWM structure within a facility necessarily involves and is often led by the infection control officer. If properly segregated, roughly 15% of waste produced at health-care facilities is infectious waste. By segregating and minimizing the amount of waste that needs to be treated as infectious, personnel end up handling smaller amounts of infectious waste. The reduced volume of infectious waste makes it more manageable and allows personnel to focus attention more effectively on exposure reduction. Proper HCWM also means segregation of sharp waste in puncture-resistant or puncture-proof containers. Although roughly only 1% of HCW by volume, sharps are responsible for an estimated 90% of disease transmission from HCW. Often, prior to the establishment of a HCWM system, sharps are disposed with all other waste and can protrude from plastic garbage bags and other containers. Rigorous segregation and containment reduce chances of needle-stick injury and other exposures. In short, proper HCWM decreases exposure to bloodborne pathogens. Infectious waste is never recycled or reused. The remaining 85% of waste, that is non-infectious and non-hazardous, could be recycled or reused. Source reduction, when coupled with segregation, can also reduce infectious waste. For example, packaging waste (including cardboard), which is the largest single component of the health care waste stream, is often discarded with infectious waste. Good procurement practices can result in products with less packaging. Combining source reduction and segregation minimizes the overall amount of waste as well as the volume of infectious waste. Inventory control and proper storage are also aspects of source reduction. For example, minimizing the amount of expired or spoiled vaccines through good inventory control and storage reduces the amount of potentially infectious waste and hence, the potential for exposure. Thus, waste reduction

Comment	Response
	and infection control can and often are accomplished as twin goals. In sum, good health-care waste management practices include all of the following components: pollution prevention; waste minimization; correct classification and segregation; proper containerization and color-coding; safe handling and collection of waste; labeling and signage; and proper storage, transport and final disposal of waste. Priority in this Project will be given to pollution prevention and waste minimization, the latter entailing environmentally preferable procurement practices, source reduction, material substitution, safe reuse, recycling and composting of waste where possible.
Section 7.3.3 states that the release of dioxins and mercury will be reduced though application of new management, training and technology options. However, in the proposal there are no examples given on what concrete actions or changes the releases will be based on.	Please see Section 2 of the Project Document: Project Rationale and Objectives.
In section 10, under Outcome B: What does it mean to "certify" experts. How would an appropriate training and certification program be established? Who would be the authority providing such program?	For overall information on "certification programs", please go to Annex 2A: Logical Framework of Overall Project Strategy and Annex 3A: Project Activity Timeline and Workplan. For country-specific information on "certification programs" please see Annex 2D: Country-Specific Project Components and Annex 3b: Country-Specific Activity Timelines and Workplans.
Section 10: It is likely that various equipment, building construction, air pollution control technologies, and other capital will be needed to achieve the overall goals of emissions reductions. Have the costs of this capital been considered in the development of the proposal? How will these substantial costs be addressed?	Costs of necessary equipment, construction, and technologies have been included in the Project budget. The budget and the co-financing can adequately fund these costs.
Minor Editorial Comments:	
Section 10, paragraph 4, 2nd sentence: Mercury is not "produced." The word "production" should be changed to "emissions" or "releases".	Noted and incorporated into the current Project document.
Section 7.3, paragraph. The fourth sentence should be revised as follows: "Mercury affects the nervous system and is particularly harmful to the fetus and young children"	Noted and incorporated into the current Project document.

The major agencies identified in this project proposal are UNDP and WHO and an NGO (HCWH). It should be noted that UNEP has the mandate to address releases of dioxins and furans (UNEP Governing Council decisions 19/13(c) and 22/4(II)), to assess mercury pollution and to provide technical assistance and capacity building activities to support the efforts of countries to take action regarding mercury pollution, (UNEP Governing Council Decision 22/4 V, February 2003, UNEP Chemicals), and to address hazardous waste, including medical waste (Secretariat of the Basel Convention). Yet UNEP has not been identified as a participant in this project proposal. If this project proceeds ahead, UNEP must be involved, as a member of the Global Steering Committee, Global Project team, and/or other roles, as appropriate.	UNEP is invited and strongly encouraged to become a fully participating member of the Project Steering Committee. In January 2006, UNEP Chemicals co-sponsored with HCWH and the Philippine Department of Health (DoH) a South-East Asia Conference on Mercury in Health Care (which is considered to be a co-financing event for this Project). In this instance, one appropriate role for UNEP in the Project was found. The Project Team is very open to working with UNEP to identify other useful roles it may wish to play.
GEF funding of projects of such size should require that the beneficiary countries are Parties to the Stockholm and Basel Conventions.	All participating countries are Parties to the Stockholm and the Basel conventions.
A concentrated and concerted joint effort is necessary to address the environmentally sound management of health care materials/practices and wastes that should involve ALL relevant UN organizations and address a cradle-to-grave approach starting with acquisition of goods and materials to be brought into a hospital, through the application/use phase until final disposal or reuse. The management of these wastes must address environmental issues, but even more importantly, it must provide safe and effective decontamination of infectious materials to prevent spread of disease.	The Project invites UNEP, the Stockholm Convention Secretariat and the Basel Convention Secretariat to participate in the Project Steering Committee. WHO and UNDP are already actively participating. The only other UN organization that might be considered to be relevant is UNIDO. UNIDO too would be welcome to join and participate. The Project utilizes a cradle-to-grave approach starting with acquisition of goods and materials to be brought into a hospital, through the application/use phase until final disposal or reuse. The Project addresses environmental issues and provides safe and effective decontamination of infectious materials to prevent spread of disease. In all the above regards, the Project will implement state-of-the art practice.
With regard to mercury, UNEP has started a new Mercury Program that will initially focus on awareness raising, capacity building, data gathering, information sharing, the identification of priorities, and related activities. It may be premature to start a major effort to address one sector of sources of mercury emissions until we get a better understanding of the priorities of various countries and regions for addressing mercury, and how best to address these sources. In particular, it is not at all clear from the concept that mercury release from these sources is even an issue, and if so whether there is either a connection with pollution of international waters or a priority compared with the countries' other mercury sources.	There is an urgent global need to strengthen the political will to reduce Hg emissions, as indicated by the fact that governments have made no binding commitments to date. The health sector has been shown to be receptive to campaigns towards Hg pollution prevention and is therefore one good starting point. UNEP, apparently, has reached a similar conclusion in that it agreed to co-sponsor and to help fund the Mercury in Health Care Conference as indicated above. As long as the health sector does not address its own Hg releases, efforts to obtain the support of the health community for broader national and global endeavors regarding mercury pollution would be undermined. On the other hand, engaging the health sector towards Hg elimination in health care would build technical expertise, create advocates that could bolster the political will of countries, and increase support for global Hg reduction activities. Thus, even though Hg emissions from health care are of smaller significance compared to other sources, the attendant benefits of engaging the health sector could be considerable.

ANNEX F4) UNDP COMMENTS TO GEF SECRETARIAT : WORK PROGRAM ENTRY REVIEW

Country/Region :	Global (Argentina, India, Lebanon, Philippines, Senegal, Vietnam, Latvia, Tanzania)
Project Title :	Demonstrating and Promoting Best Techniques for Reducing Health-care Waste to Avoid Environmental Releases of Dioxins and Mercury
GEFSEC Project ID :	1802
UNDP Project ID:	2596
Operational Program : 14	
Implementing Agenc(ies) :	UNDP
Anticipated project financing ($ million) :	PDF $ 0.72 / GEF Project Allocation $ 10.33 / Total Project Cost : 24.60
Target Work Program Date:	May 2006
Program Manager :	Laurent Granier
IA Contact Person :	Suely Carvalho

GEF SEC Review Comments	UNDP-GEF Responses to GEF SEC Review Comments
1. COUNTRY OWNERSHIP: Endorsement	
I can't find the endorsement for Tanzania.	The endorsement from Tanzania was provided on April 26th, 2006.
2: PROGRAM AND POLICY CONFORMITY: Program Designation and Conformity	
Eligibility of the Hg component needs to be further elaborated.	The Project aims to demonstrate and promote replication of best environmental practices and techniques for health-care waste management and to reduce barriers to national implementation of these strategies. During project preparation it became clear that, an additional, low-cost benefit could be achieved by incorporating a mercury component into the project, thereby reducing releases of this substance in tandem with the dioxin reductions. This would be accomplished by reducing the quantity of broken mercury-containing devices improperly discarded or burned by health care institutions/providers, thereby contributing to the broader goal of minimizing the amount of health-care waste generated and limiting the amount of waste burned in medical waste incinerators. The concern raised by the GEF Sec regarding possible ineligibility is understood - mercury is not a POP. The project has been submitted under GEF Operational Program (OP) #14 on POPs, with linkages to OP #10 on International Waters to acknowledge the mercury component. The mercury elimination component of the proposed project represents US $384,000 of the total project budget. UNDP has explored the possibility of funding the mercury component activities with co-financing generated for the project. Unfortunately, given the complex project structure, and its related complex financial structure, this option will not be feasible. A second possibility could be to secure bilateral co-financing to support the

