



**PROJECT DEVELOPMENT FACILITY  
REQUEST FOR PIPELINE ENTRY AND PDF-BLOCK B APPROVAL**

**AGENCY'S PROJECT ID:** GF/CPR/05/XXX  
**GEFSEC PROJECT ID:** 2927  
**COUNTRY:** People's Republic of China  
**PROJECT TITLE:** Environmentally Sustainable Management of Medical Waste in China  
**GEF AGENCY:** United Nations Industrial Development Organization (UNIDO)  
**OTHER EXECUTING AGENCY:**  
**DURATION:** 12 months  
**GEF FOCAL AREA:** Persistent Org. Pollutants  
**GEF OPERATIONAL PROGRAM:** OP #14 (with potential linkages to OP #10 and other Operational Programs)  
**GEF STRATEGIC PRIORITY:** POPs SP1:  
TARGETED CAPACITY BUILDING  
**ESTIMATED STARTING DATE:** November 2005  
**ESTIMATED WP ENTRY DATE:**  
**PIPELINE ENTRY DATE:** 14 October 2005

FINANCING PLAN (IN US\$):	
<b>GEF PROJECT COMPONENT</b>	
Project (estimated)	\$21,000,000
Project co-financing (estimated)	\$24,000,000
PDF A	
PDF B	\$350,000
PDF C	
<i>Sub-Total GEF:</i>	<b>\$350,000</b>
<b>PDF CO-FINANCING</b>	
Government of China (in-kind)	\$180,000
Government of Italy	\$90,000
UNIDO (in-kind)	\$20,000
Sub-Total PDF Co-financing:	\$290,000
<i>TOTAL PDF Project Financing:</i>	<b>\$640,000</b>

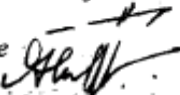
**RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT(S):**

Mr. Jinkang Wu  
GEF Operational Focal Point  
International Department  
Ministry of Finance  
Beijing  
People's Republic of China

Date: 25 September 2005

**This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for approval.**

*Name & Signature*

  
Mr. A.J.J. Rwendeire, Managing Director  
Programme Development and Technical  
Cooperation Division  
e-mail: A.Rwendeire@unido.org

  
Mr. S.M.Si Ahmed, Director  
Multilateral Environmental Agreements Branch  
Programme Development & Technical  
Cooperation Division  
Phone: +43 1 26026 3782  
email: S.Si-Ahmed@unido.org

Date: 14 October 2005

## PART I – PROJECT CONCEPT

### A – SUMMARY

#### Background information and Country situation

##### *The Stockholm Convention*

The need for the proposed project emerges from the clauses set out in Article 5 of the Stockholm Convention, where each party is obliged to make efforts to promote best available techniques (BAT) and best environmental practices (BEP) for existing potential POPs generating facilities or sources (such as medical waste processing plants) upon accession to the Convention, and to require use of best available techniques in new facilities no later than four years after the entry into force of the Convention for that Party.

The Convention defines a “new source” in Article 5 para. (f)(vi) as “any source of which the construction or substantial modification is commenced at least one year after the date of (a) entry into force of the Convention for the Party concerned, or (b) entry into force for the Party concerned of an amendment to Annex C where the source becomes subject to the provisions of this Convention only by virtue of that amendment.”

The People’s Republic of China ratified the Convention on 13<sup>th</sup> August 2004, which means that medical waste treatment facilities and systems constructed or modified in August 2005 and beyond will be required to adopt BAT and BEP not later than 12 August 2008, and should plan to employ such techniques and practices. Furthermore, in all existing facilities prior to the former date, the People’s Republic of China is required under the Convention to promote BAT and BEP.

##### *Country situation*

A recent survey of hospitals in the People’s Republic of China indicates that many hospitals have inadequate or inappropriate disposal facilities.<sup>1</sup> According to the report, medical waste management in large hospitals is usually correctly done, but in many small hospitals, and especially in remote countryside clinics and private clinics, not all medical waste are collected for special treatment. Those medical waste which are not collected are usually mixed with municipal solid waste and landfilled. In many cities, the proportion of medical waste treated is much less than waste production. For example, the quantity of medical waste produced is 20 tonnes/day in Xian (the capital of Shanxi province), which is disposed of in three ways: (1) relatively large hospitals (sickbed >100) burn the waste in their own incinerators; (2) a small amount of medical waste is sent to crematoria to be burned; (3) medical wastes produced in other small hospitals and clinics are mixed with municipal solid waste. The quantity of medical waste produced in the county level hospitals is 78 tonnes/day in Shanxi province, of which only 66% is disposed of in centralized plants, while the remainder is burned without any emission treatment or mixed with municipal solid waste. In Chongqing city, the quantity of produced medical waste is 16 tonnes/day, but separately treated medical waste is only 1-2 tonnes/day. Many of the incinerators currently in use are regarded as sub-standard and officials of the incineration plants and environmental authorities lack the capacity to monitor adherence to PCDD/F emission limits. Based on site visits conducted under the Sino-Italian UP-POP Reduction Strategy Project to existing medical waste incinerators in China, even the most recently constructed incinerators with relatively advanced technology may emit significant amounts of PCDD/PCDF (polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans) (well above the national limit of 0.5 ng/TEQ Nm<sup>3</sup>) due to insufficient flue gas treatment and discontinuous operation.<sup>2</sup>

---

<sup>1</sup> Wang Qi and Huang Qifei Chinese Research Academy of Environmental Sciences (CRAES) Problems and Countermeasures of Medical Waste Management in China, June 2005

<sup>2</sup> UNIDO 2005, Mission reports from national and international experts site visits to the medical waste disposal plants of Tianjin, Houzhou, Jinang, under the Sino-Italian project “Strategy to reduce unintentional production of POPs in China”

The table below gives an idea of the PCDD/PCDF emission in the country, which shows the magnitude of the current problem in the existing medical waste situation.

Table 1 - Emission of PCDD/PCDF from part of sources of waste incineration in 2004

Emission Source	Gas gTEQ	Residue g TEQ	Total g TEQ
Medical Waste	341.0	598.0	939.0
Municipal Solid Waste	135.0	931.5	1,066.5
Hazardous waste	1.2	54.0	55.2

*Source: China zero draft NIP, based on UNEP toolkit and existing waste disposal volume*

Finally, disposal of medical and hazardous waste in the country does not yet follow a market mechanism. The fee for waste disposal is defined by the central and local governments, and in most cases, does not allow the waste processor to cover the plant's actual operational costs, let alone to pay off facility investment costs.

### ***Hazardous Waste and Medical Waste Treatment Facility Construction Plan***

The SARS (Severe Acute Respiratory Syndrome) epidemic in China drew the Government's attention to the urgent need for sound management of hazardous medical waste from the healthcare and environmental perspectives. As a result, the State Environmental Protection Administration (SEPA) and other relevant agencies were instructed to work together to prepare a "Hazardous Waste and Medical Waste Treatment Facility Construction Plan" (hereinafter referred to as the "National Plan").

The National Plan, completed and approved by the State Council in 2003, proposes the construction of 332 disposal facilities, of which 277 are small scale medical waste treatment plants and 55 are multipurpose waste treatment facilities containing both medical and hazardous waste treatment plants. Of the 332 planned plants, 292 have a planned capacity equal to or less than 8 tonnes/day and 245 have a planned capacity equal to or less than 5 tonnes/day. Four large scale treatment plants with a capacity of greater than 30 tonnes/day are planned for the municipalities of Beijing (60 tonnes/day), Shanghai (50 tonnes/day), Chongqing (50 tonnes/day) and Tianjin (30 tonnes/day). Total planned medical waste treatment capacity is in the order of 2,080 tonnes/day (760,000 tonnes/year). According to local information, the treatment costs per kilo of medical waste is 4 Yuan (about half dollar), which is about \$500 per tonne including transportation costs.

The planned average investment unit cost for the multipurpose plants ranges from less than 2,000 to nearly 16,000 RMB tonnes/year (with cost inversely related to plant capacity), while the cost for the small medical waste plants ranges from 5,700 to 6,000 RMB/ tonnes/year.

Total investment required by this national plan is in the order of 14.2 billion Yuan (approximately US\$1.75 bn.), of which nearly 11.1 billion Yuan is dedicated to the 55 multipurpose facilities and 3.12 billion to the 277 small sized medical plants. About 0.7 billion Yuan (approx. US\$85 million) has already been pledged by central government for co-financing or subsidizing these projects. Of this amount, US\$ 37 million is allocated for medical wastes.

The current implementation status of the National Plan is that 27 plants have passed the technical review of the Chinese Academy for Environmental Planning. Of these plants, 14 plants representing 84 tonnes/day of disposal capacity have received approval from the National Development and Reform Council (NDRC) for a total investment of RMBY 183 million. A second group of 8 plants representing 43 tonnes/day of disposal capacity and with RMBY 110.6 million investment is currently awaiting NDRC approval. Five plants have passed technical review and are currently awaiting submission to NDRC.

However, the National Plan was adopted before China's accession to the Stockholm Convention and due to the influence of the SARS epidemic has been more focused on perceived immediate healthcare needs, rather than long-term human health and environmental benefits. While the National Plan is not

intrinsically and irrevocably in conflict with the Convention, GEF and other international support are needed, as evidenced by the Sino-Italian UP POPs project, in order to support and ensure that the National Plan's implementation is able to proceed in accordance with China's current obligations under the Stockholm Convention.

## **Project Rationale**

In general, medical waste has a higher content of chlorinated plastic products than municipal solid waste and is more likely to contain infectious or toxic materials. For these reasons, waste incinerators used in the disposal of medical waste are recognized in Annex C Part II of the Stockholm Convention as having the potential for comparatively high formation and release of PCDD/PCDF, hexachlorobenzene, and PCBs. As described in the "Standardized Toolkit for identification and Quantification of PCDD/PCDF Releases" – 2<sup>nd</sup> edition February 2005,<sup>3</sup> the incineration of medical waste, particularly when carried out in small and/or poorly controlled incinerators, is a major source of PCDD/PCDF emissions.

