



Urban Agenda Platform

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# Innovative Emergency Solutions to the Pandemic Challenge for Urban Medical Wastes Disposal

Award Scheme

Guangzhou Award

Sustainable Development Goals

Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable

## Summary

With the global outbreak of COVID-19 and the ecological crisis, all countries are facing the challenge of growing urban medical wastes. Based on the accumulated experiences from “SARs”, Chongqing municipality has explored innovative emergency solutions to the urban medical wastes disposal, which were successfully been applied in Wuhan and Chongqing. It provides a good model for the global medical waste emergency disposal and improvement of urban safety resilience under the pandemic.

## Background and Objective

“Basel Convention on the Control of Transboundary Movement and Disposal of Hazardous Wastes” (1992) “Stockholm Convention on Persistent Organic Pollutants” (2001) “People’s Republic of China Solid Waste Pollution Prevention Law” (2020 revised) “Medical Waste Disposal Facility Capacity-Building Plan”(MEE, 2020) “Regulations on the Safety Management of Hazardous Chemicals” (2002) (Reasons for Insufficient medical waste disposal system in Wuhan:1)new laws/regulations but old standards;2)no requirements for designed "margin" of medical waste disposal ,no contingency plan and planning in the specifications;3)only one operator for disposal

## Actions and Implementation

Under sudden outbreak of COVID-19, how to achieve an innocuous disposal of medical wastes timely was the key to win battle. With the growing medical wastes, a “3-Level Emergency Mechanism” was established in Chongqing to hold the last line of defense of COVID-19. The neighborhood city Wuhan was suffering the outbreak of COVID-19, with the daily medical wastes from 45 tons to 247 tons, far exceeding its daily disposal capacity, Wuhan with only one private operator for medical wastes was under great risk and asked help from Ministry of Ecology and Environment of the People’s Republic of China (hereinafter MEE). MEE and Wuhan Municipal Government together asked China Energy Conservation and Environmental Protection Group (hereinafter CECEP) to offer solutions to Wuhan, then Gient from Chongqing, the only one supplier for such service at that time, was selected by CECEP to offer the emergency solutions to medical wastes of Wuhan. 1) Under the help of Chongqing, an emergency disposal center for medical wastes of COVID-19 was constructed and operated in Wuhan, processed medical wastes from LeiShen Shan and HuoShenShan makeshift hospitals and other 16 districts, building security lines for Wuhan residents. 2) The principal of 100% environmental supervision to the hospitals and 100% collection and disposal of medical wastes in Chongqing was implemented to ensure the scientific regulation of medical wastes, which effectively prevented the secondary infection and virus spread. In Wuhan The emergency disposal center for medical wastes with a daily capacity of 30t/d was constructed within only 14 days, followed by a phased 60t/d permanent medical waste disposal plant. The highly intelligent plant minimize personal contact infection. In Chongqing A “3-Level Emergency Mechanism” was well equipped with systems such as daily based report, dispatch, analysis and research. A warning system was given to the operation load of disposal facilities, if 80% load was exceeded, other forms of temporal emergency disposal facilities should be started (such as mobile disposal facility, incineration plants, etc.). In Wuhan: The construction of emergency medical waste disposal center demonstrated a good partnership between the central government-local government, government -industries,city-city and state-owned companies-private companies. In such a partnership, MEE was a leading partner who made an urgent decision and approval of the construction of two disposal plants, CECEP was responsible for the investment, construction and operation of two plants, Chongqing Gient was responsible for in-situ technology and equipment, Wuhan Environmental Investment Group provided the local support for CECEP and Chongqing Municipal Government provided the administrative support for rapid procurement of complete sets of equipment required by Gient for the two plants. In Chongqing Ddepartments in charge of transportation ensured a clear traffic for vehicles loading medical wastes and the departments of healthcare and economic and information commission ensured the provisions of medical protective substance. 1 As no manufacturer for medical waste disposal equipment in Wuhan, the only one operator for medical waste disposal hardly respond to complicated situations due to lack of technical capability. Chongqing, both national and international leading city in the manufacturing of complete sets of equipment for medical wastes disposal, is well equipped with Gient and a group of supporting factories, forming a powerful industry chain. This powerful industry chain formed significant resources for this initiative. 2 Advance-fund construction and operation model was adopted for Wuhan emergency medical waste disposal centre by construction and operation units with no charges from the hospitals at all. After the end of the



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outbreak, Wuhan Municipal Government audited the investment, then an agreed lump sum was paid to construction and operation units. The construction fund of the permanent disposal plant shall be borne by the construction party, and the investment will be gradually recovered through the subsequent provision of charged medical waste disposal services to the hospitals in Wuhan.