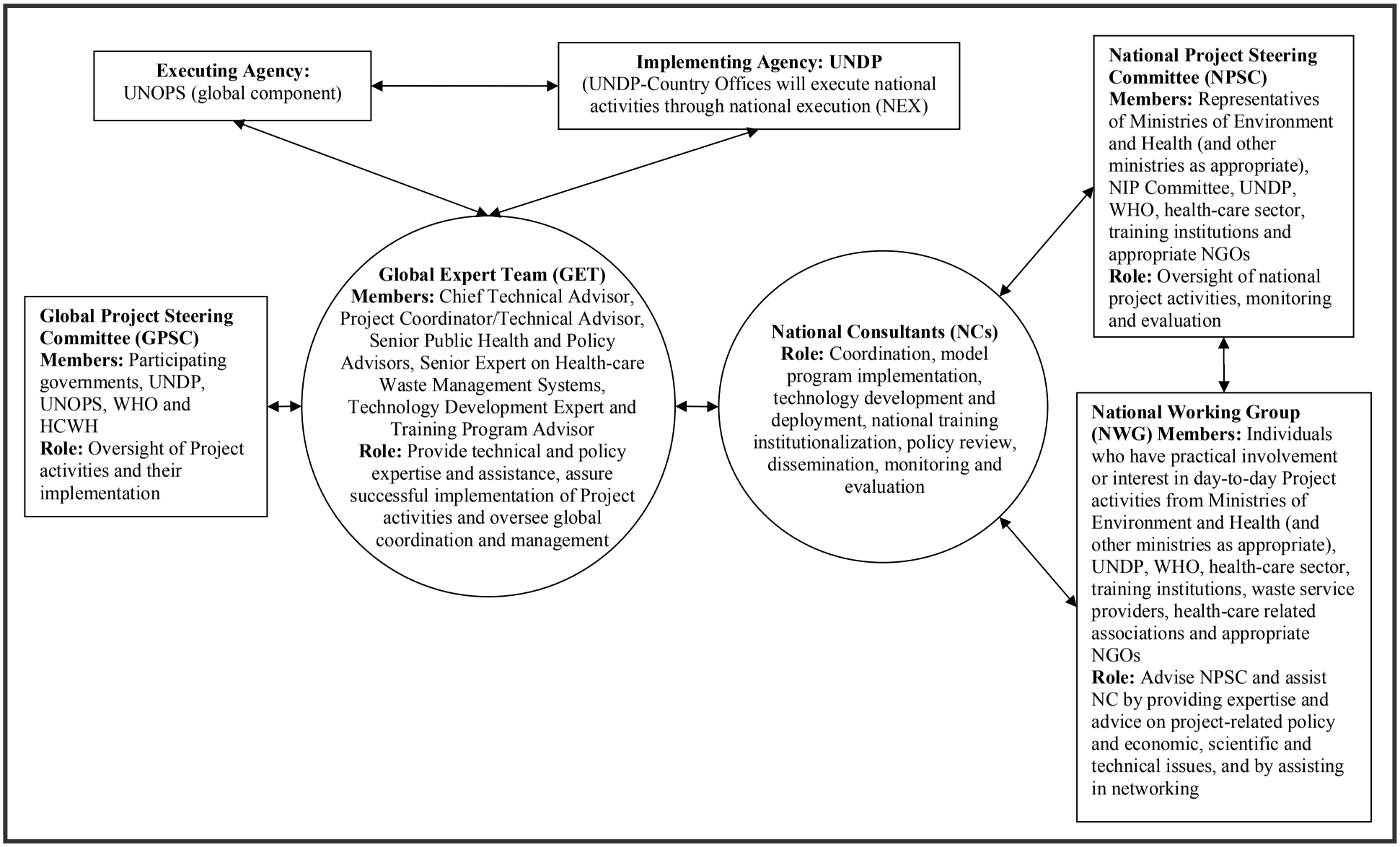
<table>
<tr><th>GEF SEC Review Comments</th><th>UNDP-GEF Responses to GEF SEC Review Comments</th></tr>
<tr><td></td><td>project's mercury component. UNDP has initiated contact with a possible bilateral donor. A concern with regard to this approach rests on the fact that bilateral co-financing agreements, should UNDP be successful in securing a commitment, can often take time to negotiate and may lead to delays in approval of a project.</td></tr>
<tr><td>The significance of Hg emissions seems smaller (1%?), which in fact justifies the emphasis on unintentionally produced POPs in this project, Hg reduction being almost a "side-benefit" with low additional cost.</td><td>There is an urgent global need to strengthen the political will to reduce Hg emissions, as indicated by the fact that governments have made no binding commitments to date. The health sector has been shown to be receptive to campaigns towards Hg pollution prevention and is therefore a good starting point. As long as the health sector does not address its own Hg releases, efforts to obtain the support of the health community for broader national and global endeavors regarding mercury pollution would be undermined. On the other hand, engaging the health sector towards Hg elimination in health care would build technical expertise, create advocates that could bolster the political will of countries, and increase support for global Hg reduction activities. Thus, even though Hg emissions from health care are of smaller significance compared to other sources, the attendant benefits of engaging the health sector could be considerable.</td></tr>
<tr><td>However small, it would be good to have an estimate of the actual direct UPOPs/ Hg reduction expected from the detailed description of the type of management options and interventions that will be undertaken.</td><td>Estimated Reductions at Local Model Facilities, Clusters and Programs Due to Project Intervention
<table>
<tr><th>Country</th><th>g TEQ / yr</th><th>kg Hg / yr</th></tr>
<tr><td>Argentina</td><td>0.71</td><td>2.7</td></tr>
<tr><td>India</td><td>32</td><td>170</td></tr>
<tr><td>Latvia</td><td>0.21</td><td>1.7</td></tr>
<tr><td>Lebanon</td><td>1.8</td><td>2</td></tr>
<tr><td>Philippines</td><td>0.61</td><td>1.3</td></tr>
<tr><td>Senegal</td><td>0.44</td><td>0.95</td></tr>
<tr><td>Vietnam</td><td>2.8</td><td>2.4</td></tr>
</table></td></tr>
<tr><td colspan="2">2: PROGRAM AND POLICY CONFORMITY: Monitoring and Evaluation</td></tr>
<tr><td>The section on "key indicators of success" should be strengthened. It would be desirable to include some sort of results table with a limited number of quantitative or semi-quantitative indicators and targets, including baseline data, to facilitate the later judgment as to whether or not the project is a success and why.</td><td>Please refer to Table 3.</td></tr>
<tr><td>The table for M&E work plan looks comprehensive but includes too many "responsible parties". To be meaningful, that column should only list the main "Party" responsible for the particular M or E activity,</td><td>Please refer to the modified table: Table 1.</td></tr>
</table>

<table>
<tr><th>GEF SEC Review Comments</th><th>UNDP-GEF Responses to GEF SEC Review Comments</th></tr>
<tr><td>not all the people involved.</td><td></td></tr>
<tr><td colspan="2">3. FINANCING: Financing Plan</td></tr>
<tr><td>Cost-effectiveness should be strengthened. As it is, we have a statement that this is a cost-effective way to reduce releases of unintentionally produced POPs.</td><td>This information has been incorporated into section 4b of the Executive Summary.

Cost-effectiveness calculations were conducted using annualized costs per annual reduction in UPOPs emissions. These calculations are based on generic simulations corresponding to 5,448 beds. These calculations are provided in order to inform the readers. During the Full Project implementation, actual cost computations will be documented.

Cost Effectiveness of Alternative Treatment Systems
<table>
<tr><th>Technology and Cost Comparison</th><th>Cost Effectiveness (in $/g TEQ reduced)</th></tr>
<tr><td>A. Comparison of Technologies and Practices:</td><td></td></tr>
<tr><td>High-Tech Incineration With Best Practices</td><td>3192</td></tr>
<tr><td>Alternative Treatment Technology With Best Practices</td><td>1300</td></tr>
<tr><td>B. Comparison of Technologies Only:</td><td></td></tr>
<tr><td>High Tech Incinerator</td><td>2200</td></tr>
<tr><td>Alternative Treatment Technology</td><td>300</td></tr>
</table>
Notes: Calculations were based on waste from a cluster of health facilities corresponding to 5,448 beds. Annualized costs include direct costs (labor, utilities, maintenance, disposal, consumables, and other operating costs) and indirect costs (capital recovery, overhead, administrative and other fees). Part (A) above includes the costs of developing and maintaining model facilities employing best practices (e.g., segregation and waste minimization) and takes into account the reduction in the amounts of waste that need to be treated as a result of best practices. Section (B) compares only the annualized costs of imported technologies for the same amount of health-care waste to be treated. Costs of the alternative technology were based on an autoclave-shredder system. In countries where the alternative technology will be locally manufactured (e.g., Philippines and Tanzania), installed capital costs of alternative technologies would be lower and consequently, alternative treatment systems would be even more cost effective. In all cases, the baseline used for calculating UPOPs emission reduction was a cluster of health facilities corresponding to 5,448 beds wherein all health-care wastes (with no segregation) are burned in an uncontrolled incinerator with no pollution control, as is done in many developing countries.</td></tr>
<tr><td colspan="2">5. RESPONSE TO REVIEWS: Other IAs and RDBs</td></tr>
<tr><td>WB comments are appropriately responded to. I can’t find response to UNEP comments.</td><td>Please refer to Annex F3.</td></tr>
</table>

ANNEX G: MANAGEMENT ARRANGEMENTS



ANNEX H: COUNTRY-SPECFIC PROJECT COMPONENTS

ARGENTINA

Model Facilities

Urban Model Hospital	
Public Pediatric Hospital (Hospital Público de Pediatria) is a teaching hospital where residents and interns are trained in different specialties through agreements with various universities. It has a Commission of Education comprised of multidisciplinary teams. The hospital has demonstrated a high commitment to quality. Waste is managed through the department of Medicine, Hygiene and Safety, which is committed to this Project and has made substantial advances in the field of health-care waste management. The hospital infrastructure is reliable and capable of responding to the needs of this Project. Work teams are dedicated to administration and documentation, as well as to the promotion of research in different fields. The hospital has a direct institutional link to the Ministry of Health and Environment that will ensure the continuity of the Project's gains over the long term. The hospital's activities have a strong national and regional impact, a fact that will undoubtedly facilitate the dissemination of information related to the Project's activities. Currently, the hospital does not have procurement policies that favor waste minimization or the identification and substitution of inputs (for instance, of mercury-containing materials). Few materials are recycled (paper and cardboard) or reused within the hospital. By the end of 2002 the hospital stopped operating a pyrolytic incinerator, and waste is now treated and disposed off-site. This change has required a shift in thinking that has not yet been completely accepted, a factor that may impede the implementation of best management practices. The hospital's technical staff agree that a wide range of improvements regarding the efficiency of waste segregation is possible. The hospital has a large professional and technical staff, many of whom could become trainers on health-care waste management.	
Hospital name	*Public Pediatric Hospital (Hospital Público de Pediatria)* SAMIC Prof. Dr. Juan P. Garran Buenos Aires
Number of beds	475
Average occupancy rate	90%
Average number of outpatients per day	1,800
Type based on hospital services	Teaching and research pediatric hospital. Services include: medical clinic, surgery, burn emergencies, radiology, laboratories, oncology and transplants.
Hospital type	Public. Decentralized management. National and international patients served.
Type and location of technology	By the end of 2002 the Hospital stopped operating a pyrolytic incinerator and the infectious waste is treated and disposed of off-site through an external autoclave service.
Southern Region Focal Hospital	
Hospital "Francisco López Lima" does not have procurement policies that favor waste minimization or the identification and substitution of inputs (for instance, mercury-containing materials). Materials are not formally recycled, though informal collection of paper and cardboard occurs. There is a wide range of possible improvements regarding the efficiency of waste segregation; problems include the mixing of infectious and domestic wastes and the presence of PVC and diverse chemicals in waste, including chemotherapeutic waste. The Project will have to review the actual classification of waste according to risk criteria, and analysis will have to be done to establish the necessary mechanisms to achieve and sustain efficient segregation. The staff has identified its own training and capacity-building needs. The Municipality of General Roca has acquired an autoclave to replace the incinerator. The new technology requires new internal practices that need to be strengthened, especially in all aspects related to segregation.	
Hospital name	Hospital "Francisco López Lima" City of General Roca Province of Rio Negro

Number of beds	134
Average occupancy rate	90%
Type based on hospital services	General medicine hospital. Services include: general, surgery, gynecological, maternity, neonatology, trauma and radiology services.
Hospital type	Public. Patients come from all over the region
Type and location of technology	At present, an external incineration service for infectious wastes is being used. It is a municipal plant operated by a private firm. The replacement of the incinerator is likely to be implemented around 2006.
Northern Region Focal Hospital	
President Juan Domingo Perón Hospital does not have procurement policies that favor waste minimization or the identification and substitution of inputs (for instance, mercury-containing materials). Materials are not formally recycled, though informal collection of paper and cardboard occurs. There is a wide range of possible improvements regarding the efficiency of waste segregation; problems include the mixing of infectious and domestic wastes and the presence of PVC and diverse chemicals in waste, including chemotherapeutic waste. The Project will have to review the actual classification of waste according to risk criteria, and analysis will have to be done to establish the necessary mechanisms to achieve and sustain efficient segregation. The staff has identified its own training and capacity-building needs. The new hospital building is a highly motivating factor, since all the personnel have high expectations to work under better conditions.	
Hospital name	President Juan Domingo Perón Hospital City of Tartagal, Province of Salta It includes a sanitary facility 6 km away that serves a Wichi settlement.
Number of beds	120, increasing to 200 at the new building
Average occupancy rate	100% maternity, 75% other services
Average number of outpatients per day	22
Type based on hospital services	General and some critical specialties. Diagnosis and treatment services.
Hospital type	Public. Patients come from all over the region.
Type and location of technology	At present, the hospital sends its infectious wastes to a plant using an autoclave and incinerator located more than 450 km away.
Central Region Focal Hospital	
Reconquista Central Hospital (Hospital Central Reconquista) does not have procurement policies that favor waste minimization or the identification and substitution of inputs (for instance, mercury-containing materials). Materials are not formally recycled, though informal collection of paper and cardboard occurs. There is a wide range of possible improvements regarding the efficiency of waste segregation; problems include the mixing of infectious and domestic wastes and the presence of PVC and diverse chemicals in waste, including chemotherapeutic waste. The Project will have to review the actual classification of waste according to risk criteria, and analysis will have to be done to establish the necessary mechanisms to achieve and sustain efficient segregation. The staff has identified its own training and capacity-building needs. There is strong institutional and political support to pursue initiatives that help improve waste management conditions at health-care facilities.	
Hospital name	Reconquista Central Hospital (Hospital Central Reconquista) City of Reconquista *Province of Santa Fe* It includes Lanteri rural hospital.
Number of beds	140
Average occupancy rate	90%
Type based on hospital services	General medicine. Services include: general, surgery, intensive care, obstetrics, gynecological, pediatric and neonatal services. Medium complexity diagnosis and treatment services.
Hospital type	Public. General. Patients come from all over the region.
Type and location of technology	At present, the hospital sends its infectious wastes to an electrothermal deactivation plant located more than 450 km away. Due to long distances, this service is critical and frequently stops for long periods of time. The private sector disposes of medical waste in open dumps.

