

## China Integrated Waste Management NAMA (IWM NAMA)



### 1. Facts

<b>Implementing partners</b> .....	Ministry of Housing and Urban-Rural Development (MoHURD) of the People's Republic of China China Association of Urban Environmental Sanitation (CAUES)
<b>NAMA Facility funding</b> .....	EUR 8 million
<b>Project duration</b> .....	five years
<b>Status</b> .....	implementation

### 2. Towards a New Low-carbon Integrated Waste Management System

The China Integrated Waste Management NAMA is a NAMA Support Project (NSP) that aims to transform the Chinese waste management sector as part of a sustainable low-carbon and circular economy. The overarching project goal is to induce a transformational change in the way that waste is segregated, collected, treated or recycled and reused in an integrated and low-carbon manner. In the process, lowered greenhouse gas (GHG) emissions may also generate a source of income under the Chinese national Emissions Trading Scheme (ETS).

Through a comprehensive optimization of different MSW treatment facilities and the utilization of possible synergies between them, waste-to-energy and GHG emission reduction potentials will be fully realized.

The NSP aims to support the transformation of the current Chinese waste sector from simple treatment, landfill and incineration into an integrated approach with physical infrastructure and governance aspects. The former is composed of facilities based on best available techniques (BAT) and best environmental practices (BEP) for waste management. The latter promotes pro-activeness, inclusivity and financial sustainability through technical standards, policy recommendations, capacity building and awareness raising.

On behalf of



Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety



Department for Business, Energy & Industrial Strategy



Danish Ministry of Energy, Utilities and Climate



### 3. Overcoming Challenges in the road to Change

In 2015, the government of China submitted its Intended Nationally Determined Contribution (INDC) of reducing CO<sub>2</sub> emissions per unit of GDP by 60–65% (based on 2005 levels) by 2030. Based on China's first Biennial Update Report on Climate Change (2016), 158 Mt CO<sub>2</sub>e of GHG emissions were produced from the waste sector, amounting to 1.3% of the total GHG emissions. With its rapid urbanization, China is expected to reach 1 billion urban citizens by 2025, contributing an estimated annual GHG emissions potential from the waste sector of 236.3 Mt CO<sub>2</sub>e, a 50% increase compared to 2016 levels.

Currently in China, waste segregation at source is still at an early stage, and most of the MSW plants handle mixed waste in China. Chinese MSW is characterised by an overall low calorific value and high water content due to cooking habits. The mixed MSW results in low operational effectiveness of waste treatment facilities.

According to official sources, landfill and incineration are still the main technologies to treat the municipal solid waste (MSW) in China, which accounts for 62% and 30%,

respectively. The business as usual (BAU) waste treatment approach in China is mainly characterised by the improvement of individual waste treatment facilities without considering possible synergies between the different treatment facilities. As a result, the waste-to-energy and GHG emission reduction potential in the sector has not yet been fully utilized.

Current sector policies and technical standards are also mainly aimed at single facilities instead of adopting a holistic and integrated approach. A comprehensive system for the measurement and monitoring of the level of integration of a waste management system does not exist in China yet. Neither the policy framework nor technical standards for waste management consider GHG mitigation. Hence, GHG mitigation is not given enough consideration in the planning and operation of waste management systems and facilities.

The deficit of technical and management capacities in combining different MSW treatment facilities, as well as on the awareness of environmental impacts by local operators to verify GHG emission reduction in the form of the Chinese ETS will be addressed in this NSP.



## 4. How to Achieve Transformational Change

The NSP will induce changes within the sector that go beyond the improvement of MSW treatment and set the basis for a transformative change in the sector. Changes will be made through technical assistance to support the implementation of IWM systems in (at least) three demonstration municipalities, policy advice, tailor-made capacity building and the mobilisation of the private sector and public investment in the replication of the demonstrated integrated solutions instead of BAU in other municipalities.

Through waste segregation at source supported by the Chinese National Government, the organic fraction of MSW (such as kitchen, restaurant waste and yard trimmings) will be separately treated by anaerobic digestion or composting to produce biogas and organic fertilisers. The high calorific fraction of MSW can be incinerated to generate power and heat. The collection and utilisation of landfill gas shall be improved in the current stage with a gradual shift towards the disposal of only stabilised waste aiming to reduce land use and potential pollution. These approaches will be piloted in at least three municipalities with a minimum of one million inhabitants each, using on BAT/BEP standards. The IWM NAMA will provide best practice know-how on planning, implementation and operation of IWM systems and on the individual treatment facilities. By introducing IWM systems, interlinkages between different treatment facilities will be optimised, and higher value will be extracted from the waste due to the sales of their energy and material products.

Waste-to-energy approaches are crucial for its long-term success and the financial sustainability of IWM. In addition, the Chinese ETS can add new income streams of waste management facilities operating under the reduced GHG emission.

Policy recommendations and capacity building on technical as well as financial aspects will be conducted for more than 200 political decision-makers and 400 waste sector stakeholders from at least 20 provinces in China.

Matchmaking activities between political decision-makers on municipal level, technology providers and private investors will serve as platforms to promote the findings of the modeled IWM and waste-to-energy approach, thus have a snowball effect with a targeted eleven additional municipalities replicating and adopting the new waste management approach while leveraging the inclusion of

the private sector. In addition to the increased functionality, effectiveness and financial profitability of the IWM systems, a broader and more efficient application of the IWM system throughout the sector is expected in the medium- and long- term.

## 5. Stakeholders and Financing

A diverse combination of stakeholders relevant for the waste sector context will be targeted in the NSP. These include the direct partners on national level, the demonstration municipalities that are directly involved in NSP activities, and designers and technicians of waste management systems and facilities benefitting from the technical assistance and capacity-building. In addition, at least three million citizens in the demonstration municipalities will be the direct beneficiaries of improved waste management and treatment services. Outside of the demonstration municipalities, private sector stakeholders will be involved in tailor-made capacity-building and dialogue activities to ensure the inclusion of private business in public waste treatment policies.

In China's 13<sup>th</sup> Five-Years-Plan (2016–2020) regarding waste facility construction, the Chinese government announced that approximately 251.84 billion CNY (about EUR 32.8 billion) of total investment will be earmarked to react to the rising need for waste management solutions. Chinese funds amounting to EUR 350 million is earmarked for IWM systems and facilities in three demonstration municipalities and can be considered as investment diverted from BAU to IWM which represents the core concept of the NSP.

## 6. Expected Outcomes

Through the utilization of an integrated waste management (IWM) and waste-to-energy system in three demonstration municipalities, a direct reduction of 220,000 to 440,000 t CO<sub>2</sub>e/year will be realized. On the local front, at least three million inhabitants will benefit directly from the implementation of the NAMA Support Project (NSP) with best practice IWM systems in the three demonstration municipalities.

Through catalytic demonstration municipalities, policies and capacity building activities for replication, 200 political decision-makers on municipal level will be involved in the up-scaling activities of NSP, so that a minimum of eleven additional municipalities will replicate the IWM approaches for their own waste management systems.



The volume of public funds mobilized for low-carbon investment and development is expected to be EUR 350 million in three demonstration municipalities, while an additional private investment in IWM systems is expected to reach EUR 300 million.

The demonstration projects in the three municipalities will serve as flagship cases for the waste sector in China. Other co-benefits of reduced leakage-induced groundwater pollution, improved food safety due to a reduction in the feeding of unhygienic waste to livestock and the mitigation of PM2.5 air pollution originating from improper waste treatment will also contribute to the overall development of China's food and environmental management.

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