

ENVIRONMENTALLY SUSTAINABLE MANAGEMENT OF MEDICAL WASTE IN CHINA, DEDICATING TO REDUCING DIOXINS—PROGRESS AND IMPACT

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Introduction

Medical waste (MW) incineration is one of the most important PCDD/PCDF(dioxins) release sources¹. The net amount of MW produced in China was approximately 670,000 tonnes in 2006, with a daily average output of 1,780 tonnes. Following the outbreak of Severe Acute Respiratory Syndrome (SARS) epidemic in 2003, Chinese Government moved quickly to establish the National Plan for Construction of Facilities for Disposal of Hazardous Waste and Medical Waste, in which China is committed to construct about 300 dedicated MW disposal facilities across the country². According to the survey of dioxins inventory in 2004, the total amount of dioxins releases from MW incinerators in China reached 427.4 g TEQ, accounting for 11.5% of the total releases from all sources listed in the Toolkit³. As a key emission source of dioxins, MW incinerations should be given the application of best available techniques and best environmental practices (BAT/BEP) in priority, required by Article 5 of Stockholm Convention⁴⁻⁵. Under such a circumstance, a project concerning the supervision, operation, packaging and labeling, construction, storage, landfill sites, transportation, new technical, pollution control and etc of MW, was developed as “Environmentally Sustainable Management of Medical Waste in China” project, with the concept of improving overall process and whole life cycle on MW management. Based on the project design, dioxins releases will be avoided and reduced up to 22.66 g TEQ annually after its successful implementation⁶⁻¹⁰.

Concepts and objectives

The overall objective of the project is to reduce and ultimately eliminate the releases of unintentionally produced POPs and other globally harmful pollutants into the environment, and assist China in implementing its relevant obligations under the Stockholm Convention. The project is to interact with the Nationwide Investment Plan and promote the widespread adoption of BAT/BEP in the evolving MW management infrastructure and industry in a manner that reduces adverse environmental impacts and protects human health⁹⁻¹⁰.

Conceptually, the overall objective will be achieved through combined strategies of reducing and modifying the materials to be disposed of, the optimization of incineration technologies, the introduction of non-combustion technologies, the raising of awareness and the dissemination of know-how, the incorporation of management systems, the innovation and adaptation of appropriate technologies and techniques, the integration of economic and financial systems and the enhancement of relevant laws and regulations⁹⁻¹⁰. The project conceptual framework is given in Figure 1¹⁰ and Figure 2¹¹.

To continuously reduce dioxins releases, the project is determined to carry out the demonstration and replication of BAT/BEP in the environmentally sound management of MW by upgrading the incineration equipment and air pollution control systems to the BAT level and replacing outdated or over-capacity incineration facilities with alternative, non-incineration techniques that avoid the release of dioxins as shown in Figure 3 and Figure 4. Accordingly, demonstrations on the application of integrated MW management among institutions and the coordinated MW treatment among the dedicated MW facilities are to be carried out at the municipal level and the provincial level respectively⁹⁻¹⁰.

While China has established a relatively complete regulatory framework for the MW management given in Figure 5¹¹, there are important articles in the laws and regulations, which may be absent or impractical. The regulatory framework requires practical application and fine-tuning to assure its effectiveness⁹⁻¹⁰.