Technology

Twenty-five percent of the provinces do not have any health-care waste treatment at all and no transboundary movements are officially registered. In six other provinces only one plant has been identified.

Seventy-eight percent of health-care waste is treated by incineration, achieved through diverse technologies with differing maintenance requirements. More than one-third of the incineration processes are in situ. The great majority of these plants do not meet international requirements.

The decision to incorporate autoclaves is a result of local regulations rather than an acknowledgement of the effects of incineration. The strategy consists of letting hospitals that serve large rural areas located far away from existing treatment plants use in situ alternative technologies.

The plan is to install an autoclave – of not more than 150 kg per cycle – in one or two of the regional hospitals, with the possibility that they could also receive and treat health-care waste from other sources. Another possibility is to install one autoclave in one of the regional hospitals and to install alkaline hydrolysis equipment as part of a pilot study at the National Research Institution in order to explore its effectiveness in treating organic residues and medicine and chemotherapeutic wastes, which are currently being incinerated. A study of this kind would provide reliable information on a new technology that is not well known but may prove appropriate for this range of chemicals. Conducting the study at a National Research Institution may also induce the national government to encourage the use of this technology if the outcome is positive, with the additional benefit that it may open the market to new business possibilities.

Approach	On-site treatment
Type of technology	Autoclave, and possibly an alkaline hydrolysis unit
Capacity	150 kg/hour
Additional equipment	Steam generator and compacting device
Category of waste to be treated	Infectious waste
Facility being serviced	The hospital, its primary care centers, and private institutions within the region
Location of treatment system	Within the hospital
Distance to landfill or dump site (km)	Approximately 10 km

National Training Program

Health-care waste management (HCWM) capacity-building needs are not yet well identified nor satisfied. The specific capacity-building needs regarding training and certification should be clearly spelled out.

The public health sector is where the best conditions may be found to support the program through the commitment of health-care staff and personnel to training and certification at national, provincial and municipal facilities.

The National Working Group is analyzing the legal and administrative procedure in order for the Ministry of Health and Environment to issue a regulation establishing that all health-care staff and personnel within its jurisdiction should be duly trained and certified in HCWM. Its application in other jurisdictions may be achieved through an agreement with Argentina's Health Federal Council (COFESA). The commitment of the private sector to hire staff and personnel certified through the program could be obtained.

Relevant existing trainings and stakeholders	*National Technological University (UTN)* Public Educational Structure with regionalization • Post-graduate degree in Hygiene and Safety • Specialization in Environmental Management – Special Wastes Management • Master in Environmental Management – Special Wastes Management Salta Catholic University (UCS) Distance education courses • Technical Course on Hygiene and Safety, Graduate level • Technical Course on Quality Management, Graduate level

	• Specialization in Hygiene and Safety, Post-graduate level • Master in Environmental Management, Post-graduate level
Name of training institution	*National Technological University (UTN)* Héctor Brotto, Dean Sarmiento 440 City of Buenos Aires Dr. Patricio Colombo Murúa Pellegrini 790 City of Salta
Training program description	Multiple campuses of UTN Distance education courses of UCS
Key partners	Ministry of Health and Environment through its competent departments
Certification Institutions	UTN and UCS
Strategies to ensure sustainability after Project completion (funds to pay for the training)	The commitment of health-care staff and personnel to training and certification at national, provincial and municipal facilities will contribute to long-term sustainability. The National Working Group is analyzing the legal and administrative procedure in order for the Ministry of Health and Environment to issue a regulation establishing that all health-care staff and personnel within its jurisdiction should be duly trained and certified in HCWM. In other jurisdictions an agreement with Argentina's Health Federal Council (COFESA) is being planned.

INDIA

The GEF Project Consultants and the Global Expert Team recommend that a unique approach be taken in India. The central recommendation is based on the assessment that India is already advanced in relation to other countries participating in the Project, and it has already developed several excellent model institutions. However India is a geographically vast and diverse country, and some states' health-care waste management systems are less developed than others. Taking both of these facts into account, the India Project component will involve the development of a model facility in a currently underserved state to encourage further institutional development, particularly in low-resource regions. This approach will be supplemented and paralleled by an approach to build a model state in a region that already has a good infrastructure of well-functioning health-care facilities and Central Treatment Facilities, and is overseen by State ministries that have taken a progressive approach to achieving best health-care waste management practices. This dual track will ensure that India not only contributes new knowledge to the Project based on advances that have already been made in certain regions, but also will continue to inspire further work at the institutional level in regions that are not so advanced, keeping the Project in line with similar approaches in other participating countries. Approval by the NPSC, the Government of India and the GEF Focal Point is reserved until the Project is reviewed in full detail in the project document.

Thus Project implementation in India will focus on a three-part strategy. One track will focus on developing a model state where work will improve the current system within one central facility and the area it services. A second track will identify a model hospital in a poorer state with an underdeveloped waste management system for development into a model facility whose performance may be replicated in other states and regions. A third track will focus on updating national HCWM training programs to reflect lessons learned in support of Project sustainability and replicability goals.

Model Facilities

Model State Program in HCWM

Under this approach, the Project will first evaluate gaps in the state's HCWM systems that must be filled in order for the state to meet Project Objectives (reductions in mercury and dioxin emissions). The Project model will build on the current effort to set up service territories within a state based around a Central Treatment Facility (CTF) as a focal point for system change. One existing Central Treatment Facility will be chosen in concert with the State MOEF and Ministry of Health. The criteria for this choice will include the following considerations:

- Consider gaps in the coverage of service territories (rural and urban);
- Consider gaps in treatment technology (incineration of some wastes); and
- Consider gaps in the health-care waste management practices of institutions in their service area.

Once these gaps are identified, the Project will then implement activities aimed at addressing these gaps in service and compliance, developing a complete system for proper treatment and disposal options for both rural and urban areas. The outcome will be the establishment of a seamless network of services and treatment and disposal practices that is cost effective and meets Project objectives.

The state of Tamil Nadu has been chosen as an excellent candidate for this Project component. The criteria used for selecting Tamil Nadu as a candidate for the model state program included:

- State with good track record in implementing HCWM objectives
- High likelihood of success
- Ease of translating project experience and success nationally
- Ongoing HCWM programs/activities in state
- Availability of CTF
- Opportunities for partnerships
- Opportunities for co-financing

Specifically, Tamil Nadu met the above criteria in the following ways:

- Tamil Nadu has a good track record in implementing HCWM objectives. This is evidenced by the future action plan of the government as well as current status of implementation;
- Working in Tamil Nadu means a high likelihood of success because of good governance and the environment in the state;

- Experience gained in Tamil Nadu can be easily translated to inform projects in other regions of the country, especially developed states;
- There are already a rich set of ongoing HCWM programs/activities in state including the World Bank-funded State Health System development project, which has a substantial HCWM component;
- CTFs are well-established in Tamil Nadu, and they have been cooperative with the Pollution Control Board and with the goals of this Project;
- In Tamil Nadu there are many opportunities for partnerships, with such institutions as WHO, the World Bank, medical colleges, and IGNOU Study Centres (as described below in the National Training Program component for India);
- In Tamil Nadu there are many opportunities for co-financing of the project, including with the World Bank and WHO initiative on tsunami relief.

State	Tamil Nadu* * *The state of Tamil Nadu is being used as a possible example of a state that has already achieved some level of consistent HCWM practice at the institutional level, has been developing a network of CTFs to serve health-care institutions, and has active programs in the government, NGOs and with other development organizations.*
Number of health-care facilities	2,450 (Private facilities: 1835)
Number of hospital beds	85,519 (Private: 41,306 beds)
Number of Central Treatment Facilities	10 proposed; 5 are operational. All are cleared for operation. Start-up of next 5 set for first half of 2006.
Number of facilities using CTFs	650
Type and location of technology	CTFs equipped with autoclave/incinerator (*Ramnathapuram facility is without an incinerator*)

Model Cluster and Central Treatment Facility

The Project will develop very specific health-care waste management models through working with at least one large hospital and several smaller clinics and/or rural health or injection programs in the service territory of one CTF. The focus will be on education, training, assessing management systems and ensuring that the systems for properly moving waste from point of generation to treatment to final disposal is a continuous flow.

The Project will help staff at participating facilities develop and implement best practices in concert with the work at the CTF. To accomplish this, the Project's activities include the following: reviewing existing waste management practices and policies including purchase and product utilization; establishing waste minimization and waste management objectives; proposing and adopting modification in current practices and policies; training managers and staff; monitoring and reviewing progress; and providing ongoing support and assistance to ensure objectives are being met.

CTF practices at individual institutions in the service area will be evaluated and actions will be recommended for improving practices to increase waste segregation, reduce waste volumes and ensure compliance with existing law mandating that no chlorinated plastics be sent for incineration. Systems design and staff training will be evaluated, and standardized recommendations will be established for the CTF to disseminate to facilities using its services. In the case of rural facilities or smaller facilities not captured in the service territory of a CTF, systems will be designed to either create a collection and transportation linkage to a CTF, or an alternative system for treatment and disposal will be established and modeled at key unconnected facilities and documented as part of the "model" process.

Facility name	GJ Multiclave (India) Pvt. Ltd.
Technologies in place	Autoclave Shredder Incinerator for anatomical wastes
Number of beds served	Capacity is 10,000 but currently operating at the level of 7,000 beds only
Description of services and training offered by the CTF to health-care facility clients	Waste collection from one section of private facilities in Chennai

Model Facility in an Underserved Area

The second part of the India implementation plan is to select a state with less expertise and lower outcomes in implementing HCW management, and establish an institutional model to demonstrate new practices and technologies that are most relevant for a state with access to fewer resources. Uttar Pradesh qualifies as a state that would serve as a good host for a model of this nature, according to the state selection matrix prepared by India's NPSC for this purpose. In addition to its other attributes as an underserved area, it is in the process of implementing a World Bank Health System Development project that includes HCWM as a component that can be incorporated into the Project design.

The Project will select and assess one facility to serve as the model within Uttar Pradesh. As part of the assessment, the facility will be examined according to how well it would serve as a point of learning and dissemination for other facilities in the state and in similar low-resource states in India. A baseline assessment of current practices, assets and liabilities in the waste management system will be conducted and an overall HCWM improvement plan will be established to increase segregation, reduce wastes needing special treatment, better manage mercury with the goal of virtual mercury elimination, select and install an alternative treatment technology appropriate to the size and needs of the facility, and document both the transition to the new condition of best practices as well as the new state of best practice and technology as a benchmark for other facilities.

State	Uttar Pradesh
Number of health-care facilities	3,224
Number of hospital beds	78,083
Number of Central Treatment Facilities	14
Number of facilities using CTF	1,581 (49.03%)
Number of facilities granted authorization	519
Total number and percent of facilities utilizing/proposed to utilize CBWTF	2,100 (65.12%)
Percent of total BMW treated per day	23.93%
Co-finance opportunities	World Bank
Partnership opportunities	World Bank, medical colleges

National Training Program

As detailed below, lessons from both of the model programs will be integrated into a new national curriculum. This effort will start with the curriculum currently in use through the Indira Gandhi National Open University on health-care waste management that is part of a distance learning certificate program. IGNOU will be a partner in developing training at the state level (Tamil Nadu, Model State), and will use the experience in both demonstration programs to strengthen its national certificate program and to continue building a network of satellite learning centers for students enrolled in the certificate program. The Project will focus intensive training efforts through the certificate program in the two model states during the Project implementation period to build a critical mass of educated workers and supporters to grow and sustain the program. In addition, work will begin to build links with medical colleges and nursing schools in the two model states to incorporate elements of the training into their professional curricula that is consistent with the IGNOU program.