An expert group meeting held in Japan during December 2004 expressed concern regarding the difficulties in developing countries to meet the BAT/BEP standards for persistent organic pollutants in medical waste management due to lack or inadequacy of capacity and technology, particularly in coordination with other high priority socio-economic issues. In this regard, the meeting reiterated the need for an early provision of financial resources for capacity building and institutional strengthening to enable the compliance with BAT/BEP guidelines and guidance for POPs management by developing country parties.

### ***Atmospheric emissions of PCDD/PCDF from the medical waste treatment sector in China***

*Present situation:* In 2002 the People's Republic of China produced nearly 1,780 tonnes/day of medical waste. Given the expected growth in the medical service sector, medical waste production could grow to an estimated 1,870 tonnes/day by 2010.<sup>4</sup> Based on available information, only a small fraction of this waste is presently disposed in an environmentally sound manner. PCDD/PCDF emissions from most of the medical waste incineration plants existing around the country is unknown, preliminary data concerning existing incineration plants however talk about dioxin emissions of tenths ngTEQ/Nm<sup>3</sup> (resulting in 500-2600 µgTEQ/tonne waste incinerated), while existing national emissions limits for the medical waste incineration (following pollution control standard for hazardous waste incineration GB18484-2001) is 0.5 ngTEQ/Nm.<sup>3</sup>

*Planned emissions after the adoption of the national plan.* An estimate overall emissions from all 332 planned medical waste treatment systems is in the order of 7.5 gTEQ/year, assuming that all of these plants will be incinerators and able to meet the national standard for dioxin emissions taking into account the high flue gas volumetric flow due to their small average size.

*Emissions after the optimization and adoption of the national plan and more stringent emissions limits.* The second expert group meeting on the Stockholm Convention BAT/BEP held in Chile in December 2003 suggests that Parties make efforts to achieve an emissions limit of <0.1ngTEQ/Nm<sup>3</sup> for the incineration of medical waste.

Achieving this standard would represent a significant reduction from the level of dioxin emissions that is likely to take place if current standards (<0.5ngTEQ/Nm<sup>3</sup>) remain in effect. As an additional project benefit, the increase in the use of non-combustion technology (high pressure steam autoclave and/or microwave sterilisation) will allow to reach the yearly emissions for PCDD/PCDF which can be even lower than those achieved by using combustion plant adopting the emission standard of 0.1ngTEQ/Nm<sup>3</sup>. Non-combustion technologies can be indeed adopted for the small scale plants (less than 8 tonnes/day) as foreseen by the National Plan. As for these plants (i) disposal technology has not been chosen and (ii) incineration is not recommended due to the small size and expected discontinuous waste input.

---

<sup>3</sup> The Toolkit is available at [http://www.pops.int/ons/dayocuments/guidance/toolkitonsen/Toolkit\\_2005\\_En.pdf](http://www.pops.int/ons/dayocuments/guidance/toolkitonsen/Toolkit_2005_En.pdf).

<sup>4</sup> Based on 5% medical waste yield. Higher yield rates would result in proportionally higher waste.

Finally, medical waste produced by medical institutions below the county level are not being included in the National Plan program. For these institutions, it is therefore necessary to enhance waste management and disposal, which would significantly reduce emissions from these sources. Furthermore, given that these facilities will tend to be small ones, the benefits of implementing non-combustion technology such as autoclave, microwave irradiation and chemical disinfection below the county level are significant.

### ***Project technical approach***

Based on the above considerations, the first important step of the project will be to assist the People's Republic of China to build the technical, administrative, and monitoring capacities needed for the National Plan implementation, since the plan and enhancement of its implementation through this project allow the important progress in reducing UP-POP emissions.<sup>5</sup> The project's opportunity to enhance implementation of the National Plan in order to ensure the country's compliance with the Stockholm Convention arises from the following factors:

- Small size incinerator plants are characterized by high pollutant emissions (including PCDD/PCDF emissions) per unit of waste processed. The adoption of the Air Pollution Control (APC) technologies necessary to reduce these emissions levels is often not cost-effective in terms of capital and operating costs for small scale plants. Moreover, it is difficult and expensive to monitor and ensure compliance with environmental limits (including PCDD/PCDF and other emissions) of a large number of small plants. Alternative solutions that will therefore be evaluated for small plants include: (i) adoption of non-combustion disposal technologies after proper design, assessment, and validation and (ii) merger of several small plants in larger and centralized plants, where feasible from the point of view of logistics and management.
- The project will build on the results of the UP-POPs Sino-Italy project for medium sized incinerators, in particular, which has initiated a sampling program in order to identify and quantify dioxin emissions during the incineration process in representative medical waste incinerators both before and after the potential technical and management modifications identified by the international and national project experts. These results as well as the results of additional emissions data collection to be undertaken during the PDF-B phase will be used to design a range of BAT/BEP options for incinerator operational improvements.
- Improving incinerator capacity management offers a significant opportunity to reduce emissions of PCDD/PCDF and other global toxics. Based on the results of the UP-POPs Sino-Italy project and on site visits conducted by the national and international experts during the preparation of this PDF-B proposal, many existing incinerators (including modern and recently constructed ones) are characterized by stop and start operations due to under capacity utilization and inconsistent waste production levels. Since a large share of PCDD/PCDF and other pollutants are emitted during the start-stop phase of an incinerator due to incomplete combustion and releases from cold surfaces, such operation represents a highly inefficient and polluting way to operate an incinerator. Stop-start and warm-up emissions can potentially be significantly reduced by reprogramming and optimizing waste management and the incineration cycle.<sup>6</sup>

---

<sup>5</sup> Given that an enhanced monitoring network is being developed for POPs under China's National Implementation Plan (NIP), these activities will be coordinated in order to ensure that the medical waste disposal issue is addressed. Given that the Stockholm Convention requires BAT/BEP, monitoring under this project will also include evaluation of monitoring equipment necessary for individual facilities to meet the requirements.

<sup>6</sup> One of the principal reasons that many existing medical waste disposal facilities often do not operate at full capacity, and one present in both market and non-market economies, is the highly variable nature of medical waste production. A medical waste disposal system must be designed with enough capacity to account for medical emergencies (such as the SARS crisis), while still operating in an efficient, cost-effective, and environmentally sustainable manner during non-emergency periods. The optimization of these diverging requirements is one of the factors that characterize BAT/BEP facility and program management, development and promotion of which is one of the project's key goals. In this regard, collection of management and operational data regarding existing medical waste disposal facilities is a key task under the PDF-B proposal, based on which activities will be designed for implementation under the Full Project. Other key reasons for under capacity operation include over-capacity plant and system design, poor system management, and improper diversion of medical waste by sources

- Technical assistance, capacity building and development of information material and guidelines for incinerator operators therefore represents a substantial opportunity for low cost emissions reductions.
- Reduction of medical waste production and its chlorine and mercury content before incineration by proper segregation of waste in the place of origin, and individualization of alternative non-combustion disposal technologies, when feasible, can greatly reduce the emissions of UP-POPs from the medical waste disposal. Furthermore, waste minimization also reduces the costs of transporting and processing medical waste through non-combustion technologies, as well as reducing the amount of post-treatment by-products that must be landfilled or otherwise disposed of. Technical assistance, capacity building, and development of information materials and guidelines for medical and hospital personnel therefore provide the opportunity to reduce medical waste quantity, avoid the use of chlorinated materials and minimize the dispersion of dangerous component chemicals.

Waste source reduction is not addressed in the National Plan, but will be an important part of this GEF project. Specific source reduction techniques to be promoted will include:

- material elimination;
- preferential purchasing of products with reduced packaging and recyclable;
- change or substitution with non-toxic biodegradable products;
- employing multiple-use items instead of single-use products;
- using short-lived radionuclides instead of radium - 226 needles in cancer treatment;
- using non-mercury-containing devices;
- using ultrasonic or steam cleaning instead of chemical-based cleaners; and
- replacing chemical based process for development of radiography with a computer one.

The project can therefore be summarized as enhancement of the People's Republic of China National Plan implementation in order to support and ensure compliance with the Stockholm Convention, particularly in the areas of technology selection, development of monitoring capacity for UP-POP emissions at the government and plant management levels, specification of the action required for the adoption of more stringent PCDD/PCDF emissions limits for existing or new plants, adoption where feasible of alternative or ancillary non-combustion technologies for medical waste disposal, and adoption of incentive and market mechanisms in the waste management sector.

While the project intends to fully leverage investment from the National Plan, the project does not intend to exclude independent programs and facilities. At present, three municipalities namely Nanyang, Wuhan and Xian have initiated the construction of medical waste treatment facilities with funds outside of the context of the National Plan. In order to maximize project impact and leverage additional non-National Plan funds, the project will work with these and any additional non-National Plan facilities and programs, which will be permitted and encouraged to participate fully in project activities. In addition, new policies and environmental standards to be developed through the project will apply not only to plants funded through the National Plan, but also to all medical waste disposal facilities in China.

### ***Sources of leverage and possible barriers to implementation of the project***

The project will identify, eliminate obstacles and to make full use of leverage in the fulfilment of project objectives. The project's ability to work within the context of and on the basis of the National Plan constitutes a significant source of leverage for GEF funding. Opportunities to enhance implementation of the National Plan and achieve this leverage include:

- Based on discussions among project stakeholders and international and national experts, there is now a strong willingness in the country to consider management options that go beyond incineration (the

---

and/or processors in order to reduce treatment costs. These issues will be addressed during the design of the Full Project through technical assistance in system design and management and development of incentives and regulations to reduce diversion.

National Plan's erstwhile emphasis) and pursue, for example, waste separation and non-combustion technologies.

- For incineration plants, operational and investment unit costs are inversely related to plant size; one of the reasons for this relationship lies also in the need to perform online monitoring and expensive periodical emissions measurement of the concentration of UP-POPs in the outflow of the plants, regardless of the size of the plant itself.
- For small scale plants, which are in any case to be planned due to difficult geographic, logistic and administrative features of the country, non-combustion technologies are more favourable from the environmental and cost effectiveness point of view.
- GEF grants could be at least partially used in the framework of incentive mechanisms to encourage provincial and municipal authorities to develop improved waste management systems with reduced number of plants, adoption of alternative technologies, and implementation of market rules.