## Outcomes and Impacts

1) The rapid completion of Wuhan emergency medical waste disposal center played a significant role in a timely and innocuous disposal of medical wastes during COVID-19. It processed 1/4 medical wastes from Wuhan including two big makeshift hospitals. After the completion of a 60t/d medical waste disposal plant, the annual disposal capacity can achieve 19800 tons with 100% safe disposal. This has both improved Wuhan's medical waste disposal capacity and provides model for other cities around the world. 2) From the outbreak of COVID-19 to the July 11th, 2020, the accumulated medical waste disposal in Chongqing amounted to 11600 tons, meeting the requirements of "all receivable", "daily clear", "safe disposal". In Wuhan and Chongqing, data collected by Municipal Government and its relevant departments followed by Municipal Development and Reform Commission, Municipal Construction Commission, Municipal Health Commission Municipal Planning Bureau, Municipal Ecology and Environment Bureau, Municipal Finance Bureau, Municipal Water Affairs Bureau, Municipal Urban Management Bureau and other departments, including geographic environment, daily waste production, analysis of hazardous factors, social stability risks analysis and other data. 1) The construction of Wuhan emergency medical waste disposal center demonstrated a rapid and replicate approach followed by the period of as fast as 14 days (normally it takes 10 months) and rapidly-installed modular equipment. In the permanent disposal plants, new technologies are adopted to create an environmentally-friendly and full smart workshop, preventing the operators from infection. The most important to attain the desired outcome were collaboration and technology. The collaboration was featured by a large quantity of people involved nationally, a clear division of responsibilities and quick response. Hundreds of officials, experts, technicians, workers, medical staff and volunteers were involved. 2) According to the infectious characteristics of new coronavirus, Chongqing innovative mechanism made the following requirements for medical waste regulation, followed by 24 hours-based collection, disposal and monitoring, stricter treatment of rubbish and sewage from hospitals and quarantine locations. Due to the lockdown of city during the COVID-19, the design of innovations failed to invite the participation of stakeholders, but in the implementation process of innovations, many volunteers, medical staff, poor people and women were involved. The innovations have paid much attentions to the equal rights of the elders, women and poor people to get medical waste disposal service. The innovative solutions are environmentally-friendly and sustainable and can be applied in other global cities, especially cities in the developing countries under the pandemic or other major public health incidents. 1) Wuhan emergency medical waste disposal center and the permanent medical waste disposal plant (phase 1) are 30 tons/d respectively, serving 388 hospitals of 16 districts of Wuhan, benefiting about 14 million residents. 2) In Chongqing, during the earlier of COVID-19, a "Battle Time" daily capacity of 90 tons/d for medical wastes disposal was formed rapidly, involving 426 front-line management and disposal staff and 125 special vehicles for medical waste, safeguarding the health of 32 million Chongqing residents and the environmental safety. Measures to sustain innovation -Establish a guarantee mechanism to keep track of the results and make a continuous improvement of the innovations to ensure the continuous use of the facilities and emergency mechanism in the post-pandemic. -Undertake studies on what Chongqing can learn from Wuhan experience, such as, regular training for staff related to medical wastes, regional collaboration for co-disposal of medical wastes, rational planning of medical waste disposal facilities.

## Sustainability and Scalability

Relevance of the initiative to the Sustainable Development Goals and the New Urban Agenda (1) Sustainable Development Goals Goal 6: Ensure availability and sustainable management of water and sanitation for all Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable Target 1: Access for all to adequate, safe and affordable housing and basic services and upgrade slums Target 3: Participatory, integrated and sustainable human settlement planning and management Target 6: Improve air quality and manage municipal and other wastes Target 7: Universal access to safe, inclusive and accessible green and public spaces, in particular of women, children older persons and persons with disabilities Target 9: Improving resource efficiency, mitigation and adaptation to climate change, resilience to disasters and implement holistic disaster risk management Relevance of the initiative in relation to the goals Goal 6: The construction of temperal emergency disposal center for medical wastes and the "3-Level Emergency Mechanism" safeguard the public and environmental health. Goal 9: The tempera emergency disposal center for medical wastes and the "3-Level Emergency Mechanism" were built based on the severity of COVOD-19 to accumulate inclusive and innovation practices. Goal 11: The innovations have improved the resilience of the city and make the city more inclusive, sustainable. Relevance to the targets of Goal 11: Target 1: All citizens has the equal right to get the medical waste disposal service. Target 3: Ensure the innovations to be participated by the public and make the city more sustainable. Target 6: The innovations can improve ambient air quality with non-incineration technology and manage medical waste more efficiently. Target 7: The innovations safeguard the safety of the city and improve the inclusive of the city with more involvement of women, children, persons with disabilities. Target 8: The innovations increase social and environmental links between Wuhan and Chognqing as well as urban and rural areas. Target 9: The innovations provide good examples for resource allocation, collaboration efficiency and improvement of resilience to disaster and demonstrate the risk can be well managed under a reliable and holistic emergency mechanism. (2) New Urban Agenda Provide basic services for all citizens These services include: access to housing, safe drinking water and sanitation, nutritious food, healthcare and family planning, education, culture and access to communication technologies. Ensure that all citizens have