In 2004, the Indira Gandhi National Open University (IGNOU)'s School of Health Sciences developed a distance learning curriculum on health-care waste management. In January 2006, IGNOU in collaboration with WHO-SEARO has launched a 14 credit six-month Certificate Programme in Health-Care Waste Management (HCWM) available as a distance learning curriculum and through fifteen study centers across India and partner institutions in other Southeast Asian countries. Program objectives are threefold: sensitize the learner about health-care waste and its impact on our health and environment; acquaint the learner with existing legislation, knowledge and practices regarding infection control and health-care waste management in South-East Asia Region Countries; and equip the learner with skills to manage health-care waste effectively and safely. Health managers, doctors, nurses, paramedics and others who have completed the pre-requisites may enroll in this course. The student handbook and prospectus

can be obtained from IGNOU regional centers or at the IGNOU headquarters in Delhi. www.ignou.ac.in/schools/sohs/chcwm/4-16c.pdf IGNOU initiated this program parallel to the initiation of the GEF project and has engaged the same stakeholder community in its development. The program is designed to be tuition-driven and thus self-sustaining in the long term. There is also interest in designing additional modules for training special populations in shorter certificate courses (e.g., CTF operators).	
Relevant existing trainings	Distance learning curriculum on HCWM at Indira Gandhi National Open University
Name of training institution	Indira Gandhi National Open University
Training program description	The program will be implemented through a network of Programme Study Centres in India and Partner Institutions located in other South-East Asian and other countries. These Programme Study Centres and Partner Institutions will be located in health-care institutions including medical colleges, hospitals, district and private hospitals, rural health centers, etc. A team of trained teachers called counselors will be identified and trained for providing academic counseling and supervising the Programme Study Centres/Partner Institutions. The administrative control will be through the Regional Centers of IGNOU located usually at state capitals nationally, by the Partner Institutions, by the Indian Consulate in the other countries and by the School of Health Sciences located at the IGNOU Headquarters, Delhi, India.
Key partners	Ministry of Environment & Forests Trained Nursing Association of India Individual hospitals
Certification institutions	IGNOU
Strategies to ensure sustainability after Project completion (funds to pay for the training)	IGNOU is developing the HCWM curriculum and training programs to serve regional audiences (SEARO) and possibly beyond. It is a tuition-driven program that will be developed to be a self-sustaining program at IGNOU.
Non-GEF resources	Additional ongoing training efforts in HCWM will be leveraged to provide access to training and information nationally. While the IGNOU effort will provide a national framework for consistent training and certification, it is the intent of the program to draw on the expertise of and align efforts with other training programs and resources, including Toxics Link, Centre for Occupational and Environmental Health, and Centre for Environment Education. The Ministry of Health will provide training in bio-medical waste management, and plans to conduct orientations for doctors, paramedical personnel and class IV employees in three states in 2006.

LATVIA

During the full Project inception workshop, the Latvian Project team shall consider establishing three working groups to effectively deal with the following Project subcomponents: a) training; b) technology and waste system-related issues; and c) legislation. Awareness-raising activities will be conducted at the start of the Project to broaden stakeholder understanding of the need to prioritize improving health-care waste management practices, identified as necessary by the National Working Group during the PDF B phase. If determined feasible and necessary, a review will be conducted of the National Implementation Plan for the Stockholm Convention on POPs which was adopted by the Latvian Government in May 2005.

Model Facilities

During the PDF B phase, the Ministry of Health conducted a survey of eight regional hospitals in order to select facilities for inclusion in Project activities. The main selection criteria, as agreed upon by the National Working Group and National Project Steering Committee, were the following:

- Established practices in health-care waste collection and separation and neutralization/decontamination on-site, as well as within the surrounding territory from other hospitals;
- Co-financing possibilities from the hospital itself or from the municipality;
- Capacity of staff;
- Established work safety practices; and
- Multi-profile hospitals.

Additionally, it was important to select facilities representing a wide geographic range within Latvia so as to ensure the modeling of proper medical waste management across Latvia as much as possible.

Urban Model Hospital

The Municipal Hospital of Ventspils was selected for inclusion in the Project, as it met the above criteria and could act as a representative model facility in the western region of Latvia. In addition, the National Project Steering Committee also took the following into consideration when making their selection:

- Ventspils has experience in attracting financing from the Environmental Protection Fund and other sources for medical waste;
- Ventspils has a license from the Ministry of Environment for waste disposal;
- Ventspils has established practices in waste treatment both on-site and in cooperation with private waste management company SIA "Lautus"; and
- Surrounding medical institutions have submitted requests to transport their medical waste for treatment to Ventspils.

Due to concerns both from the NWG and NPSC members on contamination of water, it was also a consideration that Ventspils uses on-site microwave technologies rather than chemical treatment.

Hospital name	Municipal Hospital of Ventspils
Number of beds	241
Average occupancy rate	67% in 2004
Average number of outpatients per day	33 per day (12,000 annually)
Type based on hospital services	Multi-profile hospital
Hospital type	Public
Type and location of technology	Using MEDISTER 160 microwave technology, a part of health-care waste is neutralized on-site.

Rural Model Facility

In addition to the main selection criteria detailed above under the Ventspils Hospital, the NPSC and NWG considered it important to address the issue of wide suspicion that many hospitals incinerate biological and other wastes in their local incineration unit, which is not equipped with special filters for reduction of harmful emissions. Thus Rēzekne was chosen as a hospital at which a more environmentally friendly approach could be demonstrated and replicated.

The Municipal Hospital of Rēzekne was selected to be a model facility in the eastern region of Latvia in part due to its geographic location. The Rēzekne Hospital has established practices for collection and treatment of waste from other surrounding hospitals. The hospital administration has experience in mobilizing funds from the Latvian Environmental Protection Fund and is willing to provide a contribution of up to 25% for this project investment mobilizing an additional 25% from the municipality of Rēzekne. The willingness of the municipality to take on financial commitment is considered a very positive aspect for Project participation.

Facility name	Municipal Hospital of Rēzekne
Number of beds	355
Average occupancy rate	82% in 2004
Average number of outpatients per day	40 (14,660 annually)
Type based on hospital services	Multi-profile hospital
Hospital type	Public
Hospital level	Regional
Type and location of technology	Sterimed disinfection technology on-site. Biological material incinerated on-site.

Technology

Latvia will maximize the effectiveness of its technology activities by using UNDP/GEF resources in combination with available funds for hazardous waste treatment from EU sources and from the hospitals, municipalities and private funding, to leverage the successful installation of up to two additional technology sites in the country's regions.

There are two private health-care waste companies that are licensed and active in Latvia. Independently of one another, both have chosen the rotating autoclave as the preferred technology for Latvia's needs and size. One company is purchasing the autoclave in 2006 for operation at the hazardous waste site in Olaine (20 km from the capital city Riga) and the other has EU LIFE financing to install an autoclave within the Riga region. Thus the UNDP/GEF Project will complement this private initiative through a public-private partnership to improve health-care waste treatment in Latvia. It has been estimated that a total of four such autoclaves would be required in Latvia to meet the country's waste treatment needs.

The National Working Group members expressed many concerns regarding the use of Sterimed-type technologies on-site, which cause chemical matter to be emitted into the wastewater system. Because of these concerns, the Project will support the introduction of microwave technologies on-site in the hospitals as a parallel effort.

Approach	Centralized treatment and on-site treatment
Type of technology	Rotating autoclave for centralized treatment; microwave technology for on-site treatment
Capacity	Up to 500 tons annually
Additional equipment	Filters on-site in the hospitals
Category of waste to be treated	Multiple types of health-care waste
Facilities being serviced	Hospitals, ambulances, private practices and veterinarians within the surrounding area of the model facilities
Location of treatment system	On-site and at the regional landfill
Distance to landfill or dump site (km) from the technology	Ventspils: up to 50km Rēzekne: up to 50 km

National Training Program

Latvia will undertake two unique activities within this Project component. Firstly, this component will commence at the full Project inception by identifying the main criteria for a procedure to select the training program's host institution. Secondly, once EU funding for hazardous waste treatment is programmed, the Project will consider providing assistance to hospitals in securing EU funding for the improvement of on-site medical waste treatment.

There are no specific training courses on health-care waste management available for health-care professionals in Latvia, and HCWM knowledge and skills are not considered in the individual certification programs for health-care providers nor in the health-care institutions themselves. There is a new *Regulation on hygienic requirements for hospitals and infection control in the health-care facilities* in the pipeline, which provides an opportunity to develop and integrate a training program on HCWM as a post-graduate training course. The main issues that were preliminarily considered in developing such a training course were twofold:

- It must enable professionals to develop and provide the training/instruction, and
- The training/instruction must be offered in the educational institution where the target group (health-care professionals) is trained or instructed.

Thus, from the research, it was determined that the best course of action would be to combine the expertise and enthusiasm of the Rīga Technical University on the topic of HCW with the infrastructure and linkage to health-care professionals at the Rīga Stradiņa University, where the course would be incorporated into the accredited program for health-care professionals.

Name of training institutions	Rīga Stradiņa University in cooperation with Rīga Technical University
Training program description	Single University
Key partners	Rīga Technical University Latvian Association of Nurses Latvian Association of Hospitals Ministry of Health Ministry of Education and Science Public Health Agency
Certification institution	Program to be accredited through the Ministry of Education & Science
Strategies to ensure sustainability after Project completion (funds to pay for the training)	Linking certification for mandatory training for health-care facility professionals responsible for HCWM to accreditation requirements of health-care facilities, thus making it in the interest of the health-care facilities themselves to fund officials to attend the program.
Non-GEF resources	State budget resources allocated for education and training

LEBANON

Model Facilities

The National Working Group (NWG) identified in January 2006 five model facilities with the understanding that the full Project and/or the National Project Steering Committee (NPSC) would reduce the number to three. Five main selection criteria were used: each facility must have passed the Ministry of Public Health accreditation cycle in 2005; obtained a waste treatment permit from the Ministry of Environment; the ability to demonstrate dioxin reduction during project implementation; different treatment technologies; and intent to sign an MOU with the Project. It is important to note that any given model facility may have failed Section 38 of the MOPH accreditation (related to health care waste management) yet passed the overall accreditation. Additionally, to achieve geographic and size distribution, the selection included one facility in Beirut and four facilities outside Beirut (four different governorates), as well as 1 small (50-60 beds), 2 medium-sized (100-150 beds), and 1 large facility (>250 bed).

In February 2006, the NPSC then reduced the selection to three facilities as follows:

1. Hotel Dieu (Beirut): A large hospital accredited by the Ministry of Public Health, Hotel Dieu holds a waste treatment permit from the Ministry of Environment. St. Georges Hospital and the American University Hospital came second and third respectively during the draw by the National Working Group.
2. Riyak Hospital (Bekaa): A medium-sized hospital in the Bekaa valley, Riyak Hospital installed an autoclave in 2003 but has expressed interest in relocating that unit to a site that would serve a larger number of hospitals. The hospital in Talsheeha and Khoury Hospital came second and third respectively during the draw.
3. Haykal Hospital (North): A small hospital in the North, Haykal Hospital is poised to receive funding to improve HCWM by installing an autoclave that will serve a cluster of hospitals in the region. Nini Hospital and the National Health Center came second and third respectively during the draw.