Possible barriers to project implementation include:

- absence of a market mechanism able to promote cost effective and environmentally superior waste management systems;
- administrative and political difficulties to strengthening existing regulations; and
- difficulties in designing waste management plans based on detailed environmental, social, and economical characteristics of the area served while much of the necessary data is currently unavailable.

These potential barriers will be addressed during the development of the Full Project with the support of PDF-B funds.

## **Project Objectives**

The objective of the project to be developed under the Block B GEF grant is to minimize the generation and emissions of UP-POP (principally PCDD/PCDF) from the medical waste treatment sector. The project will simultaneously explore ways to reduce emissions of other POPs and globally harmful contaminants generated by the medical waste sector, such as hexachlorobenzene (HCB), polychlorinated biphenyls (PCBs), mercury, and polycyclic aromatic hydrocarbons (PAH).<sup>7</sup> This approach is expected to be a highly efficient one and to result in significant additional global environmental benefits for little or no additional cost, since many of the measures to reduce PCDD/PCDF emissions are able to or can be adopted to simultaneously reduce emissions of the other organic micro pollutants. Additional measures to achieve lower mercury emissions will also be considered.

From the technological point of view, the project's objective is to enable the People's Republic of China to move towards widespread utilization of BAT and BEP in medical waste disposal, so as to ensure the reduction of PCDD/PCDF and the other micropollutant emissions while the country is pursuing environmentally sound management of hazardous medical waste and investing intensively in medical waste disposal facilities.

From the strategic point of implementation, the project's objective is to promote mechanisms capable at the same time to increase the management capacity in the medical waste treatment, and to reduce the PCDD/PCDF and other micropollutant emissions through enhanced planning and development of the medical waste treatment network at the provincial and municipal levels. This will be done as follows:

---

<sup>7</sup> For any non-Stockholm Convention globally harmful contaminants identified and addressed by the project, GEF funding will be sought under International Waters Contaminant Based Operational Program 10, and/or other related Operational Programs, as undertaken by the UNDP Global Project for *Demonstrating and Promoting Best Techniques and Practices for Reducing Health Care Waste to Avoid Environmental Releases of Dioxins and Mercury*.

- Through capacity building aimed at increasing the technical capabilities of project organizers in medical waste treatment during (a) the formulation and implementation stages of individual projects and (b) the monitoring of the micropollutant emissions;
- Through awareness raising, the project will inform stakeholders of the dangers of poorly designed or operated waste treatment plants, and promote and popularize technologies and methods to conserve resources and minimize the generation of PCDD/PCDF and other micropollutants;
- By assisting in the adoption, design and development of feasible and cost-effective systems for flue gas treatment for PCDD/PCDF and other micropollutant emissions reduction such as quenching, activated carbon adsorption, catalytic technology and safe disposal technologies for fly ashes;
- By coordinating, supporting and improving the definition of technical rules on management of medical waste disposal and emission standard for disposal plants;
- By assessing and promoting the use of proven non-combustion technologies for infectious medical waste disposal, such as high pressure steam and microwave sterilisation;
- By technical assistance, technology transfer, and targeted market-based incentives to promote adoption of BAT/BEP.

## **PROJECT ACTIVITIES AND OUTPUTS**

The project will build up an integrated intervention mechanism composed of legal, administrative, and voluntary instruments to alter the current investment pattern for medical waste treatment, with the objective to:

- Redesign waste management plans at the provincial level in order to guarantee the adoption of better solutions from the economic, environment and management point of view;
- For existing facilities, promote the adoption of BAT disposal technologies, not only with reference to the PCDD/PCDF emissions but also with other global environmental pollutants;
- Promote the use of non-combustion disposal technologies like autoclave and microwave sterilization, especially for those areas where small non-combustion plants are the best choice, thus allowing those plants to avoid the cost and the risk of long-distance waste transport.
- Analyze the technical/economical feasibility of retrofitting existing disposal facilities to meet more stringent emission requirements for PCDD/PCDF and other global contaminants.
- Increase the awareness of environmental decision makers concerning the existence and usage of disposal technologies alternative or complementary to combustion, and take the necessary action to legally establish community right to know principles and practices.
- For new facilities, require adoption of BAT technologies and techniques in accordance with the Convention.

The project will also design a possible incentive program to secure and encourage large-scale participation from public, private and semi-private sector stakeholders at central and local levels. The incentive program will be designed to build on market mechanisms and support technical assistance and technology transfer to program participants, covering their eligible incremental costs on a least-cost basis. While specific design elements of the incentive program will be developed during the implementation of the PDF-B phase of the project, based on information collected under the PDF-B, it is currently envisioned that one of the program, of utmost interest will be a market-based incentive to target waste generators and/or processors to award incremental cost funding through a competitive bidding mechanism, such that incentive funding would be competitively and transparently allocated to program participants that commit to the greatest PCDD/PCDF emissions reductions at the lowest cost. Incentive



funding would be tied to achieving targeted waste and/or emissions reductions, such that payment of the incentive would be contingent on program participants meeting the reduction target.

This approach would create a mechanism to ensure that GEF incentive funds were targeted to achieve specific, least cost emissions reductions and would also allow GEF incentive funds to leverage a high percentage of non-GEF investment by participating stakeholders, particularly those with the strongest potential to reduce emission of PCDD/PCDFs and other micropollutants, since much of the investment to achieve emissions reductions would be committed by program participants. The competitive bid mechanism itself would give waste generators and/or processors a strong incentive to maximize emissions reductions at the lowest cost to the GEF. This incentive could be further strengthened by specifying a minimum emissions reduction cost effectiveness, so that program participants would have to meet at least that level in order to receive funding. In addition, minimum co-funding levels could also be specified in order to ensure maximum leverage of GEF funds. By triggering and redirecting investment from targeted project participants to least cost PDCC/PCDF emissions reduction, the incentive program would also contribute to the sustainability of the project after its completion. Since a sound market-oriented operation mechanism has not yet been established in the country, the incentive mechanism could also be used to encourage authorities at the provincial and municipality level to design and implement better medical waste management plans, oriented toward these objectives: (1) decrease overall medical waste production; (2) reduction of the amount of waste requiring incineration through the use of segregation and pre-treatment methods; (3) where technically and economically warranted, preferentially adopt non-combustion technologies in small scale disposal plants; (4) where feasible, increase the average size and decrease the number of medical waste incinerators in order to improve their cost effectiveness, efficiency and to reduce emissions; and (5) promote adoption of BAT/BEP technologies for management and disposal of medical waste flue gas and residue treatment.

In order to quantify the impact of the above actions, environmental impact assessments will be made of (1) the existing medical waste disposal scenario, (2) impact of the current National Plan, and (3) impact of the optimized implementation of the National Plan with the new configuration of medical waste disposal emerging from the project.

In this framework and with these objectives, the current policy and project development process at local level for medical waste disposal will be altered to incorporate PCDD/PCDF and other pollutants of global environmental concerns. More specifically, at the local level, planning and policy options and alternative technologies (BAT and BEP), which stakeholders in medical waste treatment otherwise would not have considered due to lack of awareness and/or lack of funding, will be considered and their adoption will be supported. Substantial domestic and international resources will be leveraged in order to achieve both local and global environmental benefits.

The project will work with local technology end-users and local and international technology suppliers to identify areas in which local partners could benefit from internationally and/or domestically available commercial technologies that yield PCDD/PCDF and other micropollutant emissions reduction benefits relative to less environmentally beneficial technologies. The project will strive to make environmentally beneficial approaches commercially viable through supporting the establishment of sustainable long-term technology transfer approaches, such as local or joint-venture manufacturing and service companies. This approach differentiates this project from other bilateral aid and many multilateral projects, which focus on supplying equipment and products with no long-term, sustainable mechanism to ensure technology transfer and adoption.

The project will minimize market and commercial risks in the promotion of BAT and BEP in medical waste disposal facilities and expand participation of local stakeholders through the development of incentive programs for PCDD/PCDF and other micropollutant emissions reduction including, among other possibilities mentioned above, an investor-targeted rebate program for achieving high emissions reduction performance.

The project will also build national capacity for the promotion of BAT and BEP through intensive training, public education and information dissemination targeted at main stakeholders.

## KEY INDICATORS, ASSUMPTIONS AND RISKS

### *Indicators*

The project's key indicator is the comparison of PCDD/PCDF and other targeted global pollutant emissions resulting from disposal of medical waste in the People's Republic of China as calculated for the present scenario (estimated and measured), after the implementation of the Hazardous and Medical Waste Disposal National Plan (estimated), and after the environmental, technological and management improvement measures to be supported by the project.

Following the Basel Convention guidelines entitled "*Technical guidelines on the environmentally sound management of biomedical and health-care waste*", fundamental indicators are also the reduction of actual medical waste and its chlorine content before incineration by proper segregation of waste in the place of origin.

Other important indicators include other environmental impact parameters, such as the emissions rate for other air and water contaminants, land consumption due to the construction of new plants, amount of medical wastes properly disposed of relative to the total amount produced and the cost of medical waste disposal.

Environmental impact assessment and emissions rate estimates and measurement of existing and proposed medical waste management plans and technologies will also be performed in order to quantify the project baseline and key indicators of project results.

### *Assumptions*

The project's main assumptions are as follows:

- It is still possible to improve the implementation of the National Hazardous and Medical Waste Management Plan by adopting BAT/BEP technologies and better designed waste management plans at the provincial and municipal levels;
- By adoption of BAT/BEP technologies, not limited to incineration techniques, and the simultaneous improvement of waste management, it will be possible to simultaneously minimize operational and investment costs and reduce the environmental impact of medical waste disposal;
- There is willingness in the country to proceed toward the enforcement of more stringent PCDD/PCDF emissions limits.

### *Risk*

The table below lists principal project risks, as well as possible measures to mitigate them.