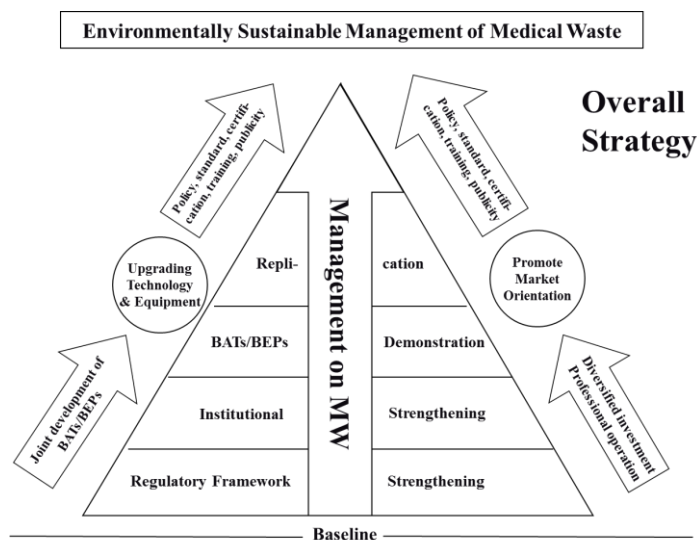


Figure 1. Overall strategy on medical waste management in China

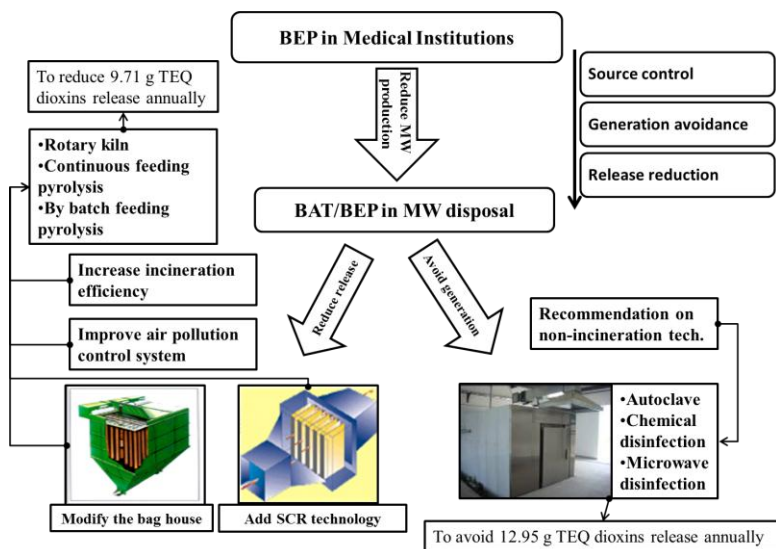


Figure 3. Logical relationship between BAT/BEP application and dioxins reduction on medical waste

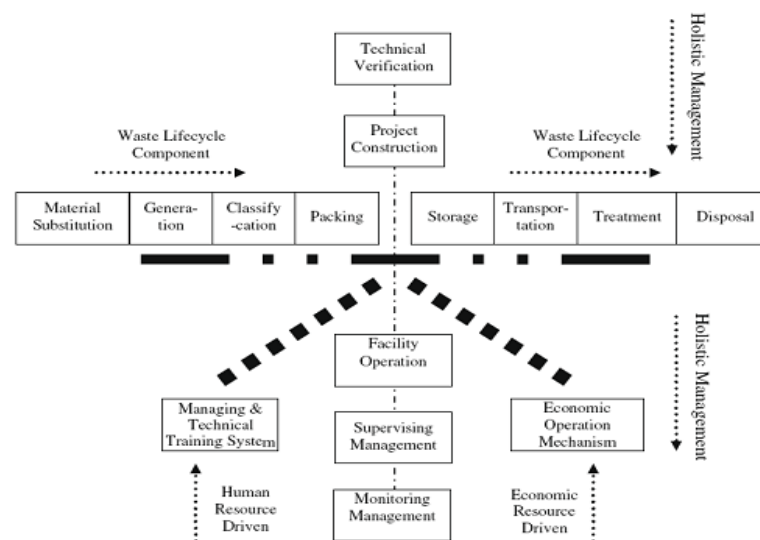


Figure 2. Concept of overall process and whole life cycle on medical waste management



Figure 4. Distributions of BAT/BEP demonstrations on various medical waste disposal technologies