The only potential drawback to this selection is that all three facilities are private. The Nabatiyeh public hospital (in the South) and Haroun Hospital (in Mount Lebanon) were dropped. The Ministry of Environment officially endorsed the selection on March 1st, 2006 and has officially notified the facilities. The PDF-B National Coordinator is currently visiting the three facilities to confirm their interest and their commitment to serve as model facilities in the full Project. In case any of the three facilities does not wish to participate, the Ministry of Environment will approach the second facility for that region (based on the results of the draw). Additionally, Lebanon will also identify and work with a model (i) medical laboratory and (ii) dental clinic.

Urban Model Hospital 1	
Hotel Dieu, located in Beirut, is one of the largest hospitals in Lebanon (>250 beds). It passed the 2005 accreditation cycle at the Ministry of Public Health with the highest overall ranking among all the hospitals in Lebanon (score "A"). The hospital has also obtained a permit from the Ministry of Environment to treat medical waste on-site; it uses autoclave technology, provided and operated by Arc en Ciel, a Lebanese NGO. The hospital is representative of large privately owned hospitals in Beirut.	
Hospital name	Hotel Dieu
Number of beds	250 beds
Average occupancy rate	N/A
Average number of outpatients per day (if applicable)	N/A
Type based on hospital services: primary, secondary, tertiary and description of services [e.g.: general, specialty (pediatric, maternity, orthopedic, etc.), teaching, etc.]	Internal Medicine, General Surgery -Heart Surgery, Kidney, Liver and Bone marrow transplant, Maternity, Pediatrics, Intensive Care Units, One day surgery, Outpatient care, Diagnostic procedures, Pathology and Laboratory Medicine, blood bank, Medical Imaging services, Radiation Oncology, Hem dialysis, Pharmacy, Physiotherapy, Emergency services.
Hospital type: [Private for-profit, private not-for-profit, public, etc.]	Private-for-profit
Type and location of technology	Auto-clave sterilization on site
Urban Model Facility 2	

Albert Haykal Hospital is a medium sized hospital (about 100 beds), representative of medium sized hospitals in North Lebanon Governorate of the North. The hospital has passed the 2005 accreditation cycle of the Ministry of Public Health (score "C"). It has also obtained a permit from the Ministry of Environment for health care waste management. The hospital is currently sterilizing HCW by way of autoclaving. The hospital has expressed its intent to sign a MoU with the project in due course.	
Facility name	Albert Haykal Hospital
Number of beds (if applicable)	100 beds
Average occupancy rate (if applicable)	80%
Average number of outpatients per day (if applicable)	60 patients
Type based on hospital services: primary, secondary, tertiary and description of services [for example, general, specialty (pediatric, maternity, orthopedic, etc.), teaching, etc.]	Internal medicine, surgery, maternity, pediatrics, intensive care unit, physiotherapy, pharmacy, laboratory and emergency services
Hospital type: [private for-profit, private not-for-profit, public, etc.]	Private-for-profit
Level of hospitals [provincial, regional, district, municipal, health center, clinic, use country-specific classification]	Provincial hospital
Type and location of technology	On-site autoclaving (unit is owned by the hospital)
Rural Model Facility 1	
The Nabatiyeh public hospital was chosen as model facility for the following reasons: 1) it is the ONLY public/government hospital that has passed the MoPH accreditation cycle in 2005 (score "C"); 2) it is medium in size; and (3) it burns HCW – in theory therefore, the Project could achieve significant dioxin reduction. The Nabatiyeh Public Hospital is located in South Lebanon (Governorate of the South).	
Facility name	Nabatiyeh Government Hospital
Number of beds (if applicable)	<100
Average occupancy rate (if applicable)	NA
Average number of outpatients per day	NA
Type based on hospital services:	NA
Hospital type:	Public
Level of hospitals	District
Type and location of technology	Burning (To be Confirmed)
Rural Model Facility 2	
Riyak Hospital is representative of medium-sized hospitals in the Bekaa region. It passed the MOPH accreditation cycle and has obtained a waste treatment permit from the Ministry of Environment. The hospital is privately owned and managed and has expressed its intent to sign a MOU with the project in due course. The hospital bought and installed an autoclave unit several years ago but is considering selling the unit to the municipality of Zahle whose mayor has expressed interest in housing the unit near the sanitary landfill. This way, the autoclave unit can serve a cluster of hospitals and the shredded/sterilized HCW could be directly landfilled. The depreciated price of the autoclave unit is about $100,000.	
Facility name	Riyak Hospital
Number of beds	100
Average occupancy rate	NA
Average number of outpatients per day	NA
Type based on hospital services:	General
Hospital type:	Private-for-profit
Hospital Level	Municipal
Type and location of technology	On-site autoclave treatment
Rural Model Facility 3	
Haroun Hospital is representative of small hospitals in the Mount Lebanon Region. It has passed the MoPH accreditation cycle and has obtained a waste treatment permit from MOE. The hospital is private and owned by the President of the Syndicate of Private Hospitals – this arrangement was considered to be a facilitating factor for project implementation.	
Facility name	Haroun Hospital

Number of beds (if applicable)	100-150
Average occupancy rate	NA
Average number of outpatients per day	NA
Type based on hospital services:	General
Hospital type:	Private-for-profit
Hospital Level	Municipal
Type and location of technology	To be Determined

Technology

Background In recent years, Lebanon has made significant progress in health care waste management (HCWM) through two service providers; Arc en Ciel (AEC), and EnvSys. AEC is a Lebanese NGO that began providing HCWM services in 2003. It purchased and installed a wet-type autoclave in Hotel Dieu Hospital in Beirut, one of Lebanon's largest private hospitals. The hospital currently receives waste from at least two other nearby hospitals and three more may soon join that system; Hotel Dieu has a permit to install a second treatment unit that would double its treatment capacity. AEC transports the health-care waste to Hotel Dieu in closed trucks. EnvSys, a Lebanese for-profit company specialized in HCWM, operates autoclaves on mobile units servicing five hospitals. Combined, AEC and EnvSys cover about 7% of the total number of private hospitals in Lebanon. The unit cost for the treatment of HCW is reportedly $0.55/kg but the basis for this cost estimation remains unclear. Hospitals that wish to install a waste treatment unit need to get the Ministry of Environment (MoE) approval first by conducting an Environmental Impact Assessment. Although incineration is not strictly banned in Lebanon, MoE no longer grants permits for new incinerators pursuant to Law #432.

In an effort to formalize environmentally sound HCWM practices, MOE with the assistance of the EU and UNDP published in 2002 an "Environmental Auditing Manual for Hospitals" that aims to (i) assess compliance with government legislation, regulations and guidelines; (ii) assess adherence to internal policies and procedures; and (iii) identify areas for improvement to minimize the adverse impacts related to HCWM.

The full project will address the following strengths and weaknesses in Lebanon's HCWM system:

- International donors have already committed funds for waste treatment technology. AEC has received a grant from the EU Life Third Countries program to install an autoclave in the Mount Lebanon Governorate (€450,000); the EU has also approved funding for two HCWM projects in the Governorates of the South (Abbasiyeh, €342,000) and Mount Lebanon (Chouf Suwaijani, about €220,000) through a program with the Office of the Minister of State for Administrative Reforms (OMSAR); the Spanish Agency for International Development (AECI) has reportedly also endorsed a HCWM project in the North Governorate (near Tripoli) for AEC to install a treatment unit in Haykal Hospital. These initiatives, plus the treatment facility at Hotel Dieu in Beirut, provide a cluster approach to HCW treatment by servicing a group of hospitals. In relation to international donor funds/project, the Project will assess coordination mechanisms amongst national HCW treatments and analyze gaps and needs.

- Lebanon has recently enacted key legislation on Health Care Waste Management -- Decree 8006 (dated 11/06/02) amended through Decree 13389 (30/09/04) -- but enforcement remains weak. The Project will explore enforcement mechanisms and work with all concerned stakeholders to accelerate their implementation.

- Waste management has little impact on accreditation. The Ministry of Public Health (MOPH) has developed accreditation standards and guidelines for acute hospitals in Lebanon grouped into 38 discrete sections; Section 38 is on waste management and contains 8 standards. The weight of any single section has little overall significance on the accreditation system – i.e., a hospital may fail the waste management section and yet score well overall. The Project will support activities towards strengthening the language of Section 38 so that waste management carries more weight in the overall accreditation system.

- Hospitals are reluctant to pay for waste treatment. Whether they can afford it or not, hospitals are not accustomed to the notion that the "polluter pays" and need to be made aware of their environmental responsibility. Enforcement of basic HCWM practices will require incentives and good will. Any given hospital

has the option of buying the service from a local service provider or buy and operate its own unit on site. The Project will analyze treatment costs to determine break-even points and economies of scale.

- Existing waste treatment technologies are not adequately monitored. At least 20 hospitals so far have licenses to treat infectious waste but many more hospitals treat their waste without a license (e.g., open burning, closed burning, disposal). The efficiency of waste treatment using autoclaves has not been assessed as not all hospitals have submitted EIAs prior to installation. Those hospitals that have submitted an EIA and received MoE approval are randomly monitored. The Project will assess the performance of these treatment units, and formulate and disseminate lessons learned nationally and regionally.

Technical Approach In light of demonstrated progress in HCWM technology in Lebanon, the Project will not invest additional resources to identify and test new technologies but instead, focus on finding ways to reduce and/or sustain treatment costs in order to encourage hospitals to start practicing environmentally sound waste management to achieve close to 100 percent coverage by 2010 (at the end of the four-year project). In particular, the Project will implement five tasks related to waste technology:

- Conduct a baseline survey of the health-care waste stream in Lebanon (update old data if needed)
- Monitor the performance of existing waste technologies to determine efficiency and compliance
- Analyze treatment costs to determine break-even point and economies of scale
- Formulate and disseminate lessons learned to other facilities in Lebanon and regionally
- Conduct a feasibility study to extend HCWM services to cover the whole country

Technology: Autoclaving (fixed)	
Arc en Ciel (AEC), a Lebanese NGO has been purchasing and installing facility-level autoclaves since 2003. The organization currently treats HCW from 10 hospitals in two facilities (urban and rural), at the rate of about 1.2 tonnes per day, which is equivalent to 15 percent of the national waste stream. The EU recently awarded AEC a three-year project (2006-8) worth €450,000 to expand their work in HCWM. In particular, AEC will purchase, install and operate an additional autoclave to serve hospitals in the Governorate of Mount Lebanon. AEC will also deliver HCWM training to an estimated 1000 nurses, design and implement a public awareness campaign and provide legal and policy support to the Ministry of Environment to revamp the HCMW sector. AEC has already purchased and installed two autoclaves (ECODAS) that incorporate vacuuming, continuous feeding, shredding, mixing, fragmenting, drying, chemical treatment and/or compaction. The unit can treat up to 300 liters per cycle.	
Approach: [onsite, cluster, central facility not by landfill, central facility at landfill, mobile, etc.]	Onsite (AEC collects HCW from several facilities and transports them to Hotel Dieu where the autoclave is housed and operated)
Type of Technology	Auto-clave (commercial name is ECODAS)
Capacity (kg/hour)	Intercycle 300 liters/cycle (35 min/cycle)
Additional Equipment (shredder, grinder, compactor, transport carts, etc.)	Shredder incorporated
Category of waste to be treated? (e.g.: bio-infectious, pathological, chemotherapy, etc.)	Infectious waste
Facility(ies) being serviced	Hospitals and laboratories
Location of Treatment System	On-site and mobile unit
Distance to Landfill or Dump Site (km)	Dependant on the hospital location
Distance to model facility(ies)	TBD
Does the technology already exist? If yes, what is the technology name?	It is used in 10 hospitals so far (more hospitals will install autoclaves in 2006)
Technology 2: Autoclave (mobile)	
Also an Auto-clave, but it is mobile. Env-Sys, a Lebanese company specialized in HCWM, has introduced a different type of autoclave to the country (commercial name is HYDROCLAVE). The company owns several autoclaves and operates them as mobile units. Treated waste is stored in special medical waste bags and sent to the nearest municipal waste landfill. The company uses chemical and/or biological indicators to test the waste after sterilization and provides the hospital with the test results.	
Approach: [onsite, cluster, central facility not by landfill, central facility at landfill, mobile, etc.]	Mobile
Type of Technology	Auto-clave H25