Risk	Mitigation measures
Local governments may not consider emissions of PCDD/PCDF and other micropollutants from medical waste disposal to be an important environmental challenge and therefore give lower priority to resolving problems during implementation.	This risk can be minimized through: <ol style="list-style-type: none"> <li>(1) the establishment of a well designed incentive mechanism with the support of the GEF funding;</li> <li>(2) promoting implementation of BAT/BEP technologies and waste management methodologies that are capable of minimizing operational and investment costs and reduce pollutant emissions; and</li> <li>(3) raising awareness concerning the issue of PCDD/PCDF and other micropollutants from the disposal of medical waste.</li> </ol>

Risk	Mitigation measures
Poor coordination among national and international stakeholders (e.g. Chinese government, academia, industry and the public) and donors (GEF and UNIDO)	China has established the Convention Implementation Office (CIO) to coordinate the interests and standpoints of different agencies. FECCO, the project implementer, has over ten years of experience in the management of projects and national programs, and also has wide experience in collaborating effectively with numerous intergovernmental organizations, bilateral donors, and enterprises.
Disposal technology fails to meet performance requirements, resulting in unacceptably high emissions of dioxin/furan and other toxic chemicals.	Selection of proven technology and equipment from recognized suppliers, provision of adequate training, and active supervision by means of proven experts of the design of disposal facilities and waste management plans will mitigate this risk.
Public opposition to the disposal projects.	Public awareness raising and inclusion of all stakeholders in both project preparation and implementation will minimize the likelihood of this occurrence.  Community right to know principals and practices will be practiced.
Magnitude of the problem to be addressed may be under-estimated	A clear picture of funding will be developed under the PDF-B phase.

## B – COUNTRY OWNERSHIP

### 1. Country Eligibility

The People’s Republic of China is eligible under Para 9 (a) and (b) of the GEF instruments.

### 2. Country Drivenness

The People’s Republic of China has expressed its strong commitment to the Stockholm Convention through signing the Convention on 23 May 2001 and ratifying it on 13 August 2004.

The Chinese government established an Inter-Ministerial Technical Coordination Group, comprising of five ministries, state administrations and commissions, to coordinate the interests and standpoints of different agencies and thus determine its position with regard to POPs. This coordination mechanism was significantly strengthened in September 2003 with the formation of a National Implementation Plan (NIP) Development Leading Group comprising 11 ministries and state administrations to coordinate implementation of the Stockholm Convention.

The Government of the People’s Republic of China through SEPA requested UNIDO to support the development of a project proposal for environmentally sound management of medical hazardous waste and to provide technical consultancy for the selection of technologies for medical waste disposal. SEPA is also in the process of establishing a multi-agency cross-sector working group to guide the development and implementation of the project including representatives from all relevant stakeholders in the medical waste generation and treatment sector.

## **C - PROGRAM AND POLICY CONFORMITY**

### **1. Program Designation and Conformity**

A range of activities, grouped into a number of work packages, has been designed to meet the project objectives. These activities and work packages have been planned according to the Articles, Paragraphs, and Annexes of the Stockholm Convention. The proposed project will serve as a model and barrier reduction exercise for future activities on BAT and BEP that will be mandated or encouraged under the provisions of this Convention.

### **2. PROJECT DESIGN**

#### *Problem statement*

The hospital waste sector of the People's Republic of China began to receive extensive public attention during the SARS epidemic in 2003, in particular compared to the low level of attention it has received in the past. Since the beginning of 2003, medical waste disposal has been made as a top priority and the China State Environmental Protection Administration (SEPA) has started designing laws, regulations and implementing orders to address the problem.

So far, a proper waste management system has not been established in the provinces, prefectures and cities. The major problems identified include:

- A series of specific laws, regulations, and rules has been formulated to ensure the sound management of medical waste. However, none of these measures were established in view of the obligations set out in the Stockholm Convention. For example, operational guidelines and emissions regulations have so far been prepared only for incineration.
- The responsible authorities have just started activities on the improvement of the medical waste disposal. However, current knowledge regarding technology selection remains inadequate. First, the current planning and decision making for the establishment of medical waste disposal facilities is based on a top-down approach, without engaging the active participation and involvement of stakeholders especially at local levels. This leads to non cost-effectiveness of technical solutions in disposal facilities, posing a serious constraint to policy formulation and investment promotion. Secondly, low attention has been given to the reduction of PCDD/PCDF and other micropollutant emissions in the technology selection process for disposal facilities.
- Sound market oriented operation mechanisms have not been established. In the past, medical waste producers do not pay for the disposal of healthcare wastes. But since the introduction of the centralized medical waste treatment, waste producers must pay for the service. To date, these payments have been low. While in some cases, the payments may be sufficient to cover waste processing plant operating cost but it is not enough to cover the full costs (investment and operating costs). To ensure sustainability of future medical waste disposal projects, the pricing system for the payment of the waste treatment services must be further improved. In addition, there is a trend in the country to change the basis of medical waste disposal fees from the earlier per kilogram fee to a per bed approach. While this may simplify administration and resolve concerns regarding misreporting of the amount of wastes, it also has the negative effect of reducing or eliminating incentives to reduce waste, given the de-linkage between fees and the amount of waste.
- The current national investment program for medical waste disposal gives little attention to the reduction of PCDD/PCDF and other micropollutant emissions but provides some opportunities. The Chinese government has initiated an investment rebate program to provide incentives for the establishment of 332 medical waste disposal facilities at local levels. According to the program, 70 - 80% of the total investment cost for the disposal facilities will be covered by the Central Government. The rebate differs from region to region, based on the region's level of economic development. The reduction of PCDD/PCDF and other micropollutant emissions is not currently a program goal. However, taking into account the strategies to reduce pollutant emissions in project design and policies would potentially offer significant benefits to both national and global environment. It will

also allow the simultaneous achievement of greater global benefits of the currently invested funds for local environmental benefits and in compliance with the Stockholm Convention at lower incremental cost.

### *Baseline scenario*

Without the project, individual efforts to improve local hygienic and environmental conditions and achieve global environmental benefits may be indirectly achieved. Compared to the present situation where most medical waste are not properly disposed of and a number of incinerators are emitting micropollutant at an unacceptable rate, the implementation of the National Plan will allow medical waste disposal in an environmentally sound manner.

However, without a concerted effort to fully incorporate the Convention compliance into the local and national policy thereby affecting project development processes, many local planning options and individual projects, which could offer at the same time opportunities for significant Convention compliance benefits and a more cost-effective management of the medical waste will be ignored and overlooked. Given the unprecedented domestic resources, which the People's Republic of China will invest in medical waste disposal over the next several years, a significant opportunity to leverage these resources to achieve both local and global environmental benefits could be missed.

Without the project, there is increasing risk that technology for medical waste disposal selected at national and local level will conflict with compliance requirements of the Stockholm Convention. The construction of a large number of very small incinerators could represent a significant risk, due to their intrinsic low combustion efficiency, high cost, and difficulties presented for in environmental monitoring. Finally, these new facilities could then only be modified to comply with the requirements of the Stockholm Convention at high retrofit costs, which would become a barrier to Convention adherence and the introduction of BAT and BEP. Thus, the without-project situation will lead to increasing emissions of PCDD/PCDF and other micropollutant, higher compliance costs and greater risks of non-compliance.

### *GEF Alternative*

Through the proposed GEF project, a concerted and coordinated effort will be made to explicitly incorporate PCDD/PCDF and other micropollutant emissions reductions into the policy and project development process at the national and local levels. Planning and policy options, use of non combustion technologies for disposal of medical waste and individual projects, which would otherwise not be considered due to lack of awareness and/or lack of funding will be reviewed. Through the use of GEF funding, a substantial co-funding from existing government resources will be leveraged in order to achieve both local and global environmental benefits.

The project will work closely with local governments in their policy and investment planning processes in order to identify opportunities to:

- 1) Promote BAT and BEP for reduction of PCDD/PCDF and other micropollutant emissions;
- 2) Evaluate and adopt non-incineration technologies, especially for small scale disposal plants;
- 3) Design and implement medical waste management plans to simultaneously reduce environmental impact and enhance waste disposal cost effectiveness.

The project will work with local Environmental Protection Bureaus (EPBs) and other local officials to make POPs reduction an integral part of environmental protection policy, planning, reporting, supervising and public raising awareness.

The project will also work with local technology end-users and local and international technology suppliers to identify areas in which local partners can benefit from internationally and/or domestically available commercial technologies that yield POPs reduction benefits.

The project will strive to make BAT commercially available and viable in the country through supporting the establishment of sustainable long-term technology transfer approaches, such as local partnerships and/or joint venture manufacturing and service companies. This approach differentiates this project from

other bilateral aid and many multilateral projects, which focus on supplying equipment and products with no long-term, sustainable mechanism to ensure technology transfer and adoption.

The project will also work with multilateral agencies, bilateral donors, and non-Governmental Organizations (NGOs) to obtain integrated technical and financial assistance to develop POPs management subprojects. Some bilateral donors, such as Italy and Germany, have expressed their interests to participate in China's medical waste disposal program and have already contributed co-financing to initial activities in the sector. The project will actively work with these and other potential bilateral donors in order to obtain their financial and technical support, and target that support in order to maximize POPs reduction benefits.

Activities will focus on three important levels: public awareness, policy making, and project planning. Public awareness building will include activities aimed both at policy makers (with the principal focus on local policy makers) and the general public. Policy support (including training, institutional capacity building, and technical assistance) will focus on local governmental agencies in areas related to reduction/elimination of POPs. Projects supported by national medical waste disposal program and implemented by public and private sector will be specifically linked with GEF project's auspices to achieve global benefits. The goal of assistance to local stakeholders in each of these three categories will be to reduce or eliminate barriers to the sustained adoption of measures, technologies, and approaches to reduce PCDD/PCDF and other micropollutant emissions.

Activities to promote awareness of POPs emissions in medical waste disposal sector will include (but not necessarily be limited to):

- Awareness raising for local government officials relevant to micropollutant emission control through training, workshops, public campaigns, etc.;
- Discussion by national and international experts with local government officials on medical waste management and planning;
- Training for local government officials in environmental impact assessment of waste management plans;
- Training for local government officials in the Strategic Environmental Impact Assessment (SEIA) making use of such advanced software tools as Geographic Information Systems (GIS), necessary to evaluate complex system interactions between medical waste sources, waste disposal plants, waste transportation systems and waste reduction activities;
- Training and study tours for local government officials in order to learn technologies and policies of foreign countries on the use of BAT and BEP and non-combustion technologies for medical waste disposal;
- Training for local government officials in refining policies and projects to promote reduction of PCDD/PCDF and other micropollutant emissions;
- General public awareness building in target regions on the importance of reducing PCDD/PCDF and other micropollutant emissions and their linkage to local environmental quality, particularly where necessary to build public support for policy changes;
- Development of indicators for local and global environmental performance for local policy makers' recognition of POPs reduction performance.