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access to equal opportunities and face no discrimination Everyone has the right to benefit from what their cities offer. The New Urban Agenda calls on city authorities to take into account the needs of women, youth and children, people with disabilities, marginalized groups, older persons, indigenous people, among other groups. Promote measures that support cleaner cities Tackling air pollution in cities is good both for people's health and for the planet. In the Agenda, leaders have committed to increase their use of renewable energy, provide better and greener public transport, and sustainably manage their natural resources. Strengthen resilience in cities to reduce the risk and the impact of disasters Many cities have felt the impact of natural disasters and leaders have now committed to implement mitigation and adaptation measures to minimize these impacts. Some of these measures include: better urban planning, quality infrastructure and improving local responses. Take action to address climate change by reducing their greenhouse gas emissions Leaders have committed to involve not just the local government but all actors of society to take climate action taking into account the Paris Agreement on climate change which seeks to limit the increase in global temperature to well below 2 degrees Celsius. Sustainable cities that reduce emissions from energy and build resilience can play a lead role. Improve connectivity and support innovative and green initiatives This includes establishing partnerships with businesses and civil society to find sustainable solutions to urban challenges Relevance of Actions to the Each of the Selected Commitment(s): 1. Provide basic services for all citizens: Ensure that all citizens have safe and environmentally-friendly medical waste facilities so that municipal medical wastes can be disposed timely, effectively and harmlessly to avoid secondary pollution. 2. Ensure that all citizens have access to equal opportunities and face no discrimination: About 14 million Wuhan people and 32 million Chongqing people are benefited and all citizens have equal rights to get innocuous medical waste disposal service. 3. Promote measures that support cleaner cities: Environmentally-friendly new technologies were used in the construction and operation of the innovations, resulting in a safe and reliable solutions for medical waste disposal and safeguarding the public health and the planet. 4. Strengthen resilience in cities to reduce the risk and the impact of disasters: By increasing the capacity of innocuous disposal of medical wastes, the prevention and control capacity response to large-scale infectious disease can be enhanced. 5. Take action to address climate change by reducing their greenhouse gas emissions: Non-incineration-based environmentally-friendly and high temperature steam technology is adopted with no harmful gas emissions from traditional incineration technology. 7. Improve connectivity and support innovative and green initiatives: Medical waste disposal involves the cooperation among the government, hospitals and disposal business operators.

## Innovative Initiative

Wuhan emergency medical wastes disposal centre and Chongqing “3- Level Emergency Mechanism” are both evolutionary-based and are innovative solutions to the pandemic in terms of management and technology. Such innovations not only provided effective solutions to Wuhan and Chongqing but also valuable experiences with replicability and transferability for other global cities. Top 1 obstacle: powerful resource scheduling and integration Solution: good collaboration and efficient decision-making mechanism, Top 2 obstacle: the conflict between the prevention and control capacity for medical waste disposal Solution: the government and the society should pay prevention-based medical waste disposal “margin” far exceeding daily needs Top3 obstacle: insufficient policy and regulation support Solutions: improving regulation, standards, facilities and technology; ensuring data quality control, enhancing training and awareness; achieving standardized medical waste management

## Conclusion

1) Because of the successful application of innovative solutions in Wuhan, MEE encouraged Chongqing to share its Wuhan experience with other cities. Several cities in China are ready to re-plan their capacity of medical waste disposal facilities based on this model, and build enough environmentally-friendly medical waste disposal facilities. At the same time, plans for emergency disposal facilities should be prepared to improve the local medical waste disposal capacity in case of large scale outbreak of the pandemic. 2) The Solid Waste Management Center of CEEB won the national award for its excellent contributions against COVID-19 and attended the national commendation meeting held in Beijing. After this meeting, as the only city winner in the medical waste management and disposal sector, Chongqing is ready to share its innovations with other Chinese cities and other global cities.