Capacity (kg/hour)	75 kg/cycle (60 min/cycle)
Additional Equipment (shredder, grinder, compactor, transport carts, etc.)	Generator, shredder, grinder and heater (chaudière)
Category of waste to be treated? (e.g.: bio-infectious, pathological, chemotherapy, etc.)	Infectious wastes
Facility(ies) being serviced	Hospitals
Location of Treatment System	Mobile
Distance to Landfill or Dump Site (km)	Dependant on the location of the hospital
Distance to model facility(ies)	NA because mobile unit services several hospitals that have subscribed to the service
Does the technology already exist? If yes, what is the technology name?	It is used in more than 5 hospitals with MoE treatment permits
Technology 3: mobile	
A second type of mobile auto-clave systems is the H100. It is a system used by the private company Env-Sys. Once the waste is treated it is placed in Medical Waste Disposal Bags and disposed off in the municipal waste stream.	
Approach: [onsite, cluster, central facility not by landfill, central facility at landfill, mobile, etc.]	Mobile
Type of Technology	Autoclave H100
Capacity (kg/hour)	400kg/cycle (2 hours)
Additional Equipment (shredder, grinder, compactor, transport carts, etc.)	Shredder and grinder
Category of waste to be treated? (e.g.: bio-infectious, pathological, chemotherapy, etc.)	Infectious waste
Facility(ies) being serviced	Hospitals
Location of Treatment System	Onsite
Distance to Landfill or Dump Site (km)	Dependant on the location of the hospital
Distance to model facility(ies)	NA because the system is mobile
Does the technology already exist? If yes, what is the technology name?	Yes

Training and Education

Background Since 2000, several organizations have designed and organized training sessions on HCWM for hospital staff and nurses including the Ministry of Public Health and WHO, the Syndicate of Private Hospitals, the Order of Nurses and Arc en Ciel (AEC). In coordination with WHO, the Syndicate of Private Hospitals conducted the first formal training in 1997; the most recent training was conducted in 2004. The number of hospitals that passed the waste management section of the ministry's accreditation system reportedly increased between the first and second accreditation cycles. During this period, Lebanon's nursing schools/faculties have also been including some course work on HCWM but so far they have not offered a formal course on HCWM.

With grant funding from the EU-Life Third Countries Program (2007-2009), AEC started implementing a program on HCWM in Mount Lebanon; the Governorate of Mount Lebanon is host to 49 private hospitals, 36 percent of the total number of hospitals in Lebanon. As part of this program, AEC in cooperation with the Faculty of Nursing at Saint Joseph University will implement a training program on HCWM in a dozen hospitals. The program will train more than 1,500 nurses per year and culminate with the dissemination of a formal training kit designed to enhance in-house training capabilities.

WHO has established a Regional Centre for Environmental Health Activities (CEHA) based in Amman, Jordan. The center is engaged in several programs related to HCWM including the "Promotion of Health of Cities, Villages and Communities." The WHO office in Lebanon has expressed interest in the PDF-B project and would be ready to mobilize CEHA resources to support the training program.

Project Justification The GEF Project will address the following weaknesses related to Lebanon's achievements and capabilities in HCWM training:

- Lebanon has organized a number of training sessions but training needs have not been formally assessed; training capabilities have not been tailored to specific stakeholder groups like service providers, nurses, infection control staff, hospital managers, housekeeping, etc.
- The Syndicate of Private Hospitals has expressed concerns that hospitals cannot /will not pay to sustain training programs. So far, there is no system in place to finance training programs.
- There is no formal evaluation of training programs or a certification system to designate trainees who have completed a training program/module.
- So far, there has been little coordination between training organizations and projects. The opportunities for synergies between those organizations in relation to HCWM remain untapped.

Technical Approach

The GEF Project will have two elements; training and education. Both elements will build on previous achievements in HCWM training and education through pilots and national integration. The training element will target hospital staff and service providers including HCW providers and housekeeping. It will culminate with the launching of a certification system involving several line agencies including the ministries of public health and environment, World Health Organization and the Syndicate of Private Hospitals. The educational element will target the five schools/faculties that offer a degree in nursing by elevating HCWM from an ad-hoc syllabus to a full-fledged, stand-alone course. In particular, the GEF Project will implement the following tasks related to HCWM training and education:

Training

- Based on the preliminary assessment conducted during PDF-B, assess national training needs covering relevant stakeholders both internal to the facility (nurses, doctors, waste workers, infection control and procurement staff, housekeeping, public health and environmental health specialist, etc.) and external (municipal, government, and private sector players)
- Evaluate the training program/module prepared by AEC (Université Saint Joseph) by sharing it with relevant institutions for comments and enhancement (MOE, MOPH, WHO)
- Audit HCWM in the model facilities before and after the training
- Train hospital staff, nurses and services providers in all four model facilities using the training program/module prepared by AEC/Université Saint Joseph
- Based on the outcome of the pilots in the model facilities, modify and enhance the facility-specific training to produce a "custom" training program/module that is nationally suitable
- Formalize the training program/module during a national workshop to achieve national ownership
- Develop incentives to sustain training programs by examining training costs and potential sources of funding (e.g., apply a "training fee" on treatment service)
- Adapt and disseminate the "custom" training manual regionally and organize bilateral exchanges to maximize cross-learning
- Organize awareness seminars for hospital staff including nurses and housekeeping on mercury spill prevention, management and clean-up, and designate responsibility for monitoring training program, its effectiveness and impacts
- Develop a certification system for trainers and trainees

Education

- Work with the Faculty of Health Sciences at the American University of Beirut to develop a formal course on HCWM as part of the nursing curriculum; alternative facilities include the Lebanese University (Hadath), Université Saint Joseph (Beirut) and the University of Antonine (Baabda)
- Test the course on HCWM by completing at least one nursing cycle with HCWM as a formal course.

National Training Program
The Syndicate of Private Hospitals started a training program in 1997 with considerable WHO support through its regional Center for Environmental Health Activity (CEHA). At least four training sessions were organized each year between 1997 and 2004. The number of hospitals that have passed the Health Care Waste Management section of the MOPH accreditation reportedly increased since the start of the training program. AEC has received some funding from the EU-Life Third Countries program to implement a training program on

HCWM in a selection of facilities. Also, the Order of Nurses and WHO will be involved in the training component.	
Relevant Existing Trainings and stakeholders (if applicable)	
Name of training institution(s)	Syndicate of Private Hospitals
Training program description (single university, multiple campuses of one university, multiple universities and programs, health ministry training centers, government run program, other training institutions, WHO training center, medical or nursing schools, other described)	Training has taken place in several hospitals
Key partners (health ministry and related departments, WHO, universities, associations of nurse, medical doctors, public health, hospital	WHO (CEHA)
Certification Institutions	None to date
Existing training policies and regulations (if applicable)	None to date
National Training Program	
AEC has received some funding from the EU-Life Third Countries program to implement a training program on HCWM in a selection of facilities.	
Name of training institution(s)	Arc En Ciel
Key partners (health ministry and related departments, WHO, universities, associations of nurse, medical doctors, public health, hospital	Order of Nurses, Syndicate of Private Hospitals, MOPH/WHO, Arc En Ciel
Certification Institutions	WHO/MOPH and MOE
Existing training policies and regulations (if applicable)	None to date
Strategies to assure sustainability after Project completion (funds to pay for the training)	TBD
Non-GEF Resources	EU Life Third Countries, OMSAR

Model Facilities

Urban Model Hospital

Ospital ng Maynila Medical Center (OMMC) was identified as the urban model hospital because it is a good representative of the Local Government Unit (LGU)-operated hospitals in the National Capital Region and the country as a whole. Most of the government hospitals in the Philippines are devolved to the Local Government Units and the model facility should be operated by the LGU to facilitate replicability of the project to other health-care facilities.

The size and capability of the hospital as a tertiary facility and the range of services it offers are important factors that were considered in the selection. The hospital location (in metro Manila) makes it accessible for coordination in terms of planning, monitoring and evaluation. It is also accessible and convenient for other project components such as training and model facility visits, and as a showcase to other health-care facilities in the country and the region.

The hospital management and the City Government showed strong commitment as project partners and the City Mayor signed a Letter of Intent (LOI) to participate in the HCWM project. Included in the LOI is the City's commitment to provide co-financing to the Project. The City has also designated personnel in charge of HCWM and is willing to collaborate on the training program.

OMMC is a teaching and training hospital for health-care providers. Proper waste management in the facility would therefore have unlimited benefits in terms of producing health workers that are future advocates of proper waste management.

Hospital name	Ospital ng Maynila Medical Center
Number of beds	300
Average occupancy rate	Average of 85% (maximum more than 100%)
Average number of outpatients per day	374
Type based on hospital services	Tertiary. Services include: surgery, obstetrics, medicine, ear-nose-throat, ophthalmology, pediatrics, family medicine, and rehabilitation for physical therapy patients. The facility is also a teaching hospital.
Hospital type	Public
Type and location of technology	Formerly incineration (on-site); contractor (off-site)

Rural Model Facility

Pangasinan Provincial Hospital (PPH) was identified as the rural model hospital because it is a good representative of the Local Government Unit (LGU)-operated hospitals in the country. It is located in Region 1 and within the Health Resources and Services Administration (HSRA) "Formula One for Health" areas, which is one of the criteria set by the Technical Working Group (TWG).

The size and capability of PPH as a provincial hospital (tertiary facility) and the range of services it offers are factors that were also considered in the selection. The hospital location makes it accessible for final disposal of treated HCW to the Clark Sanitary Landfill, an approved and operational sanitary landfill. The total lot area of about five hectares is more than adequate for housing an on-site treatment facility. The hospital plans to upgrade to 250-bed capacity. It has also designated personnel in charge of HCWM and is willing to collaborate on the training program.

PPH is a teaching and training hospital for health-care providers in the province. Proper waste management in the facility would therefore have further benefits in terms of producing health workers that are future advocates of proper waste management.

Facility name	Pangasinan Provincial Hospital
Number of beds (if applicable)	150
Average occupancy rate (if applicable)	100% or more
Type based on hospital services	Tertiary. Services include: obstetrics-gynecology, surgery, pediatrics, medical, and outpatient services. The facility is also a teaching hospital.

Hospital type	Public
Hospital level	Provincial
Type and location of technology	Burying (on-site); open pit (onsite)

Technology

By virtue of the Philippine Clean Air Act (RA 8749), the use of incineration is banned in the Philippines. The following treatment technologies can be used for HCW management in the country: autoclave, microwave, hydroclave or other approved non-burn technology. The preferred option for appropriate technology is an on-site treatment facility (facility-based). This strategy will minimize cost and potential risks of HCW transport and storage.

Priority will be given to locally made or manufactured technology or equipment to ensure sustainability of operations and minimize cost of maintenance. Treatment technology should comply with existing Environmental Laws and Regulations in the country. Based on the above considerations, an autoclave treatment technology will be used in this project. Treated health-care waste for both model facilities will be transported to and disposed in the Clark Sanitary Landfill, which is about 100 km from both locations.

Approach	On-site treatment
Type of Technology	Autoclave
Capacity	1.5 cubic meters (450 kg) per unit per hour *(Target for this project is to provide two units per model facility)*
Additional equipment	Shredder, bins, color-coded bags and transport carts
Category of waste to be treated	Infectious, pathological
Location of treatment system	On-site
Distance to landfill (km) from the technology	Approximately 100 km

National Training Program

The Department of Health (DOH) provides training on HCWM in the country. A training module developed by the DOH is used in training health-care providers from different levels of the health-care delivery system. At present the DOH has trained a total of 468 key persons: 45 from the regional level, 59 from DOH hospitals, 114 from provincial and city levels, 152 from local government units, 35 from private hospitals and 3 from other units.