Technical assistance activities for policy and project planning to be undertaken with local government counterparts will include (but are not necessarily limited to) the following:

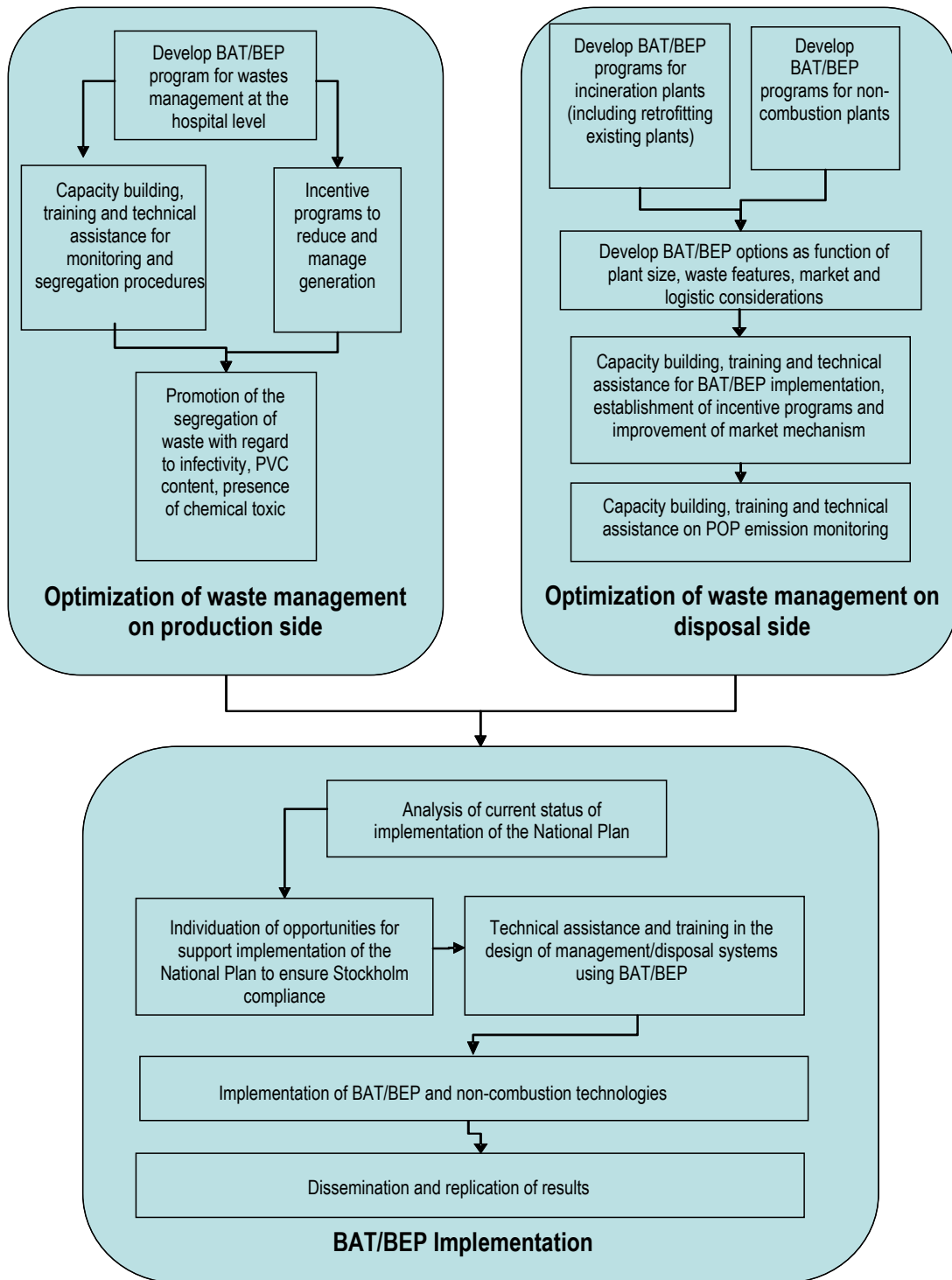
- Identify opportunities to incorporate the Stockholm Convention requirements into local policy-making and planning processes;
- Individuate the conditions for the cost-effective and environmentally sound adoption of non-combustion technologies (autoclave, microwave sterilisation) for waste management disposal.
- Determine feasibility of including strategies and technologies on reduction of PCDD/PCDF and other micropollutant emissions in existing or planned local projects;

- Establish methodologies and criteria for the environmental impact assessment of waste management plans and waste disposal plants;
- Develop and implement financing plans to execute globally beneficial projects; and
- Design and implement an incentive program supported by GEF funding for local governments with good performance on the reduction of PCDD/PCDFs emissions in medical waste disposal sector.

Capacity building, technical assistance, and other project support activities to be undertaken with Chinese and international private sector counterparts to identify, develop, finance, and implement subprojects under the medical waste disposal program, will include (but are not necessarily limited to) the following:

- Exposure of local technology end-users, local manufacturers, and local service providers to BAT and BEP;
- Technical assistance to local technology end-users, manufacturers and service providers to develop or adapt projects and technology transfer approaches that address reduction of PCDD/PCDF and other micropollutant emissions;
- Support for completion of techno-economic studies to allow selection and specification of BAT and BEP;
- Technical assistance to local technology end-users, manufacturers, and service providers to develop business plan, implementation and financing plans to execute projects on reduction/elimination of PCDD/PCDF and other micropollutant emissions;
- Support for activities (e.g., risk reduction, end-user education, and policy transition funding) on a grant basis to remove or reduce barriers to adoption of BAT and BEP;
- Where cost-effective, provision of funding incentives for the incremental cost of adopting the BAT and BEP; and
- Support in seeking and securing other bilateral, multilateral, and private sector sources to provide leveraged non-incremental cost funding for Program activities.

For a flowchart illustrating the overall project design, please see the schematic diagram below.





### **3. SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY)**

The People's Republic of China ratified the Stockholm Convention in 2004 and is now making provisions for the Convention implementation, which has laid a solid foundation for the sustainability of the project. The commitment of the country to the implementation of the Convention and all its efforts for the development of a NIP provide initiatives to mainstream the objectives of the Convention into the nation's broader development policies and strategies and opportunities to engage a wide range of stakeholders.

Various objectives of the full project are directed to remove barriers to the acceptance of BAT and BEP so as to reduce or eliminate emissions of PCDD/PCDF and other micropollutant in medical waste disposal. Policy, legal and management improvements to promote the adoption of BAT and BEP in the medical waste disposal sector will provide positive incentives for local governments and enterprises to participate in the program.

Sustainability will also be enhanced through the dissemination of information and public awareness materials as well as by the high degree of capacity building.

### **4. Replicability**

The experience that the People's Republic of China gains in the medical waste disposal sector will be of benefit to other sectors obliged to reduce emissions of PCDD/PCDF and other micropollutant in the near future in line with the compliance requirements of the Stockholm Convention.

The People's Republic of China's experience will also be relevant to other developing countries, particularly to the more industrialized nations of South and Southeast Asia. Experience within the demonstration and case study components of the project will have a direct benefit to other developing countries seeking effective strategies and approaches to reduce PCDD/PCDF and other micropollutant emissions in medical waste disposal in particular.

### **5. STAKEHOLDER INVOLVEMENT**

The State Environmental Protection Administration (SEPA) of the People's Republic of China and UNIDO initiated the project jointly in consultation and support from the NGO Coalition, Health Care Without Harm as well as from findings and recommendations provided by experts from the National Development Reform Commission (NDRC), Ministry of Construction (MOC) and the Ministry of Public Health (MPH). These experts were intensively involved in the development and implementation of the National Hazardous Waste and Medical Waste Treatment Facility Construction Plan in which this GEF project has high interest of cooperation.

Awareness of project objective amongst stakeholders at the national, provincial and local levels has been increased during the project concept preparation through series of discussions and wrap-up meetings where stakeholders and representatives from different ministries including NDRC, MOC and MPH participated. To assess the needs and requirements of different stakeholders, including those from the NDRC, MOC and MPH, the team of national and international experts who drafted the PDF-B proposal have made active site visits to hospitals, waste transportation terminals and disposal facilities and exchanged views with the local branches of the above three government entities.

During the PDF-B proposal development and implementation, each component work package will include opportunities to engage relevant stakeholders in the development of policies, legislation and local waste disposal projects. One of the characteristics of the medical waste disposal sector is that stakeholder interests may vary significantly between and within national, provincial and local levels. One of the analytical goals of the PDF-B phase of the project will therefore identify convergent and divergent interests and develop approaches to address them through appropriately targeted project activities. Addressing divergent stakeholder interests will be facilitated by the multi-area project scope since negative stakeholder impacts in one area can potentially be balanced by positive impacts in another,

which would not be the case with a single area project. During the PDF-B phase, the project will be structured to ensure that all stakeholders are involved in project design and execution.

The project will also ensure stakeholder participation at the governmental level through the National Implementation Plan (NIP) Development Leading group. This group is chaired by SEPA and comprises high ranking decision-making representatives from 11 ministries including the key agencies involved in the medical waste disposal sector (NDRC, MPH and MOC) and state agencies. Under this group, a project management office (PMO) will be set up. The members of the NIP Development Leading group will provide constant guidance to PMO through regular meetings and review of reports enabling the PMO to work efficiently and carry out routine work smoothly.

It is expected that this pattern of high-level over-arching coordination of agencies will be followed in the Full Project development and implementation.

Project development will also incorporate in the project design the experiences of international development projects such as the GEF/UNDP/WHO/HCWH project “*Demonstrating and Promoting Best Techniques and Practices for Reducing Healthcare Waste to Avoid Environmental Release of Dioxins and Mercury,*” the China/WB Infectious and endemic disease control project, as well as those projects in other countries with close linkage to environmentally sound and health care waste management.