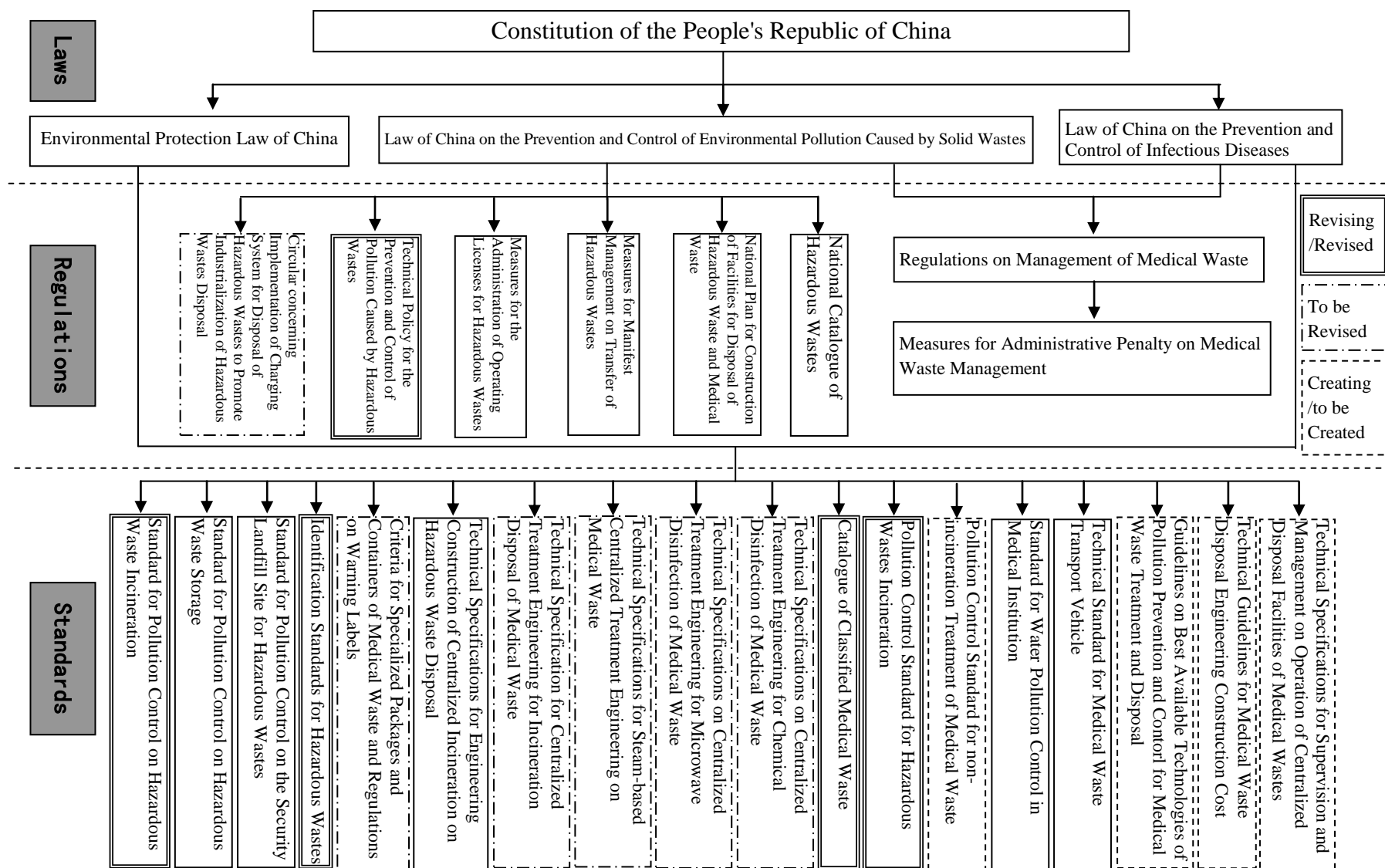


Figure 5. Legal Framework on medical waste management in China

Progress and impacts

Through the development of this project, awareness at central governmental level has been further raised for the need to properly manage MWs in order to minimize the formation and release of dioxins. As a result of this, nearly half of the MW disposal centers are turning from using incineration techniques into using non-incineration techniques, avoiding 12.95 g TEQ dioxin release annually as shown in Figure 3. Another important impact is the inclusion of the BAT/BEP guidelines for the management of MWs in the 12th Five Year Plan¹².

The gaps of the existing regulatory framework and their consequences are analyzed by reviewing and bringing forward recommendations for the creation of an enabling regulatory environment¹¹. Currently, a total of 18 national policy, technical guidelines & standard and 10 management measures and booklets have been developed including BAT/BEP guidelines and related policies¹³. It is particularly worth noting that the MW incineration pollution standard of dioxins release is hopeful promoted from 0.5 ng TEQ/m³ to 0.1 ng TEQ/m³.

6 MW disposal centers, 3 for incineration techniques and 3 for non-incineration techniques, were selected as demonstrations to retrofit equipments to meet the requirements of BAT/BEP, whose experience will be replicated amongst disposal centers nationwide. In the 6 demonstration cities of integrated MW management, a proper system for collection, transportation and disposal of MW, as well as a fee system to be paid by Medical institutions to MW disposal centers have been established¹³. Furthermore, the coordinated MW treatment demonstrations are ready to set off at the provincial level.

At all levels and for all stakeholders, awareness regarding the need to soundly manage medical waste has been aroused during the execution of the project. Based on the existing administrative structure and training system of the health administration, a 4-tier personnel training system covering national, provincial, municipal, and county medical institutions, including establishment of 7 training bases for training of high-level managerial and technical staff in health agencies and medical institutions has been established. 3 training bases for training of dedicated MW treatment staff will be established on the basis of the existing environmental technical training and research system¹⁰.

In the joint efforts of all stakeholders, the MW management in China has made tremendous progress under the promotion of the project. Although there is still a long way to go to realize environmentally sustainable management on MW, China has formed a set of internationally compatible management system.

Acknowledgements

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