Aside from DOH training, there is no other training program on HCWM in the country. Most of the personnel trained came from government health-care facilities with only 35 trainees or about 7.5% from private health-care facilities. In spite of these efforts from the DOH to train health-care providers on proper HCWM, most of the stakeholders believe that there is an urgent need to sustain training of personnel from the private sector and other government health-care facilities.

The University of the Philippines, College of Public Health (CPH) will be the partner academic institution for the training component of the Project. A Letter of Intent (LOI) submitted by the College states the institution's commitment to be the training arm of the Project during the implementation phase. The College is also willing to offer the training and certification course on HCWM continuously after Project completion.

The target trainees per model facility include personnel from management, rank-and-file, maintenance, as well as medical and nursing staff. For other LGU hospitals/clinics and private hospitals in Metro Manila, only key persons will be trained (five per facility) as trainers for their respective health-care facilities.

At the end of the Project, the HCWM training module will be part of the regular short course offering of the College of Public Health. This is open to participants from any health-care facility in the Philippines and other countries.

Relevant existing trainings and stakeholders	Training-of-trainers on HCWM, Department of Health
Name of training institution	Department of Environmental and Occupational Health College of Public Health, University of the Philippines, Manila

	Dr. Ronald D. Subida Department Chair
Training program description	Multiple campuses of one university, or Health Department training centers
Key partners	Department of Health Local Government Units (LGUs) University of the Philippines
Certification institutions	College of Public Health, UP Manila
Strategies to ensure sustainability after Project completion (funds to pay for the training)	Core trainers trained from each health-care facility can conduct training for other staff of the hospital. Private and other government hospitals can avail of the training modules that will be part of the regular short courses offered by the College of Public Health, UP Manila (for a minimal fee) after Project completion.
Non-GEF resources	Department of Health Local Government Units Private Hospitals

SENEGAL

Model Facilities

Urban Model Hospital	
The Senegalese Steering Committee unanimously agreed that Hoggy Hospital should serve as the urban model facility for this Project. Criteria identified by the national stakeholders included facility size, number of services provided, replicability of outcomes and a willingness and ability to implement and maintain the changes necessary to meet Project goals. Hoggy Hospital best met all of the identified criteria. It is a medium-sized hospital located in the Dakar area, large enough to be an appropriate urban model while small enough that Project results could be easily replicated by health-care facilities throughout the country. It is similar in systems management, financial structure and stability and waste management systems to the average medium-size Senegalese hospital. Further, as a public hospital, Hoggy is quite willing to collaborate with the ministries and the Project team, exchange and share information and implement related training programs. Most critically, since Hoggy Hospital currently does not have a health-care waste treatment technology, the hospital management is open to purchasing non-burn technology for this purpose.	
Hospital name	Hoggy Hospital (Dakar)
Number of beds	287
Average occupancy rate	95%
Average number of outpatients per day	No data
Type based on hospital services	Tertiary hospital. Services include: surgery, gynecology, maternity, emergency, research, laboratory, pediatrics, medical clinic, surgery, radiology and oncology.
Hospital type	Public
Type and location of technology	Currently some of the health-care waste is open-burned on-site and some is transported off-site where it is also burned.
Rural Model Facility 1	
Sangalcam is the first of two rural model facilities chosen in Senegal. Sangalcam is located approximately 30 kilometers outside of Dakar in the Rufisque region. It is close enough to the city to be accessible to Dakar's waste management system and to be linked to the urban model facility. Uniquely, Sangalcam is located among 52 villages thus serving a relatively wide region with a population of 50,000; generally, facilities of this size are in more isolated areas and serve a much smaller population. This unique situation will be leveraged to facilate replication of Project gains among the health stations where most rural medical services are provided (768 stations nationally). Sangalcam will provide information about best practices to these health stations to encourage adoption of best practices.	
Hospital name	Posté de Santé de Sangalcam
Number of beds	4
Average occupancy rate	Over capacity during rain/malaria season. Other seasons 100%.
Average number of outpatients per day	45
Type based on hospital services	Primary services
Hospital type	Public
Hospital level	Provincial
Type and location of technology	Currently there is no health-care waste treatment management. Open-burning is practiced on-site.
Rural Model Facility 2	
Youssou Mbargane (YM) Diop Hospital is the second rural model facility and also located in the Rufisque region. Of the two rural facilties, YM Diop Hospital is further from Dakar and located in a more remote rural area. YM Diop Hospital already is and will continue to be involved in the Project-linked training program. YM Diop is representative of many smaller health centers in Senegal, making it ideal for demonstration of best practices that can be replicated nationwide. Currently YM Diop has no health-care waste management system.	
Hospital name	Youssou Mbargane Diop Hospital
Number of beds	50
Average occupancy rate	Over capacity during rain/malaria season. Other seasons 100%.
Average number of outpatients per day	No data.
Type based on hospital services	
Hospital type	Public

Type and location of technology	Health Center
Type and location of technology	Currently health-care waste is burned in small-scale incinerator with no air pollution control measures.

Technology

In Senegal, health-care treatment waste technologies are currently quite limited. In many cases, the waste is not treated at all and is disposed with municipal waste. The Dakar region is in the process of opening its first sanitary municipal landfill. In the rest of the country, all waste is disposed in a non-sanitary and non-secure fashion. Most treated health-care waste is either open-burned or burned in small-scale incinerators with no air pollution control measures. Due to low or no awareness of proper health-care waste management systems and lack of knowledge about economically viable non-polluting treatment technologies, the current trend in Senegal is the promotion of burning.

Through the Project, health-care waste from the urban model facility and both rural facilities will be treated through economically viable, simple non-burn technologies. Currently, it is unclear if the partnership between the government of Senegal and the private contractor AMMA responsible for collection, transportation and management of municipal waste will continue. In the first six months of the Project's implementation phase, national stakeholders in collaboration with the GEF will decide whether to promote the central or on-site treatment of waste from the urban model facility; the allocated budget for activities in Senegal is adequate to fund either option. Both rural model facilities will use simple, low-cost on-site autoclaves for the treatment of health-care waste. All model technologies will be chosen with consideration given to the local circumstances and needs in order to assure the highest likelihood of replication, sustainability and pollution reduction.

Approach	Urban to be decided; both rural facilities will use on-site technologies.
Type of technology	Economically viable simple autoclaves
Capacity	Variable as needed
Additional equipment	N/A
Category of waste to be treated	Bio-infectious and anatomical
Facility being serviced	Model facilities and potentially additional urban facilities if central facility model is chosen
Location of treatment system	On-site for rural and undecided for urban facility
Distance to landfill or dump site (km)	20 to 40 km

National Training Program

The Project will collaborate with and build on the PRONALIN training program on infection control, HCWM and epidemiology funded by the Scandinavian Development Fund and overseen by the Department of Preventative Medicine of the Ministry of Health in Senegal. PRONALIN began in 2005 and will continue through 2015. The program's overall budget is thirty million USD devoted to the procurement of technology, materials and training. The training program is allocated approximately seven million USD. Through this program, every health-care facility in Senegal will receive HCWM training. The training program will range from 3 days for medical doctors to one week for nurses, infection control staff and waste managers. Originally, the program managers planned to purchase small-scale incinerators. However, because of their collaboration with the Project thus far, the PRONALIN project managers have agreed to further explore other treatment technology options in the upcoming year. All three model facilities have been trained through the PRONALIN program. Building on this program, the Project will provide technical support and content expertise, additional national and regional materials-development and dissemination support and further financial support. Through this Project the training program will be disseminated to other west African francophone countries.

Name of training institution	PRONALIN in collaboration with the Department of Preventative Medicine
Training program description	Basel Regional Center for Francophone Countries (BCRC Dakar)
Key partners	Ministry of Health, Department of Preventative Medicine, Scandinavian Development Fund; The National School for Sanitary and Social Development (ENDSS).

Strategies to ensure sustainability after Project completion (funds to pay for the training)	The Project is in collaboration with an existing training program that is in place through 2015. The existing training activities are overseen and monitored by the Department of Preventative Medicine of the Ministry of Health and funded by the Scandinavian Development Fund. Through financial and programmatic collaboration with this existing government program, the Project can best assure continuation and improvement of HCWM training nationally after the Project's completion.

TANZANIA (Appropriate Technology Development Component)

Background of Partner Institutions
The College of Engineering and Technology (CoET) is a semi-autonomous campus College of the University of Dar es Salaam. The College is composed of three faculties, namely the Faculty of Mechanical and Chemical Engineering, the Faculty of Civil and the Built Environment and the Faculty of Electrical and Computer Systems Engineering. The Faculty of Mechanical and Chemicals Engineering is the largest in the College with six academic departments. It offers eight undergraduate programs and about the same number of postgraduate programs, employs approximately 59 academic staff and 30 technical staff, and has a student population of about 700 undergraduate students and 200 postgraduate students. All staff and students involved in the Project will come from this Faculty, which has experience in developing small- to medium-scale equipment and technologies.

The Technology Development and Transfer Centre (TDTC) plays the role of coordinating technology development and transfer activities in the College. The Centre is equipped with a modern mechanical workshop and has access to all laboratories and workshops in the College of Engineering and Technology. The Centre focuses on the following components: In-house technology development, which involves development of research outputs from College faculties and departments; and technology brokerage, which involves developing and transferring technologies using a mediated approach (negotiated contacts or purchase and sale agreements).

The College, in collaboration with Tanzania Gatsby Trust, the Ministry of Industry and Trade, and Small Industrial Development (SIDO), is promoting the incubation concept. A Technology Incubator promotes the development of small- and medium-sized enterprises through the enhancement of the technology available to and used by the enterprises. An incubator will act as a vehicle to provide an instructive and supportive environment to entrepreneurs who will be ready to take on and commercialize the health-care waste treatment technologies that will be developed by the Project. This will consequently guarantee sustainability and replication of Project activities in Tanzania and other countries.

Project Organization
A Technology Development Team (TDT) of about 5-6 people will be created. Its function is to coordinate and oversee the work of the Technology Development component of the project. It will be co-chaired by the lead technical consultant of the Global Expert Team and the Dean of the Faculty of Chemical and Mechanical Engineering at the University of Dar es Salaam. It will include international experts in infection control and product development, and a hospital engineer in Africa familiar with the hospital setting. Communication will be primarily through email, although site visits will be organized as needed.

In addition, a Technology Development Advisory Committee (TDAC) will be formed. This committee of about 20 people will provide advice and feedback on performance requirements, final designs, testing, evaluation and other aspects of the development as requested by the TDT. It will include representatives from each of the main Project partners (UNDP, WHO and HCWH), the seven participating countries, other countries in Africa, and international experts in specific areas related to health-care waste treatment and disposal. Communication will be through email.

Within the University of Dar es Salaam will be a university-based Research and Development Group (R&DG) which will be involved in the engineering, development, construction and test work. This will include the Faculty of Chemical and Mechanical Engineering, the Technology Development and Transfer Center (TDTC) and possibly the Department of Microbiology.

Technology Concepts
The basic requirements are a small- and medium-size treatment technology and appropriately sized waste containers. Basic design criteria could include:

- Effectiveness in disinfecting waste (ability to meet microbial inactivation efficacy requirements),
- Ease of validation of microbial inactivation,
- Ability to meet recognized standards,
- Affordability for developing countries,
- Ease of fabrication using locally available materials and human resources,
- Ease and safety in operation and maintenance,

- Durability and reliability under normal daily use,
- Relative ease of repair,
- Appropriate sizes (capacities),
- Options for different energy sources (electric, bottled gas, local fuels, solar, etc.),
- Low environmental emissions, and
- Residues could be recycled or safely discarded in open dumps.