The project has secured broad participation of the country's bilateral and multilateral development partners since the commencement of the project concept development. The governments of the USA, Japan and Canada have jointly sponsored an international workshop on POPs from combustion, in which along with other subjects, the experience of other developed countries in medical waste treatment have been introduced and issues confronted. The results and findings of these activities as related to medical waste disposal have been incorporated into this PDF-B proposal. Donors have also expressed their interests to participate in the project's work package activities.

## **D. FINANCIAL MODALITY AND COST EFFECTIVENESS**

Managerial responsibilities for overseeing the finances of the project will be the overall responsibility of the Implementing/Executing Agency (UNIDO), since the GEF Council has granted UNIDO direct access to GEF resources in the industrial aspects of POPs.

For full project implementation, UNIDO will enter into a contract with FECO/SEPA, its national implementing agency counterpart, allowing for the release of funds to FECO/SEPA at milestones identified during the project implementation planning. UNIDO will assist FECO/SEPA in the execution of the project and in its financial management by holding and disbursing funds necessary for international expenditures. UNIDO will also provide periodic progress and financial reports to the GEF as required.

The People's Republic of China has been successful in attracting a considerable proportion of funding for the proposed Full Project from its own domestic resources, in conjunction with the national medical waste disposal program. Cash co-financing from this source will far exceed the funding required from the GEF, as explained below (see “Commitment of co-financing partners”).

## **E. INSTITUTIONAL COORDINATION AND SUPPORT**

### **1. CORE COMMITMENTS AND LINKAGES**

#### *China's Commitment*

The People's Republic of China signed the Stockholm Convention on the date when it opened for signature and ratified the Convention in 2004. China recognises its obligation under Article 5 of the Convention to promote BAT and BEP in existing emissions sources of PCDD/PCDFs, and to phase in use of BAT and BEP for new emissions sources of PCDD/PCDFs no later than four years after the entry into force of the Convention.

The country has committed a large scale of co-funding for the proposed project. It is committed to start the project as soon as the necessary technical and financial support from the international community is provided in accordance with Article 13 of the Convention.

#### *UNIDO's Commitment*

UNIDO is committed to assist its developing country Member States with the implementation of the Stockholm Convention. The GEF has approved Enabling Activities proposals submitted by UNIDO for 38 countries, including proposals by China and India to undertake NIP development via the GEF full project cycle. In addition, UNIDO is executing or developing a range of demonstration and capacity building projects geared to support the implementation of the Convention. UNIDO has committed considerable resources to build this assistance program. This commitment is based on the clear understanding that these activities are compatible with UNIDO's mandate and corporate strategy and lead towards achieving the Millennium Development Goals.

The People's Republic of China is UNIDO's largest recipient of technical cooperation assistance. Activities undertaken in the country by UNIDO include a range of measures related to investment, cleaner production, industrial efficiency, and waste management. The experience gained in these projects will be highly relevant in the development of this project. UNIDO will also establish a project focal point to ensure effective implementation of the project. In addition, UNIDO will provide for the assistance of senior staff within its Multilateral Environmental Agreements Branch to support project implementation as part of its in-kind contribution to the project.

#### *Commitment of co-financing partners*

The Governments of Italy have provided in-kind co-financing of \$400,000 in the form of the pilot project "*Hospital Waste Management Assessment in China: Guidelines for a methodological approach*" evaluating the status of administrative and technical management of hospital waste disposal in 7 Chinese cities (Shenyang, Jiujiang, Fuzhou, Hangzhou, Yibin, Chengdu, and Zunyi). An additional \$90,000 is being provided by the Government of Italy to directly support development of the full Project Brief in conjunction with the GEF PDF-B funding. The German government has supported "*Kreditanstalt für Wiederaufbau (KfW)*" completion at a cost of approximately \$100,000. This is a fact finding mission for the medical waste disposal projects in Tianjin, Shenyang and Qingdao. The governments of the USA, Japan and Canada have also expressed their interests in co-financing the PCDD/PCDF targeted projects, including those in the medical waste disposal sector. The Government of China and UNIDO have offered additional in-kind co-financing amounting to US\$200,000.

## **2. CONSULTATION, COORDINATION AND COLLABORATION BETWEEN AND AMONG IMPLEMENTING AGENCIES, EXECUTING AGENCIES AND THE GEF SECRETARIAT**

During the PDF-B project phase, UNIDO will facilitate a coordinating mechanism drawing together the People's Republic of China's donor and development partner communities. The purpose of the group will be to ensure that project activities will take full advantage of the findings and experience of associated projects and programs executed by intergovernmental organizations and bilateral donors.

During full project implementation, a Technical Coordination Group will meet formally twice a year to report and review project progress. The Group will comprise all relevant multilateral and bilateral donors.

## **3. IMPLEMENTATION AND EXECUTION ARRANGEMENTS**

The People's Republic of China has established an Inter-Ministerial Technical Coordination Group (ITCG), chaired by SEPA, to coordinate and harmonize the interests and standpoints of different ministries, state agencies, and commissions in order to determine the position of the Chinese Government with regard to POPs issues and the Stockholm Convention.

In September 2003, a high-level POPs Leading Group was formed to ensure that actions required for Convention implementation could be taken up and coordinated at the highest levels. The Group is chaired by SEPA and comprises 11 ministries and state agencies. Within SEPA, a Convention Implementation Office (CIO) coordinates and administers compliance activities. The CIO will act as the national focal

point for interaction and information exchange between China, other Parties and the Secretariat to the Convention (Article 9) and translate decisions at the intergovernmental level into appropriate national action.

The CIO represents the nucleus for sustainable and integrated management of Convention implementation activities. It will provide support to China's representatives to the Conference of Parties (described in Article 19) and its review committees (c.f. Article 8), and be responsible for vertical coordination with local and provincial government representatives and stakeholders representing the public, industry, academia and other stakeholder groups. The CIO will be charged with fulfilling the national review, reporting and information exchange obligations set forth in the Convention.

A Project Management Group (PMG) will be established within FECO/SEPA. FECO/SEPA has over ten years experience in the development, implementation and managerial oversight of projects and programs funded by various MEAs and funding mechanisms, including the GEF. It has wide experience of collaboration with various intergovernmental organizations and bilateral donors. FECO/SEPA has acted successfully as the national implementing agency for both PDF-B and Full Project phases of other GEF projects. The PMG will manage all local elements of the project including, recruitment and supervision of local experts, subcontractors preparing component technical investigations and recommendations and drafting of project outputs. The PMG will cooperate with UNIDO for the procurement and delivery of project inputs and the organization of project activities. The PMG will also prepare periodic forward planning, progress and financial reports through FECO/SEPA to UNIDO.

FECO/SEPA will appoint a National Project Director (NPD) responsible for the day-to-day project management.

During the PDF-B phase, UNIDO will assist FECO/SEPA through the provision of timely assistance at key phases, in the review of investigations and reports prepared as outcomes to the project, and in guiding FECO/SEPA in relation to the requirements of the Stockholm Convention and GEF procedures. UNIDO will also assist FECO/SEPA in the execution of the project by holding and disbursing funds necessary for international consultancy services and other international expenditures.

## **PART II – PROJECT DEVELOPMENT PREPARATION**

### **A – DESCRIPTION OF PROPOSED PDF ACTIVITIES**

The activities foreseen under the PDF Block B for the preparation of the Project Brief are as follows:

#### **1. Analyzing the existing rules and procedures related to the medical waste disposal and management.**

PDF-B activities are designed firstly to gain a sound knowledge of base scenario by reviewing the current National Plan on Hazardous and Medical Waste, the related regulations and institutional structure in the medical disposal sector.

As already mentioned, the People's Republic of China approved the National Plan for the Building of Medical and Hazardous Waste Disposal Facilities in 2003. Aside from this plan, a number of technical rules have been recently approved or are under preparation such as those concerning the management of medical wastes (2003); packaging and labeling of medical wastes (2003); technical rules for the construction of medical waste incineration plants (1999, 2003, 2004); standards concerning storage (2001), landfill sites (2001), transportation of hazardous wastes (2003), new technical and environmental standards for combustion and non combustion medical waste disposal technologies (in preparation), etc. It is extremely important to achieve a sound knowledge of existing regulations and on the possible trends for new technical standards and regulations, not limited to the problem of pollutant emission, but extended to the general framework of medical waste policy and management. The knowledge of the regulation, at the provincial and national level will define, from one side, the possible and immediately practicable actions and capacity building needs for a better implementation of the regulations itself and on the other side, the needs for improvement of existing regulation.

#### **2. Achieving a realistic picture of the situation of disposal and management of medical wastes in the country at the light of the requirement of the Stockholm Convention**

These activities will result in (i) the identification of the gaps to the obligations of Stockholm Convention; (ii) identification of the gaps to the requirements of BAT and BEP guidelines; and (iii) projection of the priority actions to be taken to address the gaps and improve the global environmental effect.

An evaluation of the actual emission of PCDD/PCDF and other pollutant from the medical waste sector will then be one of the tasks of the PDF-B activities, as this parameter is fundamental for defining the baseline and the incremental cost of the adoption of BAT/BEP. Presently, few estimation concerning PCDD/PCDF emission from the medical waste disposal are available, and in any case, the available figures does not consider the fact that a great fraction of medical wastes are simply “abandoned” rather than “disposed”. The increase in the amount of medical waste incineration could represent a solution to local environmental and health problem, but at the same time will represent an increase in the emission of pollutant of global concern if BAT/BEP will not be adopted.

Information gathered from previous studies show that the problem of POPs emission from medical waste is not limited to the technological aspects of waste disposal. Considering only the needs for pollutant emission reduction, environmental goals can be fulfilled (i) by waste minimization, (ii) by waste segregation, (iii) by disposal plant management and (iv) by adoption of proper disposal technologies. Thus, the minimization of PCDD/PCDF (as required by the Stockholm Convention) and of other dangerous pollutant emission is not only a matter of disposal technology, but also planning, management and capacity building. It is well known that in the country the management of medical waste is quite good in few, rather big hospital in the main cities but extremely poor in the small clinics dispersed in the small cities all over the country. Moreover, very few is known concerning medical waste disposal at the sub-county level, and the National Plan itself does not consider the problem of medical waste below the level of the counties. Concerning the availability and diffusion of disposal technologies, few data concerning existing disposal facilities are available at present, and sometimes it is evident that the bigger

incinerator plants are often facing management problem due to discontinuous availability of waste to incinerate. All these aspects, which are known but not exactly quantified, needs to be studied in depth in order to allow designing and prioritization of the Full Size Project actions.

Previous data on POP emissions from hospital waste incinerators will be used and analysed, with the aim of carrying out a preliminary evaluation of the different kinds of incinerators and assessing a relationship among existing combustion/pyrolysis techniques, installed abatement devices and emissions characteristics.

In order to propose the reduction of possible contaminants (like mercury) and precursors (like plastics for PCDD/F) proper actions according to international parameters and with the Chinese situation will be studied and proposed, such as the preferential purchasing of cleaner products, substitution with non-toxic products and non mercury devices, proper segregation and minimisation, correct storage and handling, safe transportation and correct disposal measures at landfills and incinerators.

An overall assessment of the common used Chinese combustion/pyrolysis techniques and pollutant abatement devices will be carried out. On the basis of the results of the Sino Italian UP-POP reduction Project, the introduction of suitable and feasible BAT and BEP from the technological and economic point of view will be evaluated and proposed.

Each critical step of the hospital waste reduction plan at hospital level, the adoption of suitable BAT at incinerator level and the introduction of non combustion disposal techniques will be investigated for the potential reduction of PCDD/F and other micropollutants.

Meetings with national and international experts, analysis of case studies concerning both disposal plants or the management of medical wastes, translation and evaluation of technical documents from Chinese, site visits and analysis of case studies concerning medical waste disposal and management will be done in order to reach this second objective.

### **3. Identification and agreement of project priorities among stakeholders**

A sound project must be based on shared objectives. PDF-B activities are then targeting root causes of environmental problems by consulting local stakeholders, collecting necessary data and information relevant to emission and environmental impact and identifying various technical, economic and social barriers to the implementation of BAT and BEP. In coordination with China's National Implementation Plan (NIP), National Plan for Medical and Toxic Waste Disposal, and POPs Long-term Capacity Building Project, project experts will work with medical waste sector stakeholders to determine their capacity building needs to participate in development, promotion, and/or implementation of best available techniques (BAT) and best environmental practices (BEP) for POPs generating medical waste related sources. Target stakeholders will include public institutions and Government bodies, testing laboratories, monitoring entities, equipment manufacturers, and NGOs. The principal sub-output of this activity will be capacity building reports for all relevant stakeholders. Project experts will interact with stakeholders through a series of workshops and informal interactions in order to ensure stakeholder participation in capacity building assessment reports so that final reports fully reflect stakeholder input to and concerns with the process. The project team will review individual needs assessments, analyzing and ranking them in order to identify regional and sectoral priorities for capacity building action. The project team will collate and summarize individual needs assessments and the prioritization analysis and present those findings to national authorities responsible for the National Plan and investments in medical waste disposal. Based on the summary findings, needs assessments, and priority analysis, the project team will work with project stakeholders to develop programs, approaches, and strategies to carry out capacity building measures. The third activity line will also support the specially designed incentive program which helps shifting the overall management and disposal of medical waste towards a market oriented practice while at the same time assisting China in fulfilling its obligations under the Stockholm Convention.

4. Complete necessary work prior to the approval of the Project Document, including calculation of the incremental cost, formulation of the work plans, drafting the Project Brief and Project Document, endorsement of all stakeholders, etc.
5. Establishment of an integrated system for managing the project, which will play an important role in harmonizing the interests and standpoints of different ministries, state administrations and commission. Establishing project management office and project steering committee group, as the core of the activities will also support parallel coordination with local governments, and stakeholders representing public, industry, academic and other groups.

## **B - PDF-BLOCK B OUTPUTS**

**Output 1:** *Review of national program for the establishment of hospital waste disposal facilities prepared, and recommendations for its harmonization with the Stockholm Convention to reduce emissions of PCDD/PCDF and other micropollutants provided*

- Activity 1.1 Overall regulatory, technical and environmental assessment of the present situation of the medical waste management in China, including operational and investment costs; amount of medical waste actually co-disposed in landfills; information on agencies responsibility for waste management in the country.
- Activity 1.2 Overall Assessment of current national plan and local relevant plans, including case studies at city or province level, for the establishment of hospital waste disposal to identify barriers for the reduction of PCDD/PCDF and other micropollutant emissions.
- Activity 1.3 Analysis, in light of BAT and BEP, of the technologies and waste management methodologies identified in the National Plan, assessment of accessibility, availability, feasibility of internationally available BAT and BEP, as well as the associated policy and legal framework.
- Activity 1.4 Identification of priorities for harmonization with the Stockholm Convention and the collection of data and information.

**Output 2 :** *Case studies, and technical assessment carried out*

- Activity 2.1 Collection of information and data on the emissions of PCDD/PCDF and other micropollutants from existing disposal plants.
- Activity 2.2 Identification of opportunities to reduce emissions through improved waste management and disposal technology.
- Activity 2.3 Analysis of technical level for existing disposal facilities and possible introduction of appropriate new technologies.
- Activity 2.4 Identification and elaboration of market and commercial barriers to the large-scale application of BAT and BEP and improved waste management plans.
- Activity 2.5 Identification and elaboration of the need for advice on provision of technical guidance at sites of disposal.
- Activity 2.6 Estimation of the potential for the reduction of PCDD/PCDF and other micropollutant emissions.

**Output 3:** *Action plan for capacity building to implement best available techniques, including technologies and operating procedures to ensure that the People's Republic of China's obligations under multilateral health and environmental agreements, in particular the Stockholm Convention, are met*

- Activity 3.1 Identify elements of capacity building needs for relevant stakeholders including public institutions and Government bodies, testing laboratories, monitoring entities, equipment manufacturers, NGOs, etc.
- Activity 3.2 Research concerns and needs of stakeholders through collaboration and participation in capacity building assessment reports.
- Activity 3.3 Select and specify the key areas and regions for priority support.
- Activity 3.4 Organize a joint workshop with WHO and World Bank to share technical information on medical wastes treatment (autoclaving, microwave, etc.) undertaken in other countries.
- Activity 3.5 Summarize findings, present capacity building needs and assessment reports to local as well as national authorities responsible for the National Plan and investments in medical waste disposal.
- Activity 3.6 Develop technical assistance, incentive programs, and other strategies to promote BAT and BEP in medical disposal sector.

**Output 4:** *Project Brief and Project Document prepared and submitted to GEF*

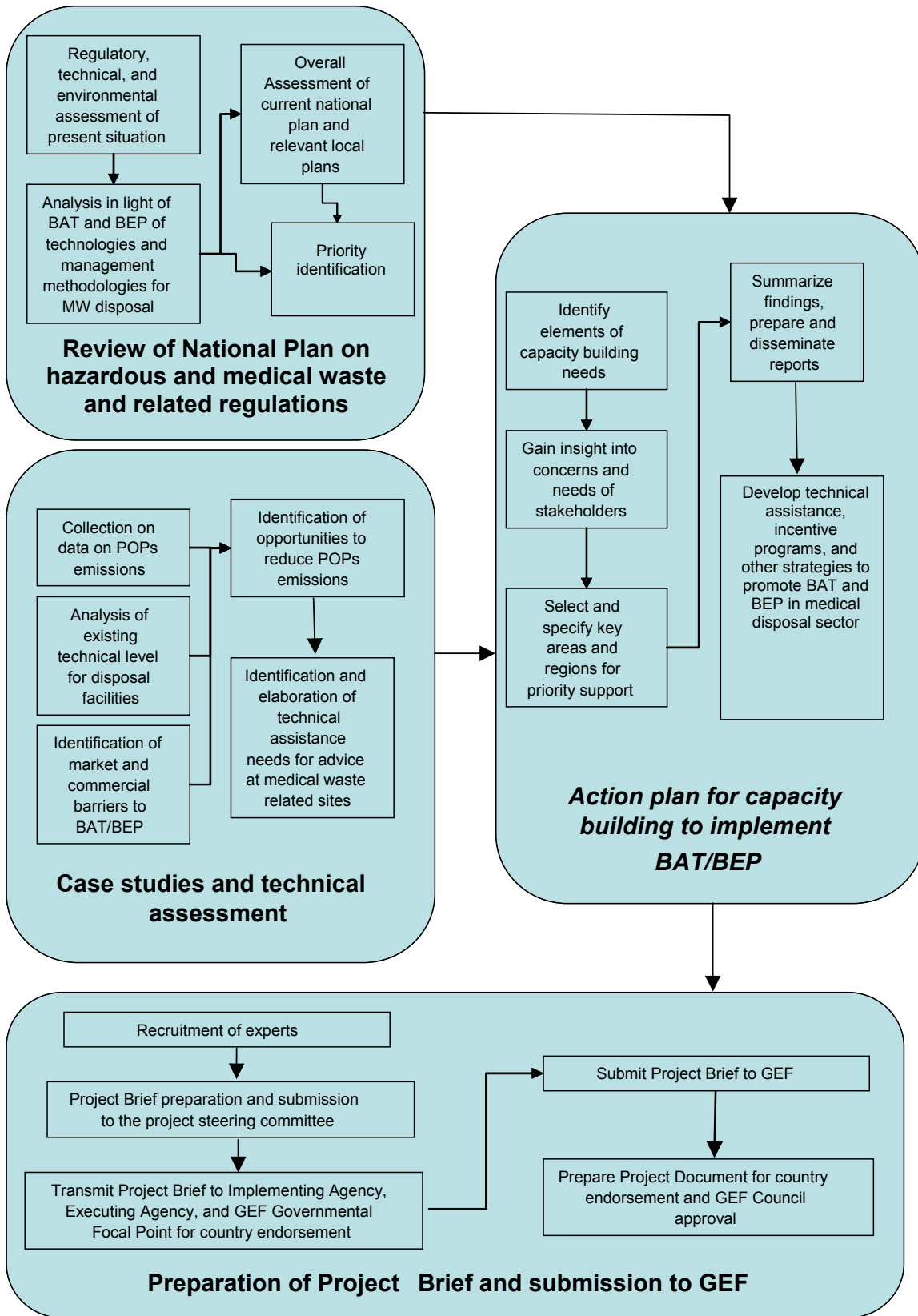
- Activity 4.1 Recruit and acquaint through study tour the required expertise to develop the draft Project Brief.
- Activity 4.2 Prepare the draft Project Brief and submit to the Project Steering Committee for review and approval.
- Activity 4.3 Transmit the final Project Brief to the Implementing Agency, Executing Agency, and GEF Governmental Focal Point for country endorsement.
- Activity 4.4 Submit the Project Brief to GEF.
- Activity 4.5 Prepare the Project Document for country endorsement and GEF Council approval.