Some of the initial designs will be taken from the results of the 2003 international competition sponsored by Health Care Without Harm with technical support from the World Health Organization (www.medwastecontest.org). Initial input will also be obtained from the members of the Technology Development Advisory Committee.

Activities during the Full Project

Task	Output	Responsibility
Develop performance criteria or performance specifications for the appropriate technologies	Draft design specifications	TDT
Review criteria or specifications by TDAC	Finalized design specifications	TDT, TDAC
Screen concept designs from existing technologies and results of the 2003 international competition on low-cost treatment technologies for rural areas	Proposed concept design	TDT
Conduct research and review of concept designs by R&DG to come up with recommendations	Recommended design	R&DG
Review and finalize recommended design; share information on the final design with the TDAC	Final design	TDT, R&DG
Develop and review engineering drawings	Engineering drawings	R&DG, TDT to review
Build prototypes	Prototypes	R&DG
Determine tests to be conducted (engineering, performance, pressure vessel certification, microbial inactivation); develop test protocols; review and approve test protocols; share information on test protocols with the TDAC	Test protocols	TDT, R&DG
Perform tests; modify designs and repeat tests if necessary	Test results	R&DG, TDT (EK)
Send test results to TDAC for review	Comments from TDAC	TDT
Determine factors to evaluate in field-testing; inform TDAC	Factors to evaluate	TDT
Install technology at a local hospital; conduct operator training; monitor operation, maintenance, microbial inactivation testing, etc.; keep records	(Unit operating in hospital or clinic)	R&DG, AGENDA, selected hospital and clinic*
Conduct field-testing and evaluation for at least one month	Report	AGENDA
Send field-testing reports and evaluation to TDAC for review	Comments from TDAC	TDT
Select manufacturer to fabricate technology using construction manuals**	Manufacturer selected	TDTC, TDT, AGENDA
Demonstrate fabrication	Units built	Manufacturer
Validate fabricated units, including validation of manuals; arrange for certification of pressure vessel	Validation report; certification	R&DG, certification agency
Send reports, manuals, etc., to TDAC for final review	Comments from TDAC	TDAC
Finalize construction, installation, operating and maintenance, training and other manuals	Manuals	R&DG, AGENDA
Lay groundwork for replication and sustainability		TDTC, AGENDA

*The Tanzanian NGO AGENDA will work beforehand with the selected hospital and clinic to implement a basic waste management program and conduct trainings

**TDTC and AGENDA will prepare a market study/needs assessment and will identify a manufacturer and possibly an entrepreneur in Tanzania.

As part of information dissemination, results of the technology development component will be posted on the Project website along with test results and field-testing case studies. Results will also be submitted for publication in scientific and engineering journals. The results will be presented at national, regional and international conferences.

Model Facilities

Urban Model Hospital	
Viet Duc University Hospital is one of the best known hospitals in Vietnam both nationally and in Hanoi. Constructed in 1904, Viet Duc University was originally established to enable ideal learning conditions for medical students of Hanoi Medicine University. Through a century of development, the hospital is now not only the biggest surgical center but also one of the leading medical internship and research locations in Vietnam. Viet Duc was chosen as the model urban hospital for the project for the following reasons: (a) it has the highest reputation and quality nationally, (b) it receives some of the largest support and investment amounts from the Government of Vietnam, (c) it has an excellent management system, (d) it is dedicated to the goals of the Project and willing to implement the planned activities, (e) it has the necessary financial means to maintain sound health-care waste management, (e) its medium size is ideal, allowing a demonstration of extensive systems change while still remaining manageable, and (f) it is a training/university hospital thus ensuring replication of the management practices.	
Hospital name	Viet Duc University Hospital
Number of beds	450
Average occupancy rate	Overloading (200%)
Average number of outpatients per day	620
Type based on hospital services	Teaching hospital. Services include all major surgeries and services.
Hospital type	National state-own at central level
Model Cluster	
The NPSC and NWG agreed that in order to best demonstrate rural models for best techniques and practices in health-care waste management, a cluster of hospitals would be necessary. In Vietnam, provincial hospitals, district hospitals and health centers work closely in providing health-care services. The system needs to be examined holistically in order to make any substantive and long-lasting change. Additionally, the NPSC and NWG set proximity to Hanoi as a criteria for the rural cluster. This criterion was necessary in order to ensure collaboration between urban and rural model centers as well as between the rural cluster and the training program. A study tour and survey of facilities within 100 kilometers of Hanoi was conducted in the following provinces: Ninh Binh, Nam Dinh, Ha Tay, Hai Duong and Bac Ninh. After careful assessment, the cluster in Ninh Binh province, with the Provincial General Hospital as its core, was selected for the following reasons: hospitals in Ninh Binh province are willing to cooperate; they have the management system and financial structure necessary to implement and sustain the necessary programs and changes; Ninh Binh province is 100 kilometers from Hanoi enabling day-long study tours linked to the training component; and Ninh Binh province was the only surveyed province without existing incinerators, decreasing the likelihood of conflict with the proposed Project-related technology.	
Hospital name	Ninh Binh Provincial General Hospital (together with more than ten other neighboring district and communal facilities)
Number of beds	400 beds in Ninh Binh Provincial General Hospital and more than 200 beds in other neighboring district and communal facilities
Average occupancy rate	Range of 70-300%
Average number of outpatients per day for each location	300 outpatients per day for Ninh Binh Provincial General Hospital and more than 500 for other neighboring district and communal facilities
Type based on hospital services	Multi-profile hospital. Services include: diagnosis, surgery, emergency, pediatrics, X-ray, labs, etc. Other neighboring district and communal facilities provide mostly diagnosis and some simple treatment.
Hospital type	State-owned
Level of hospital	One provincial hospital and more than ten district and communal facilities

Type and location of technologies	One small simple autoclave
Main facility	Ninh Binh Provincial General Hospital
Distances from other facilities to the main facility	Within 10 km
Waste treatment plans for the cluster	All bio-medical waste from the cluster will be collected and treated by the autoclave in the main facility. None-infectious waste will be managed by the municipal authorities and disposed in the sanitary landfill.

Model Central Facility

Currently Hanoi Urban Environment Company (URENCO) services all of the hospitals (more than 50) and a majority of the health centers in Hanoi. Further, URENCO is responsible for municipal and industrial waste management services. Health-care waste is treated adjacent to both the composting center and the city landfill. Hanoi's Ten-Year Growth Plan includes adequate space for treatment and disposal of health-care waste. URENCO's waste management collection, transportation and treatment practices are systematic, documented and sustainable.

URENCO approached the Project partners seeking partnership, and its management is quite committed to collaboration and the Project's goals and outcomes. Currently URENCO incinerates the city's health-care waste. However, the incinerator has exceeded the recommended usage duration and URENCO is seeking to replace its treatment technology. To minimize environmental impacts, URENCO would like to replace its existing incinerator with a non-burn technology. Through the Project, we will work with URENCO to purchase twin autoclaves and a shredder. Two autoclaves will ensure continuous service even if one piece of equipment is being serviced. The shredder will lead to volume reduction, will render the waste unrecognizable and will ensure that health-care devices cannot be reused.

In addition, with collaboration of URENCO, the Project will develop a city-wide reusable sharps waste management system in Hanoi. URENCO has committed to integrate the proposed new system into its existing health-care waste management system. URENCO will provide reusable sharps boxes to all the hospitals and health-care centers it services in Hanoi, and will regularly collect, transport, treat and dispose of sharps waste. Depending on the amount of sharps waste produced, each hospital will be given an allotment of sharps boxes. As the boxes are filled, they will be exchanged with sanitized empty boxes. URENCO has agreed to oversee a tracking system as it does with its current health-care waste to ensure adequate information for feedback to hospitals on the quality of their sharps waste management. To the best of the Project management team's knowledge, this will be the first city-wide sharps waste management system of its kind in a metropolitan city in the Global South.

Approach	Centralized treatment
Type of technology	Two identical autoclaves to ensure continuous management
Capacity	200 kg/load for each autoclave
Additional equipment	One shredder
Category of waste to be treated	Infectious waste
Facilities being serviced	All hospitals and most health centers in Hanoi
Location of treatment system	Cau Dien Municipal Waste Treatment Complex, Cau Dien, Hanoi
Distance to landfill or dump site (km)	Adjacent to central facility
Distance to model facility	Within 10 km

National Training Program

The Project will collaborate with the Vietnam Administration of Preventive Medicine (VAPM) of the Ministry of Health on the national training program. VAPM currently has an extensive national training program on HCWM and occupational health and safety. Through the Project, the aforementioned training program will be further evaluated, supported and enhanced. Further, the Project will collaborate with the Ministry of Health and the Ministry of Natural Resources and Environment in order to ensure the efficacy and sustainability of the existing training program. The existing training program has a training center/node in every province, enabling the existence of decentralized, localized and effective training program(s) across the country.

VAPM manages a system of Provincial Preventive Medicine Centers. Based on this system and as obligated by national legislation, the Ministry of Health, in collaboration with other Ministries, agencies and provinces, spreads labor safety and environmental health training to health-care facilities nationwide. Surveys in 2004 by the Vietnam Preventive Healthcare Department of 74 health-care units and 1,509 health-care workers in three provinces/cities revealed that 69.5% of surveyed workers get access to labor safety and environmental health training. The training expense is incurred by the respective health-care facilities. The Ministry of Health and partners are only responsible for the development of training materials.

The Project training program will be incorporated into this system, and could utilize the existing structure and self-funding mechanism to ensure sustainability.

Furthermore, the national training program will work toward the inclusion of HCWM in the curricula of health-care and medical professionals. Such programs will help ensure appropriate systems and implementation of health-care waste practices. Currently, most medical schools have environmental-health-related curricula where HCWM could be incorporated.

Relevant existing trainings and stakeholders	Annual labor safety and environmental health training to all health-care facilities nationwide through preventive medicine system
Name of training institution	Ministry of Health, Department of Preventative Medicine
Training program description	The program trains key instructors (training-of-trainers) who in turn travel to all health-care facilities and train relevant and responsible staff. The program uses the provincial governance structure and has one central node in each province. The program is overseen by the Ministry of Health. The Program's goal is to ensure effective HCWM, infection control and worker health and safety. Objectives: • Establish Central a HCWM Training Team, • Develop training materials for HCWM, • Build provincial core trainers on HCW, and • Provide training courses for health-care workers on HCWM at health-care facilities
Key partners in the Project training program	• Lead: Ministry of Health (Vietnam Administration of Preventive Medicine, Department of Therapy, Department of Personnel) • Partners: Ministry of Natural Resources and Environment (Vietnam Environmental Protection Agency); WHO, academia, provinces, hospitals
Certification institutions	Vietnam Administration of Preventive Medicine, Ministry of Health (through its Provincial Preventive Medicine Center)

Existing training policies and regulations	• Inter-ministerial Circular No.14/1998/TTLT-BLDTBXH-BYT-TLDLDVN dated 31 October 1998 of the Ministry of Labor, Invalids and Social Affairs; the Ministry of Health; and the Vietnam General Association of Labor, on the implementation of labor protection in enterprises and businesses. • Circular 13/BYT-TT of the Ministry of Health dated 21 October 1996 on the implementation of management of laborer health and occupation diseases. • Inter-ministerial Circular No.08/1998/TTLT-BLDTBXH-BYT dated 20 April 1998 of the Ministry of Health and the Ministry of Labor, Invalid and Social Affairs, on the implementation of regulations on occupational diseases. • HCW Management Regulations promulgated by Decision 2575/1999/QD-BYT dated 27/8/1999 of the Ministry of Health.
Strategies to ensure sustainability after Project completion (funds to pay for the training)	As dictated by national legal decree, the existing training was established in 1998. The Project will enhance and support the existing program, which legally will continue after the Project.
Non-GEF resources	Korean government, WHO and other related NGOs