**Output 5:** *Project management infrastructure established*

- Activity 5.1 Establish Project Management Office.
- Activity 5.2 Establish Project Steering Committee.
- Activity 5.3 Conduct steering committee meeting and leading group meeting as necessary

The schematic diagram for the Project Brief development process to be carried out during the implementation of the PDF-B is given below.





## **C – JUSTIFICATION**

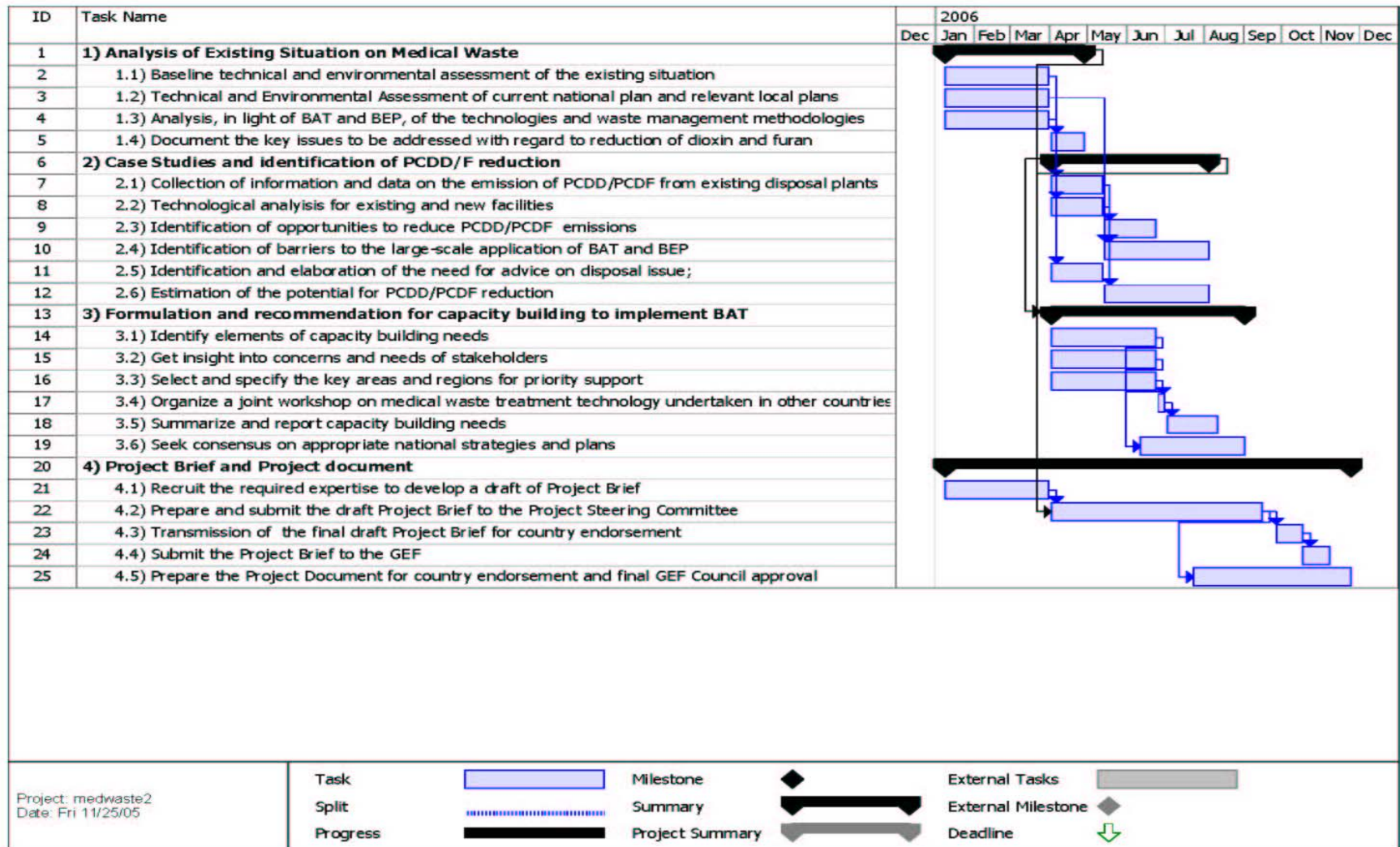
Considering that the People's Republic of China is one of the largest and most populated countries in the world with 32 provinces, autonomous regions and municipalities, and that the current medical waste disposal program is targeted at technological transformation throughout the whole country, the magnitude of the task calls for allocation of funds befitting the size of the population, the geographical area covered, the size of the medical waste sector and the magnitude of POPs emissions if project activities are not undertaken. While for a country of average size, a single foreign expert visit might be adequate to develop a full project proposal, the same standard cannot be applied for China.

Furthermore, in order to ensure effective and comprehensive project planning, it is imperative to establish a mechanism through the PDF-B project that allows for the timely cooperation and coordination of the proposed GEF project with the implementation of the current national program without any start-up delays.

Promotion of BAT and BEP is the most essential part of the project, and it cannot be conducted without the consideration of local context and detailed environmental and techno-economic studies. The PDF-B project will help to avoid the problems with alternative technology selection during the implementation of the Full Size Project.

The PDF-B grant is also necessary to lay the foundation for the full-scale project, to identify and target the appropriate experts, resources and policies, and to test and confirm the appropriateness of the approach. In addition, the PDF- B grant will allow to investigate other funding sources including multilateral institutions, national institutions and the private sector, for a larger sectoral level project.

## D – TIMETABLE



**E – BUDGET Project Budget by activity and source**

Output No.	Activity	Total Cost (US \$) by activity	Co-financing (US \$) ( <i>italics = in-kind</i> )				GEF (US \$)
			Italy	China	UNIDO	Total co-financing	
<b>1</b>	<b>National Program Review</b>						
	1.1 Overall regulatory, technical and environmental assessment of the present situation of the medical waste management	3,000					3,000
	1.2 Overall Assessment of the current national program and other relevant national plans	30,000		4,000		4,000	26,000
	1.3 Analysis, in light of BAT/BEP, of the technologies identified in the National Plan, as well as the associated policy and legal framework	9,000		3,000		3,000	6,000
	1.4 Document key issues to be addressed with regard to reduction of PCDD/PCDF	31,000		4,000		4,000	27,000
	1.3 Identification of priorities for harmonization with the Stockholm Convention and the collection of data and information						
<b>2</b>	<b>Data Collection and Analysis</b>						
	2.1 Collection of information and data on the emissions of PCDD/PCDF from existing disposal plants	91,000	5,000	60,000		65,000	26,000
	2.2 Identification of opportunities to reduce emissions through improved waste management and disposal technology	13,000		10,000		10,000	3,000
	2.3 Analysis of technical level for existing disposal facilities and possible introduction of appropriate new technologies	10,000	5,000	2,000		7,000	3,000
	2.4 Identification and elaboration of market and commercial barriers to the large-scale application of BAT and BEP and improved waste management plans	6,000		3,000		3,000	3,000
	2.5 Identification and elaboration of the need for advice on provision of technical guidance at sites of disposal	6,000		3,000		3,000	3,000
	2.6 Estimation of the potential for the emissions reduction of PCDD/PCDF and other micropollutants	29,000		3,000		3,000	26,000

Output No.	Activity	Total Cost (US \$) by activity	Co-financing (US \$) ( <i>italics = in-kind</i> )				GEF (US \$)
			Italy	<i>China</i>	<i>UNIDO</i>	Total co-financing	
<b>3</b>	<b>BAT/BEP Action Plan</b>						
3.1	Identify elements of capacity building needs for relevant stakeholders including public institutions and Government bodies, testing laboratories, monitoring entities, equipment manufacturers, NGOs, etc.	31,000	5,000	<i>3,000</i>		8,000	23,000
3.2	Research concerns and needs of stakeholders through collaboration and participation in capacity building assessment reports	26,000	10,000	<i>2,000</i>		12,000	14,000
3.3	Select and specify the key areas and regions for priority support	26,000	10,000	<i>2,000</i>		12,000	14,000
3.4	Organize a joint workshop with WHO and World Bank to share information on medical wastes treatment undertaken in other countries	20,000					20,000
3.5	Summarize findings, present capacity building needs, assessment reports to national authorities responsible for the National Plan and investments in medical waste disposal	39,000	10,000	<i>3,000</i>		13,000	26,000
3.6	Develop technical assistance, incentive programs, and other strategies to promote BAT and BEP in medical disposal sector	31,000		<i>3,000</i>		3,000	28,000
<b>4</b>	<b>Project Brief and Project Document</b>						
4.1	Recruit and acquaint experts, develop draft of Project Brief, including incremental cost calculations	25,000				-	25,000
4.2	Revise the draft Project Brief and submit to Project Steering Committee for review and approval	20,000	15,000			15,000	5,000
4.3	Revise the Project Brief and transmit to GEF Focal Point for country endorsement	20,000	10,000			10,000	10,000
4.4	Submit the Project Brief to the GEF	20,000	10,000			10,000	10,000
4.5	Prepare the Project Document for country endorsement and final GEF Council approval	50,000	10,000			10,000	40,000
<b>5</b>	<b>Project management infrastructure</b>						
5.1	Establish project management office	65,000		<i>50,000</i>	<i>10,000</i>	60,000	5,000
5.2	Establish project steering committee	25,000		<i>20,000</i>	<i>5,000</i>	25,000	-
5.3	Conduct steering committee meeting and leading group meeting as necessary	14,000		<i>5,000</i>	<i>5,000</i>	10,000	4,000
	<b>Total Cost</b>	<b>640,000</b>	<b>90,000</b>	<b><i>180,000</i></b>	<b><i>20,000</i></b>	<b>290,000</b>	<b>350,000</b>